

**REPORT OF
THE THIRTY-SIXTH MEETING OF THE PROGRAM COMMITTEE
OF THE SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**

**Penang, Malaysia
25-27 November 2013**



**THE SECRETARIAT
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**

SEC/RM/117

MARCH 2014

PREPARATION AND DISTRIBUTION OF THIS DOCUMENT

Report of the Thirty-sixth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center was prepared by the Secretariat of the Southeast Asian Fisheries Development Center (SEAFDEC). The Document is distributed to the SEAFDEC Member Countries, SEAFDEC Departments and concerned institutions.

BIBLIOGRAPHIC CITATION

SEAFDEC. 2014. Report of the Thirty-sixth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center. Southeast Asian Fisheries Development Center, Thailand. 345 pp.

NOTICE OF COPYRIGHT

This publication may not be reproduced, in whole or in part, by any method or process, without written permission from the copyright holder. Applications for such permission with a statement of the purpose and extent of the reproduction desired should be made through and addressed to:

SEAFDEC Secretariat
Suraswadi Building,
Kasetsart University Campus,
P.O. Box 1046, Kasetsart Post Office,
Bangkok 10903, Thailand.

All rights reserved

©SEAFDEC 2014

EXUCUTIVE SUMMARY

The Thirty-sixth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center (SEAFDEC) was held in Penang, Malaysia from 25 to 27 November 2013 and hosted by the Marine Fishery Resources Development and Management Department (MFRDMD). The Meeting reviewed the SEAFDEC programs implemented in 2013 and scrutinized the programs to be implemented in 2014, to ensure that these programs have been formulated and implemented in line with the priorities and needs of the Member Countries. The list of SEAFDEC programs of activities for 2013-2014 appears as *Appendix 1*. The Meeting was chaired by the Secretary-General of SEAFDEC in his capacity as the Chairperson of SEAFDEC Program Committee.

The Meeting noted the progress and achievements made by SEAFDEC in the implementation of **Programs under the FCG/ASSP Mechanism** in 2013, which comprise 21 projects categorized under five (5) Program Thrusts and one Special Project. While noting that out of these, 20 projects and the Special Project would be continued in 2013, there are also two new Special Projects proposed for implementation starting from 2014. After the ensuing discussion, the Program Committee endorsed the projects to be implemented in 2014. During the review and scrutiny processes, the Program Committee sought the assistance of SEAFDEC to sustain the implementation of various projects, and provided recommendations to enhance the implementation of projects, which could be summarized as follows:

Program Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security

1. Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds for Resources Enhancement

- i) Considering that some activities under this project are relevant to the region but could not be implemented in 2014, Vietnam requested TD to consider integrating such activities with those under the project on “Establishment and Operation of Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand”.
- ii) Cambodia suggested that SEAFDEC could consider combining several activities with similar goals, which are supported by various donors, *e.g.* Japanese Trust Fund (JTF), Sweden, the Global Environmental Facility (GEF).
- iii) Malaysia offered to collaborate with SEAFDEC particularly on the installation of appropriate models of large artificial reefs and on the assessment of the suitability of different types of sediments for artificial reefs, and suggested SEAFDEC to consider Malaysia as a pilot site for this project.

2. Human Resources Development (HRD) Program on Fisheries Management Approaches for Sustainable Fisheries

- i) Vietnam requested SEAFDEC to consider the management of fishing capacity under the trend of developing offshore fisheries in the region as high priority in formulating activities under this project.
- ii) SEAFDEC was requested to also consider integrating some of its activities with the national programs of the respective countries where resources may already be available.
- iii) Cambodia expressed the appreciation to SEAFDEC for supporting the activities that aim to reduce Illegal, Unreported and Unregulated (IUU) fishing, and promote Monitoring Control and Surveillance (MCS); and suggested that SEAFDEC should collaborate with similar projects funded through other sources that also aim to address IUU fishing.
- iv) SEAFDEC was requested to share the curriculum of training on offshore and high sea fisheries management to interested agencies, and to consider the possibility of expanding the training participants to cover the other countries in the region.
- v) SEAFDEC was requested to make use of the training module on “Ecosystem Approach to Fisheries Management (EAFM)” developed by NOAA in conducting training courses relevant to such topics in collaboration with various agencies.
- vi) Myanmar requested SEAFDEC to consider conducting capacity building on small-scale fisheries in Myanmar to improve the capacity of its local staff.

3. Optimizing Energy Use/Improving Safety Onboard in Fishing Activities

- i) Philippines suggested SEAFDEC to consider conducting activities on safety onboard fishing vessels for the Member Countries in 2014 with support from the Japanese Trust Fund, as well as on the impacts of climate change on small-scale fisheries.
- ii) SEAFDEC was requested to incorporate recommendations from the United Nations Framework Convention on Climate Change (UNFCCC) in its activity on reduction of energy use in fishing vessels, and tap on advanced technologies on fishing gear systems of developed countries that aim to reduce fuel consumption.
- iii) Japan was requested to consider supporting the participation of the Member Countries' experts on small-scale fisheries to the "Resumed Session on International Guideline on Securing Sustainable Small-scale Fisheries" to be organized by FAO in February 2014.
- iv) SEAFDEC under FAO support in conducting energy audits onboard fishing vessels was requested to enhance the implementation of this project to prove that small-scale fishing vessels operating in the region create low carbon emission, and to provide scientific justification that could be used for negotiating and safeguarding the small-scale fisheries sector in the future.

4. Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release

- i) NOAA expressed the willingness to be involved in the activity on adaptive measures for coral reef replenishment of the ASEAN Member States based on its experiences on ocean acidification, and looked forward to collaborating with SEAFDEC in the implementation of relevant activities.

5. Promotion of Sustainable and Region-oriented Aquaculture

- i) Malaysia expressed the willingness to collaborate with AQD in its future research on sea cucumber.

Program Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade

6. Chemical and Drug Residues in Fish and Fish Products in Southeast Asia "Biotxin Monitoring in ASEAN": ASP, AZA, and BTX

- i) Thailand requested SEAFDEC through MFRD to consider seeking appropriate proficiency testing providers for countries in the region, and transferring the knowledge and technology on the preparation of Reference Materials (RMs) to the countries. It was, however, clarified that this is beyond the capacity of MFRD as well as the scope of this project.

7. Traceability Systems for Aquaculture Products in the ASEAN Region

- i) Malaysia offered to host the End-of-Project Seminar on implementation of traceability system for aquaculture products in Johor Bahru, Malaysia.

8. Utilization of Freshwater Fish for Value-added Products

- i) Singapore was requested to consider continuing its support to the countries in the region on the development of value-added fishery products.

9. Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia

- i) Malaysia confirmed the country's interest in conducting surveillance and training on fish-borne zoonotic parasites, and assured AQD that the country's response to its query on this matter would be sent in due course.

10. Food Safety of Aquaculture Products in Southeast Asia

- i) AQD was requested to continue coordinating with Malaysia on the development of the Guidelines on the Use of Antibiotics and Chemicals in Aquaculture, in order to ensure that the Guidelines to be published by AQD and Malaysia are harmonized.
- ii) AQD was requested to undertake activities that address emerging issue on shrimp diseases, particularly the Early Mortality Syndrome (EMS), and compile research advances on the EMS in

white shrimp. While Japan expressed the willingness to support AQD in its research on EMS in white shrimp through the JTF, Vietnam also offered to share its research results on EMS in white shrimp with SEAFDEC and the other Member Countries.

Program Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries

11. Strategies for Trawl Fisheries By-catch Management (REBYC-II CTI)

- i) Vietnam suggested that the engagement of private sector in the implementation of this project should be encouraged and their support should be sought as appropriate.
- ii) SEAFDEC was requested to consider facilitating the organization of a forum among relevant agencies and ensuring that the results of the project should also emphasize on the sustainable supply of raw materials for the fishmeal industry.
- iii) Vietnam was encouraged to organize a round table meeting to facilitate discussion among government sector and various stakeholders to raise awareness on the importance of their involvement in activities that focus on responsible trawls fisheries.
- iv) NOAA expressed the willingness to be involved in some activities of this project, especially on the training workshop on ecosystem approach to fisheries making use of its training module to enhance the capacity of the countries in the region.

12. Promotion of Countermeasures to Reduce IUU Fishing Activities

- i) Vietnam requested SEAFDEC to support its capacity building activities especially on port inspection to support the implementation of its new Decree No. 80 on Port Management with Regulation on Entry to Fishing Port by Foreign Vessels.
- ii) Cambodia suggested that TD could collaborate with other SEAFDEC Departments in conducting relevant activities. Member Countries were also suggested to involve their respective agencies relevant to Port State Measures, *e.g.* port authorities, marine departments, and customs in the implementation of IUU fishing countermeasures.
- iii) Japan encouraged that while SEAFDEC could promote regional initiatives supporting IUU fishing countermeasures, the Member Countries should also consider developing their respective national measures to combat IUU fishing.
- iv) Thailand offered to share the results of its pilot project on Port State Measures in Phuket, Thailand with the other Member Countries through the relevant SEAFDEC training courses.
- v) Myanmar expressed its willingness to participate in this project, and to share its experience on the installation of Vessel Monitoring System (VMS) in large fishing vessels which had been practiced in Myanmar.

13. Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for Trading of Fish and Fishery Products.

- i) Japan suggested that SEAFDEC should consider the development of a catch documentation system with clear focus, taking into account the measures developed by several RFMOs for commercial tuna fisheries.
- ii) Cambodia suggested that this project could be coordinated with other projects as well as initiatives of other organizations such as the RPOA-IUU.

Program Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries

14. Fisheries Resource Survey and Operation Plan for M.V. SEAFDEC 2

- i) On the proposal of Vietnam for additional survey in its waters in 2014, Vietnam will confirm the appropriate survey schedule by January 2014.
- ii) Brunei Darussalam requested SEAFDEC for the use of the M.V. SEAFDEC 2 for its resources survey in two periods, *i.e.* in April-May and September-October 2014.
- iii) Indonesia also requested to make use of the vessel in 2014 and would communicate with SEAFDEC to confirm its plans.

15. **Offshore Fisheries Resources Exploration in Southeast Asia**
 - i) Vietnam suggested that SEAFDEC facilitate the compilation and sharing of lessons learnt from Member Countries on fish handling at sea, *e.g.* hand-line tuna practices, to other countries.
 - ii) To respond to the request of Vietnam, a regional training course on tuna handling similar to the one to be organized in Philippines in December 2013 could also be conducted in Vietnam in the future.
 - iii) MFRDMD suggested that a training workshop could be organized to analyze the data which have been collected in the past through hydro-acoustic applications.
16. **Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters**
 - i) SEAFDEC was requested to take into consideration the issue on recent poaching of sea turtles in the Southeast Asian waters as this undermines the region's initiatives in sea turtles conservation and management.
17. **Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region**
 - i) Vietnam expressed its willingness to be involved in the pilot activity on national data collection on sharks, and would communicate with TD to convey the request.
 - ii) Vietnam also requested TD to continue providing assistance on community-based fisheries management to the country, and also to support the development of fisheries database by making use of its software that was already developed.
18. **Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region**
 - i) Malaysia expressed support to the project, which could address the concerns on the application of Total Allowable Catch (TAC) system in stock assessment and resource management.
19. **Research and Management of Sharks and Rays in the Southeast Asian Waters**
 - i) It was noted that this project aims to provide technical materials on identification of sharks and rays to the Member Countries.

Program Thrust V: Addressing International Fisheries-related Issues from a Regional Perspective

20. **Assistance for Capacity Building in the region to Address International Trade-related Issues**
 - i) Sweden offered to also pave the way for the successful implementation of this project, of which the mode of collaboration could be focused on the implementation of activities to follow-up recommendations developed under this project including the conduct of capacity building activities to enable the Member Countries to address international-related issues.
21. **Strengthening SEAFDEC Network for Sustainable Fisheries**
 - i) On the proposal that SEAFDEC will organize the review and evaluation meeting on 25-26 February 2014 to ensure that the JTF projects would be beneficial to the Member Countries, external fisheries experts from the region and the SEAFDEC National Coordinators for the Member Countries would be invited to sit as evaluators.
 - ii) Japan and Sweden were commended for their continued support to the Regional Fisheries Policy and Network (RFPN), and were asked to continue providing the necessary assistance for the sustained implementation of this important activity.

For the Special Project on **“Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia”** under FCG/ASSP Mechanism, the Meeting provided recommendations as follows:

- i) NOAA expressed the willingness to share the publication on “Climate Change Adaptation for Coral Triangle Communities: Guide for Vulnerable Assessment and Local Early Action Planning (LEAP Guide)” to serve as a reference for the implementation of climate change related activities in the region.
- ii) The offer of the MRC Fisheries Programme (FP) to share its series of relevant publications which are available through the MRC website was welcome as this would be useful for the relevant activities of SEAFDEC.

- iii) Cambodia suggested that local initiatives and local NGOs should be involved in the implementation of this project in order to harmonize local perspectives in eco-conservation with those of the fisheries activities.
- iv) Philippines requested SEAFDEC to include the need to improve the performance indicators on the impact of climate change as an activity under this project.
- v) NOAA suggested that the on-going project on development of multi-model ensembles based on the analysis of the Intergovernmental Panel on Climate Change for predicting weather conditions in the region could be referred to during the implementation of project.
- vi) MRC offered that relevant surveys and research studies of MRC could be useful for this project, especially on the understanding of value of inland fisheries and their implications to social well-being.
- vii) Activities relevant to inland fisheries under this project should be referred to during the planning of the proposed activities of IFRDMD.
- viii) Myanmar requested SEAFDEC to consider extending its support to the implementation of this project in Myanmar to cover the country's adjacent waters especially in the Myeik Archipelago.

For two new Special Projects proposed under the FCG/ASSP Mechanism starting from 2014, the Program Committee provided comments and suggestions to enhance the implementation of such projects as follows:

- 1. Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (UNEP/GEF/SEAFDEC)**
 - i) Brunei Darussalam expressed the willingness to share the lessons learned from its implementation of Marine Protected Areas (MPAs) to the other countries in the region.
 - ii) Malaysia expressed its intention to support and be actively involved in this project.
- 2. Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (ASEAN/IDB/SEAFDEC)**
 - i) The ASEAN Secretariat was requested to consider expediting the process of formalizing this project.

Moreover, the Program Committee also endorsed the **Departmental Programs** proposed for 2014 which comprise eight continuing programs from 2013, five of which would be implemented by AQD, namely: 1) Adapting to Climate Change Impacts; 2) Healthy and Wholesome Aquaculture; 3) Maintaining Environmental Integrity through Responsible Aquaculture; 4) Meeting Socio-economic Challenges in Aquaculture; and 5) Quality Seed for Sustainable Aquaculture; and three by TD, namely: 1) Promotion on Strengthening SEAFDEC Visibility and Image; 2) Tailor-made Training Program; and 3) Improvement of Fisheries Technology and Reduction of Impacts from Fishing.

- 1. Aquaculture Department**
 - i) Thailand requested AQD to take into consideration in its activities, the emerging issues in aquaculture such as EMS in white shrimps and genetic improvement program of economically-important species in the Southeast Asian region.
 - ii) AQD agreed to the suggestion that assessment of carbon emission from aquaculture should be included in the planning of its future activities.
 - iii) The ASEAN Secretariat expressed the willingness to work closely with SEAFDEC through the ASEAN Working Group, especially in identifying the priority areas of the region's fisheries sector.
 - iv) Cambodia suggested that SEAFDEC should be allowed to fully attend ASWGFi fora together with all ASEAN Member States, to enable SEAFDEC to work closely with the ASEAN and its Member States in the future.
 - v) Myanmar requested AQD to consider sharing information on aquaculture advances and provide technical assistance to the country to support its rural aquaculture development activities.
- 2. Training Department**
 - i) NATC suggested that SEAFDEC consider undertaking activities in collaboration with the private sector in order to come up with applicable and practical procedures and systems in

fisheries as well as to pool relevant information, *e.g.* fisheries technologies and practices, training courses, etc., under SEAFDEC's inventory/directory.

- ii) Philippines requested SEAFDEC to consider activities on improving post-harvest handling onboard fishing vessels as high priority, and encouraged SEAFDEC Departments concerned to verify and validate the relevant activities in order to address the high incidence of post-harvest losses in capture fisheries as well as in aquaculture.

Finally, the Program Committee considered and endorsed the two projects under **Other Programs**, implemented in 2013 and proposed for 2014.

1. **Coastal Area Capability Enhancements in Southeast Asia** (SEAFDEC-RIHN Collaborative Project)
 - i) The Program Committee noted that lessons learnt from this project would be shared by SEAFDEC with the other SEAFDEC Member Countries.
2. **Conservation and Management of Eel Resources in Southeast Asia** (New Project - Fisheries Agency of Japan (FAJ))
 - i) In response to the suggestion that this project should be carried out by the new IFRDMD, Indonesia informed that this suggestion would be conveyed to IFRDMD to develop necessary proposal based on the detailed outline as prepared by Japan.
 - ii) Vietnam suggested that information on the distribution of eel species in the region should be compiled prior to the conduct of further activities.
 - iii) Considering that SEAFDEC will convene an expert consultation on eel species, SEAFDEC suggested that collection of information on biological data, catch and aquaculture could be carried out; and the expert consultation would further analyze the compiled information, the result of which would be used for the development of the plan activities. It was also suggested that expert on eel species from Japan should be invited to serve as resource person to provide information on the culture of eels.
 - iv) Myanmar requested AQD to consider implementing activities on seed production of eel species in hatcheries, and suggested SEAFDEC to also invite representatives from the private sector to participate in the aforesaid expert consultation on eel species.

In another development, the Program Committee took note of the recommendations of the Special Meeting of the SEAFDEC Council for SEAFDEC to set priorities for the fisheries issues, and suggested that a special consultation among the SEAFDEC National Coordinators should be conducted to discuss this matter before the next meeting of the SEAFDEC Council. The Program Committee also agreed to consider the proposal of the Fisheries Agency of Japan on the way forward for improving the work efficiency of SEAFDEC, which would be discussed more thoroughly during the proposed special consultation among SEAFDEC National Coordinators. Furthermore, while noting the status of the Japanese Trust Fund for 2014 and onwards to support the sustainable development of fisheries in the region, the Program Committee agreed that the proposed monitoring and reporting of SEAFDEC program thrusts would also be discussed during the proposed special consultation among the SEAFDEC National Coordinators.

The Program Committee expressed support to the "Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC", while Vietnam and Cambodia informed that internal discussion would be conducted with their respective concerned agencies on this matter.

Subsequently, the Program Committee took note of the strengthened cooperation with non-member governments and international/regional organizations, *i.e.* the ASEAN-U.S. Maximizing Agriculture through Knowledge, Enterprise Development and Trade (MARKET), the ASEAN Secretariat, the Embassy of Sweden in Bangkok, the Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific (FAO/RAP), the Mekong River Commission (MRC) Fisheries Programme, the National Agriculture Training Council (NATC) of the Ministry of Agriculture and Industry Malaysia, the U.S. National Oceanic and Atmospheric Administration (NOAA), and the Swedish Agency for Marine and Water Management (SwAM).

After the deliberations, the Program Committee adopted the Report of the 36th Meeting of the SEAFDEC Program Committee for submission to the 46th Meeting of SEAFDEC Council and to the ASEAN through the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) for consideration.

SEAFDEC PROGRAMS OF ACTIVITIES FOR THE YEAR 2013-2014

I. Programs of Activities under FCG/ASSP Mechanism

Existing Projects

Program Thrust/Project Title	Lead Dept.	2013	2014
Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security			
1. Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds for Resources Enhancement	TD	Y	Y
2. Human Resources Development (HRD) Programs on Fisheries Management Approaches for Sustainable Fisheries	TD	Y	Y
3. Optimizing Energy Use/Improving Safety Onboard in Fishing Activities	TD	Y	Y
4. Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD	Y	Y
5. Promotion of Sustainable and Region-oriented Aquaculture	AQD	Y	Y
Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade			
6. Chemical and Drug Residues in Fish and Fish Products in Southeast Asia "Biotoxin Monitoring in ASEAN": ASP, AZA and BTX	MFRD	Y	Y
7. Traceability Systems for Aquaculture Products in the ASEAN Region	MFRD	Y	Y
8. Utilization of Freshwater Fish for Value-added Products	MFRD	Y	N
9. Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD	Y	Y
10. Food Safety of Aquaculture Products in Southeast Asia	AQD	Y	Y
Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries			
11. Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)	TD	Y	Y
12. Promotion of Countermeasures to Reduce IUU Fishing Activities	TD	Y	Y
13. Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for Trading of Fish and Fishery Products	MFRDMD	Y	Y
Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries			
14. Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2	TD	Y	Y
15. Offshore Fisheries Resources Exploration in Southeast Asia	TD	Y	Y
16. Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters	MFRDMD	Y	Y
17. Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region	TD	Y	Y
18. Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region	MFRDMD	Y	Y
19. Research and Management of Sharks and Rays in the Southeast Asian Waters	MFRDMD	Y	Y
Thrust V: Addressing International Fisheries-related Issues from a Regional Perspective			
20. Assistance for Capacity Building in the Region to Address International Fisheries-related Issues	SEC	Y	Y
21. Strengthening SEAFDEC Network for Sustainable Fisheries	SEC	Y	Y

Special Project

Project Title	Lead Dept.	Period
1. Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia	SEC	2013-2017

Proposed New Special Projects

Project Title	Lead Dept.	Period
1. Establishment and Operation of a Regional System of Fisheries <i>Refugia</i> in the South China Sea and Gulf of Thailand (UNEP/GEF/SEAFDEC/SCS)	TD	2014-2017
2. Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (ASEC/IDB/SEAFDEC)	MFRDMD	2014-2015

II. Departmental Programs

Project Title	Department	2013	2014
1. Adapting to Climate Change Impacts	AQD	Y	Y
2. Healthy and Wholesome Aquaculture	AQD	Y	Y
3. Maintaining Environmental Integrity through Responsible Aquaculture	AQD	Y	Y
4. Meeting Socio-economic Challenges in Aquaculture	AQD	Y	Y
5. Quality Seed for Sustainable Aquaculture	AQD	Y	Y
6. Promotion on Strengthening of SEAFDEC Visibility and Image	TD	Y	Y
7. Tailor-made Training Programs	TD	Y	Y
8. Improvement of Fisheries Technology and Reduction of the Impact from Fishing	TD	Y	Y

III. Other Programs

Project Title	Department	2013	2014
1. Coastal Area Capability Enhancements in Southeast Asia (SEAFDEC-RIHN Collaborative Project)	TD	Y	Y
2. Conservation and Management of Eel Resources in Southeast Asia (FAJ)	To be decided	N	Y

Y = Program implemented during the year

N = Program not implemented/proposed during the year

CONTENTS

	Paragraph No.
I. INTRODUCTION	1-2
II. OPENING OF THE MEETING	3
III. ADOPTION OF THE AGENDA AND ARRANGEMENTS OF THE MEETING	4
IV. REVIEW OF SEAFDEC PROGRAM IMPLEMENTATION FOR THE YEAR 2013 AND PROPOSED PROGRAMS FOR THE YEAR 2014	5
4.1 Programs under the FCG/ASSP Mechanism	6-74
4.2 Departmental Programs	75-86
4.3 Other Programs	87-94
V. PIPELINE PROJECTS AND EMERGING NEEDS FOR PREPARATION OF FUTURE PROJECT PROPOSALS	95
VI. IDENTIFICATION OF REGIONAL PRIORITIES FOR FUTURE PROGRAM FORMULATION	
6.1 Country Inputs on Regional Priorities for Future Program Formulation	96-100
6.2 Suggested Way Forward for Improving SEAFDEC's Work Efficiency	101-104
VII. OTHER MATTERS	
7.1 Introduction of 2014 JTF Projects and New JTF-VI Projects for 2015	105
7.2 Monitoring and Reporting of SEAFDEC Program Thrusts	106-107
7.3 Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC	108-109
7.4 Collaborative Program Framework for the Oceanic Tuna Resources in the Sulu-Sulawesi Seas Sub-region	110
VIII. COOPERATION WITH NON-MEMBER GOVERNMENTS AND INTERNATIONAL/REGIONAL ORGANIZATIONS	111-119
IX. RECOMMENDATIONS OF THE THIRTY-SIXTH MEETING OF THE PROGRAM COMMITTEE	
9.1 Adoption of Report of the Meeting	120
9.2 Date and Venue of the Thirty-seventh Meeting of the Program Committee	121
X. CLOSING OF THE MEETING	122

ANNEXES

Annex		Page
1.	List of Participants	19
2.	Opening Remarks by <i>Dr. Chumnarn Pongsri</i> , SEAFDEC Secretary-General	31
3.	Agenda	33
4.	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism for the Year 2013-2014	37
5.	SEAFDEC Departmental Programs of Activities for the Year 2013-2014	221
6.	Project Document (Other Programs): Coastal Area Capability Enhancements in Southeast Asia (SEAFDEC-RIHN Collaborative Project)	281
7.	Project Concept for Conservation and Management of Eel Resources in Southeast Asia	289
8.	Identified Issues Based on the Third SEAFDEC Review Recommendations and Regional Priority Inputs from ASEAN Member States	291
9.	Suggested Way Forward for Improving SEAFDEC's Work Efficiency	297
10.	Introduction of 2014 JTF Projects and New JTF-VI Projects for 2015	303
11.	Progress Report Template for the ASEAN-SEAFDEC Collaborative Programs (Starting 2014)	307
12.	Concept Proposal: Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC	315
13.	Collaborative Program Framework for the Oceanic Tuna Resources in the Sulu-Sulawesi Seas Sub-region	317
14.	Statement by <i>Mr. Timothy P. Moore</i> , ASEAN-U.S. Maximizing Agriculture through Knowledge, Enterprise Development and Trade (MARKET)	331
15.	Statement by <i>Dr. Pham Quang Minh</i> , ASEAN Secretariat	333
16.	Statement by <i>Mr. Göran Haag</i> , Sweden through the Embassy of Sweden in Bangkok, Thailand	335
17.	Statement by <i>Mr. Robert Lee</i> , Food and Agriculture Organization of the United Nations, Regional Office for Asia and the Pacific (FAO/RAP)	337
18.	Statement by <i>Mr. Ngor Peng Bun</i> , Mekong River Commission (MRC) Fisheries Programme	339
19.	Statement by <i>Dr. Rusty Brainard</i> , U.S. National Oceanic & Atmospheric Administration (NOAA)	341
20.	Closing Remarks by <i>Dr. Chumnarn Pongsri</i> , SEAFDEC Secretary-General	345

LIST OF ACRONYMS

AEG-CITES	ASEAN Experts Group on the Convention on International Trade in Endangered Species of Wild Fauna and Flora
AMAF	ASEAN Ministers on Agriculture and Forestry
APFIC	Asia Pacific Fisheries Commission
AQD	SEAFDEC Aquaculture Department
ASEAN	Association of Southeast Asian Nations
ASSP	ASEAN-SEAFDEC Strategic Partnership
ASWGFi	ASEAN Sectoral Working Group on Fisheries
BOBLME	Bay of Bengal Large Marine Ecosystem
CCRF	Code of Conduct for Responsible Fisheries
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COFI	Committee on Fisheries
CTI-CFF	Coral Triangle Initiative – Coral Reefs, Fisheries and Food Security
DOF	Department of Fisheries
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FCG	ASEAN-SEAFDEC Fisheries Consultative Group
GEF	Global Environmental Facility
IDB	Islamic Development Bank
IFRDMD	SEAFDEC Inland Fishery Resources Development and Management Department
IUU Fishing	Illegal, Unreported and Unregulated Fishing
JTF	Japanese Trust Fund
LRFFT	Live Reef Food Fish Trade
MARKET	ASEAN-U.S. Maximizing Agriculture through Knowledge, Enterprise Development and Trade
MCS	Monitoring Control and Surveillance
MFF	Mangrove for the Future
MFRD	SEAFDEC Marine Fisheries Research Department
MFRDMD	SEAFDEC Marine Fishery Resources Development and Management Department
MPAs	Marine Protected Areas
MRC	Mekong River Commission
NACA	Network of Aquaculture Centres in Asia-Pacific
NATC	National Agriculture Training Council
NOAA	U.S. National Oceanic & Atmospheric Administration
PCM	SEAFDEC Program Committee Meeting
RCCRF	Regionalization of the Code of Conduct for Responsible Fisheries in Southeast Asia
RFPN	Regional Fisheries Policy Network
RTC	Regional Technical Consultation
SEAFDEC	Southeast Asian Fisheries Development Center
Sida	Swedish International Development Cooperation Agency
SOM-AMAF	Senior Officials Meeting of the ASEAN Ministers on Agriculture and Forestry

SwAM	Swedish Agency for Marine and Water Management
TAC	Total Allowable Catch
TD	SEAFDEC Training Department
UNEP	United Nations Environmental Programme
USAID	U.S. Agency for International Development
VMS	Vessel Monitoring System

**REPORT OF THE THIRTY-SIXTH MEETING OF THE PROGRAM COMMITTEE
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**

**Penang, Malaysia
25-27 November 2013**

I. INTRODUCTION

1. The Thirty-sixth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center (SEAFDEC) was held in Penang, Malaysia from 25 to 27 November 2013 and hosted by the Marine Fishery Resources Development and Management Department (MFRDMD).

2. The Program Committee Meeting was attended by the SEAFDEC Program Committee Members for Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam together with their respective delegations as well as representatives from collaborating partners namely: ASEAN-U.S. Maximizing Agriculture through Knowledge, Enterprise Development and Trade (MARKET) Project; ASEAN Secretariat; the Embassy of Sweden in Bangkok, Thailand; Mekong River Commission (MRC) Secretariat; National Agriculture Training Council (NATC) of the Ministry of Agriculture and Industry Malaysia; U.S. National Oceanic and Atmospheric Administration (NOAA); and the Swedish Agency for Marine and Water Management (SwAM). The SEAFDEC Secretary-General, Deputy Secretary-General and Department Chiefs as *ex-officio* members of the SEAFDEC Program Committee together with officers from the Secretariat and the Departments also attended the Meeting. The list of participants, observers, and SEAFDEC officers, appears as **Annex 1**.

II. OPENING OF THE MEETING

3. The Secretary-General of SEAFDEC *Dr. Chumnarn Pongsri*, in his capacity as Chairperson of the Program Committee, welcomed the participants and observers to the Meeting. After expressing the condolences of SEAFDEC to the Philippines especially to those who have been affected by Super Typhoon Haiyan on 8 November, he continued by informing the Program Committee Members that the review of the implementation of SEAFDEC programs would start with the Programs under the FCG/ASSP Mechanism followed by Departmental Programs and other programs, and pipeline programs. He also pointed out that the Programs under the FCG/ASSP Mechanism have been grouped accordingly under the Program Thrusts of the SEAFDEC Program Framework followed by special project and the new proposed projects. He asked the Program Committee members to closely scrutinize the proposed programs of activity to ensure that these are suitable for the requirements of the region and also requested the representatives from collaborating partners to provide insights into the SEAFDEC programs. He then declared the Program Committee Meeting open. His Opening Remarks appears as **Annex 2**.

III. ADOPTION OF THE AGENDA AND ARRANGEMENTS OF THE MEETING

4. The Agenda which appears as **Annex 3** was adopted.

**IV. REVIEW OF SEAFDEC PROGRAM IMPLEMENTATION FOR THE YEAR 2013 AND
PROPOSED PROGRAMS FOR THE YEAR 2014**

5. The Program Committee took note of the twenty-one projects under the FCG/ASSP Mechanism which have been categorized based on the SEAFDEC Program Thrusts endorsed by the SEAFDEC Council during its 41st Meeting in 2009, and also of one Special Project and two new special projects. The progress and achievements of the projects in 2013 and the programs of activity for 2014, were reported by the SEAFDEC Secretariat and Departments. The results of the review process as well as the recommendations of the Program Committee will be submitted for endorsement to the higher authorities of the ASEAN and SEAFDEC.



4.1 Programs under the FCG/ASSP Mechanism

6. The Program Committee noted the progress and achievements made by the SEAFDEC Secretariat and the Departments in the implementation of the various projects in 2013, as well as the projects proposed for 2014 (**Annex 4**). During the discussion, the Program Committee provided recommendations in order to improve the projects and activities as follows:

4.1.1 Progress of Implementation of Programs under the FCG/ASSP Mechanism in 2013

Program Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security

(1) **Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement**

7. The Program Committee Member for Vietnam raised certain concerns on the status of implementation of the aforesaid project and suggested that activities under the project which are relevant to the region but would not be implemented in 2014, could be integrated with the project on “**Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand**” supported by the Global Environmental Facility (GEF). In this regard, the Program Committee was informed that SEAFDEC/TD in collaboration with the SEAFDEC Secretariat has planned to incorporate some activities under the GEF-supported project with the abovementioned Rehabilitation Project as part of a long-term plan after the GEF-supported project is completed in the next four years.

8. While supporting the suggestion of the Program Committee Member for Vietnam, the Committee Member for Cambodia suggested that in order to maximize benefits from available resources, SEAFDEC could consider combining several activities supported by various donors having similar goals, *e.g.* projects funded by GEF, Sweden and the Japanese Trust Fund (JTF).

9. The Program Committee Member for Malaysia informed the Meeting that Malaysia has the expertise in rehabilitation activities including the development of resource enhancement models and offered to collaborate with SEAFDEC in this project, particularly on installation of appropriate models of large artificial reefs and on the assessment of the suitability of different types of sediments for artificial reefs, and also suggested to consider Malaysia as a pilot site for this project. In this regard, the Program Committee was assured that SEAFDEC would consider the experts available within the region, especially in its capacity building activities.

(2) **Human Resource Development for Sustainable Fisheries**

10. The Program Committee Member for Vietnam expressed the appreciation to SEAFDEC for supporting the conduct of National Training Course on High Sea and Offshore Fisheries for the staff of new Surveillance Department of Vietnam, since the practical approach and well-designed curriculum of the training had provided useful information and knowledge for local staff. She also suggested that fishing capacity management under the trend of developing offshore fisheries in the region should be given high priority in formulating activities on human resources development for sustainable fisheries. She expressed the view that besides cost-sharing arrangements in organizing national/local activities by SEAFDEC, SEAFDEC should also consider integrating some activities with the national programs of respective countries, where resources may already be available.

11. The Program Committee Member for Cambodia expressed his appreciation to SEAFDEC for its continued support in the implementation of activities especially those that aim to reduce Illegal, Unreported and Unregulated (IUU) fishing and also concerning Monitoring Control and Surveillance (MCS). In this regard, he suggested that this project should collaborate with projects funded through other sources that also address IUU fishing.

12. In response to the query of the representative from the National Agricultural Training Council (NATC) Malaysia on whether the offshore fisheries training course curriculum promotes compliance with the International Convention on High Seas Fisheries, it was emphasized that although such training course was focused on assisting Vietnam in the establishment of its new surveillance department, a compilation of relevant international conventions was also included in the curriculum. In this regard, SEAFDEC/TD offered to share the curriculum to interested agencies. In addition, the representative from NATC suggested that the training course could be expanded to cover other countries in the region.

13. The Program Committee supported the offer of the representative from NOAA for SEAFDEC to make use of the training module on Ecosystem Approach to Fisheries Management (EAFM) developed by NOAA in collaboration with BOBLME in the conduct of relevant training courses by SEAFDEC. In this connection, the Program Committee Member for Malaysia suggested that the training course could be organized on cost-sharing arrangements.

14. The Program Committee Member for Myanmar expressed the appreciation to SEAFDEC for its continued support through this project and requested SEAFDEC to consider conducting capacity building on small-scale fisheries in Myanmar since this is very crucial for the country especially in improving the capacity of local staff.

(3) Optimizing Energy Use/Improving Safety Onboard in Fishing Activities

15. The Program Committee Member for the Philippines expressed the view that the activity on safety onboard fishing vessels is very important for small-scale fisheries and suggested that the activity could be conducted in several countries in 2014. In response to the request for JTF to provide additional budget for the conduct of activities in other countries, the Program Committee Member for Japan shared the view that safety onboard is a crucial issue, and expressed his willingness to continue supporting SEAFDEC projects on this issue through JTF.

16. The representative from NATC suggested that this project could incorporate the United Nations Framework Convention on Climate Change (UNFCCC) recommendations and Agenda 21, on reduction of energy use that has been studied by several countries. He also expressed the view that developed countries should be tapped to provide advanced technologies on fishing gear systems that aim to reduce fuel consumption.

17. With regards to reducing disaster risks for small-scale fisheries, the representative from SEAFDEC Secretariat informed the Meeting that certain issues had been discussed during FAO Technical Consultation on *International Guidelines on Securing Sustainable Small-scale Fisheries* held in May 2013. In this regard, the Member Countries were encouraged to participate in the resumed session to be organized in February 2014.

18. In this connection, the Program Committee Member for Cambodia requested Japan to consider supporting the participation of the Member Countries' experts on small-scale fisheries to join the said FAO session in order that the region's interest could be safeguarded. Moreover, since there is an ongoing online consultation forum on this issue, SEAFDEC will send the necessary information to the Member Countries to seek their views that would be reflected at the FAO Session.

19. The Program Committee Member for the Philippines expressed the view that although optimizing energy use onboard fishing vessels is crucial, it is also necessary to consider the impact of climate change on small-scale fisheries. In this connection, the Meeting was informed that SEAFDEC under FAO support is conducting energy audits onboard fishing vessels with a pilot project in Thailand, and the activities could be requested to provide support to enhance this JTF-funded project to prove that the several numbers of small-scale fishing vessels operating in the region creates low carbon emission. This could provide scientific justification to be used for negotiating and safeguarding the small-scale fisheries sector in the future.

(4) Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release

20. With regards to the activity on adaptive measures for coral reef replenishment, the representative from NOAA informed the Meeting that NOAA has worked on ocean acidification, and expressed the willingness to be involved in the activities of the ASEAN Member States, and looked forward to collaborating with SEAFDEC on the relevant activities.

(5) Promotion of Sustainable and Region-oriented Aquaculture

21. While congratulating AQD for its success in sea cucumber research, the Program Committee Member for Malaysia informed the Meeting of the country's willingness to collaborate with AQD on this research activity in the future.

Program Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade

(6) Chemical and Drug Residues in Fish and Fish Products in Southeast Asia "Biotxin Monitoring in ASEAN": ASP, AZA and BTX

22. The Program Committee Member for Thailand expressed the concern of several countries in the region on the high cost for proficiency testing and for the preparation of Reference Materials (RMs) to be used for testing. She therefore requested SEAFDEC through MFRD, to consider seeking appropriate proficiency testing providers for the countries in the region, and transferring the knowledge and technologies on preparation of RMs to the countries. In response, the Program Committee was informed that provision of proficiency testing and preparation of RMs is beyond the capacity of MFRD as well as the project scope. Moreover, he mentioned that those organizations that offer proficiency testing have to be very specialized, and preparation of RMs have to be carried out by specialized laboratories.

(7) Traceability Systems for Aquaculture Products in the ASEAN Region

23. While this project, which focused primarily on providing platform for sharing of experiences among countries, and enhancing regional capacity in the implementation of traceability systems for aquaculture products, will end in 2014, MFRD has planned to organize the End-of-Project Seminar during the 3rd quarter of 2014. In this connection, the Program Committee Member for Malaysia offered to host the Seminar in Johor Bahru to maximize the participation of representatives from the Member Countries in the Seminar.

24. While emphasizing on the importance of traceability system for aquaculture products intended for export to other countries, *e.g.* to the European Union (EU), the representative from Sweden requested the countries to share information on the extent of works on traceability that the respective countries have been undertaking. In this connection, the Meeting was informed that several countries in the region has already developed and undertaken national traceability and certification schemes, *e.g.* for *Pangasius* culture in Vietnam, shrimp culture in Thailand, national residue programs of Indonesia, and traceability system in Malaysia. Although there are many schemes developed by exporting countries in the region, the SEAFDEC Secretariat pointed out that the 45th Meeting of the SEAFDEC Council supported the development of the regional catch documentation system in order to facilitate international and intra-regional trade.

(8) Utilization of Freshwater Fish for Value-added Products

25. The Program Committee noted that this project which is supported by the Government of Singapore would be completed in 2013, and that MFRD is now in the process of publishing the handbook on the processing of the value-added products developed by each participating country using freshwater fish species which would be published by December 2013 and distributed to Member Countries. Considering that the development of value-added fishery products is important for countries in the region, the SEAFDEC Secretary-General sought the possibility of Singapore continuing its support to this kind of

activities. In response, the Meeting was informed that this suggestion has been duly noted, and Singapore will consider supporting future project activities through the MFRD Programs.

(9) Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia

26. The Meeting took note of the objective of this project which is to enhance awareness and capacity of Member Countries on fish health management, particularly through the conduct of R&D and training on immunization protocol, vaccine development and application; and zoonotic parasites particularly for freshwater fish species in the region.

27. As for the request made by Malaysia during the 35th Meeting of the SEAFDEC Program Committee for AQD to consider conducting surveillance and training on fish-borne zoonotic parasites preferably in 2013, the Program Committee was informed that AQD has not yet received any response from Malaysia after it had followed-up on this matter. In this regard, the Program Committee Member for Malaysia confirmed his country's interest in this activity, and assured AQD that response to its inquiry would be made in due course.

(10) Food Safety of Aquaculture Products in Southeast Asia

28. While noting that one of the important expected outputs from this project is the Guidelines on the Use of Antibiotics (focusing on Oxolinic Acid and Oxytetracycline) and Chemicals in Aquaculture, including withdrawal period of antibiotics, the Program Committee Member for Singapore inquired whether the Guidelines developed by AQD is similar to those developed by Malaysia under the ASEAN Framework. In response, it was clarified that since AQD has been undertaking activities related to the safe use of antibiotics in aquaculture for the past five years, AQD provided technical inputs to the development of the Guidelines led by Malaysia. It was therefore suggested that AQD continue coordinating with Malaysia to ensure that the Guidelines to be published by AQD and Malaysia are harmonized.

29. In response to the request for AQD to undertake activities that address emerging issues on shrimp diseases, particularly the Early Mortality Syndrome (EMS), the Program Committee was informed that AQD has ongoing projects on the EMS in white shrimp (*Penaeus vannamei*). In this connection, the Committee Member for Japan expressed the willingness to support AQD in its research on EMS in white shrimp through the Japanese Trust Fund.

30. Moreover, AQD was requested to compile research advances on the EMS in white shrimp since this has created large extent of impacts to the aquaculture industry of the region. In this regard, the Program Committee Member for Vietnam informed the Meeting that since Vietnam has undertaken research on EMS in white shrimp, she expressed the willingness to share the research results with SEAFDEC and the other Member Countries.

Program Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries

(11) Strategies for Trawl Fisheries By-catch Management (REBYC-II CTI)

31. With regards to this project, the Program Committee Member for Vietnam suggested that the engagement of private sector in the implementation of the project should be encouraged and that their support to the project activities could be sought as appropriate. It was therefore suggested that SEAFDEC could consider facilitating the organization of a forum among relevant agencies and ensuring that the results of the project should also emphasize on the sustainable supply of raw materials for the fishmeal industry.

32. Moreover, the Meeting noted that the Department of Fisheries of Thailand has hosted the round table meeting to facilitate discussion among governmental sector with various stakeholders, which has created awareness among stakeholders to be more involved in responsible trawl fisheries. A similar platform was therefore suggested to be organized also in Vietnam.



33. The representative from NOAA expressed the willingness of NOAA to be involved in some activities of the project especially on the training workshop on ecosystem approach to fisheries making use of training module developed by NOAA to enhance the capacity of the countries in the Southeast Asian region.

(12) Promotion of Countermeasures to Reduce IUU Fishing Activities

34. The Program Committee Member for Vietnam informed the Meeting that Vietnam has issued its new Decree No. 80 on Port Management, with Regulation on Entry to Fishing Port by Foreign Vessels. As Vietnam is now in the process of developing guidance circular on port management, she requested SEAFDEC to support in the country's capacity building activities especially on port inspection.

35. The Program Committee Member for Cambodia expressed the view that activities under this project is very important but since the project received limited budget, he suggested that perhaps more budget could be possibly allocated to this project, and that SEAFDEC/TD could collaborate with the other Departments in conducting the relevant activities. In addition, he expressed the concern that since PSM as well as other countermeasures would involve several agencies within the countries such as the port authorities, marine departments, customs among others, the fisheries sector alone therefore could not address such concerns. The Meeting then suggested that in order to address such issues, the Member Countries should involve their respective relevant agencies in implementing the necessary countermeasures.

36. While the Program Committee Member for Japan cited that reduction of IUU fishing is very important and that SEAFDEC could promote regional initiatives to support IUU fishing countermeasures, however, the implementation of appropriate countermeasures would depend on each Member Country. He therefore encouraged the Member Countries to consider developing their respective measures to combat IUU fishing.

37. In a related development, the Meeting was informed that Thailand is implementing a four-month trial period under pilot project on Port State Measures in Phuket with support from FAO since October 2013 for information collection procedures, and the pilot project would be evaluated and completed in 2014. In this regard, the Program Committee Member for Thailand offered to share the results of the project with the other Member Countries through relevant SEAFDEC training courses.

38. Considering that some countries in the region have been compiling their respective fishing vessels records, the Program Committee Member for the Philippines inquired whether the development of a regional record could alter such national records. In response, the Meeting noted that the development of one common fishing vessel record was proposed and initiated by the Member Countries in preparation for the upcoming single ASEAN Economic Community in 2015. The Meeting was also informed that the minimum requirement for regional fishing vessel record is a sub-set of global record, and this record of fishing vessels 24 m in length and over could be considered an initial step towards developing a record for small fishing vessels in the future.

39. The Meeting also noted that while SEAFDEC could extend support to fisheries related authorities of the Member Countries in their efforts to combat IUU fishing, each Member Country should have the strong willingness to collaborate with other relevant agencies and such effort should be subject to the national efforts of respective countries.

40. The Program Committee Member for Myanmar informed the Program Committee on the willingness of the country to participate in the project on the Promotion of Countermeasures to Reduce IUU Fishing Activities. In this connection, he also informed the Program Committee that installation of Vessel Monitoring System (VMS) in large fishing vessels has been practiced in Myanmar.

(13) Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for Trading of Fish and Fishery Products

41. Considering that a regional catch documentation system could serve as a tool to combat IUU fishing in the region, the Program Committee Member for Japan expressed the view that since several RFMOs have already developed measures for commercial tuna fisheries, a clear focus should be considered in the development of such documentation system under this project.

42. The Program Committee Member for Cambodia suggested that the activities under this project could be coordinated with other projects as well as initiatives of other organizations such as the RPOA-IUU. In this regard, the Meeting was informed that since the budget allocated for this project is limited and meant only for developing the necessary tool and guidelines to combat IUU fishing, the application of such tool at the national level is subject to the capability of the individual countries as appropriate.

Program Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries

(14) Fisheries Resource Survey and Operational Plan for the M.V. SEAFDEC 2

43. The Meeting took note of the conduct of the fishery resources survey in Vietnam in 2012 and the proposed surveys to be conducted in 2014 using the M.V. SEAFDEC 2. In this connection, the Program Committee Member for Vietnam expressed her country's appreciation to SEAFDEC for the assistance extended during the cruise conducted in Vietnam waters in 2012 using the M.V. SEAFDEC 2. Regarding the proposed additional survey in Vietnam waters in 2014 using the vessel, she informed the Meeting that the survey schedule will be confirmed by January 2014 as this activity is still currently under discussion between the Ministry of Finance and the Ministry of Science and Technology.

44. The Program Committee Member for Brunei Darussalam requested for the use of the M.V. SEAFDEC 2 for a resources survey in Brunei Darussalam waters preferably in two (2) periods in April-May and September-October 2014. In addition, the Program Committee Member for Indonesia also requested to make use of the vessel in 2014 and would communicate with SEAFDEC to confirm its plan. In this regard, it was suggested that the respective survey plans of the requesting countries be discussed further with SEAFDEC/TD to finalize the schedule on the use of the M.V. SEAFDEC 2 in 2014.

45. The Program Committee Member for Japan reiterated that the M.V. SEAFDEC 2 was granted by the Government of Japan to be used by the countries in the region. He therefore expressed the appreciation that several countries have proposed to utilize the vessel in 2014, and encouraged the countries to continue making full use of the vessel in the future.

(15) Offshore Fisheries Resources Exploration in Southeast Asia

46. The Program Committee took note of this project which aims to promote the exploration of offshore fisheries to reduce pressure of overfishing in coastal areas and to find alternative fishing grounds through human resources development and institutional capacity enhancement. The Program Committee was also informed that the implementation of this project is linked with the utilization of the M.V. SEAFDEC 2.

47. The Program Committee Member for Vietnam supported the implementation of this project considering that poor handling onboard fishing vessels of hand-line-caught tuna led to reduced price of the tuna, and suggested that SEAFDEC could facilitate the compilation and sharing of lessons learnt from the Member Countries on fish handling at sea, e.g. hand-line tuna practices, to other countries. In this connection, the Meeting was assured that SEAFDEC considers the need to improve the quality of catch onboard fishing vessels a priority issue, and that SEAFDEC/TD will organize the Regional Training Course on Tuna Handling in General Santos City, Philippines on 11-13 December 2013. A similar training course could also be conducted in Vietnam in the future.

48. The representative from MFRDMD shared the information that a number of research activities using hydro-acoustic method have already been carried out to study fish biomass, among others, and that experts on this area are available in the region. He therefore suggested that a training workshop could be organized to analyze data collected through hydro-acoustic applications involving such experts as the resource persons.

(16) Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters

49. The Program Committee was informed that more than hundred specimens of sea turtles have been sequenced for the DNA study and the results of the genetic data will elucidate stock structure of green turtles in foraging habitats, and that two reports on Regional Plan of Action and Information on Sea Turtle Populations, and Migration of Sea Turtles will be prepared by the end of 2013. The Meeting was also informed by the representative from NATC on the recent poaching of sea turtles by Chinese commercial vessels, which would undermine the initiatives undertaken by the region in sea turtle conservation and management. He therefore suggested that SEAFDEC could take this issue into consideration, especially in its efforts to undertake activities on management of sea turtles.

(17) Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region

50. The Meeting was informed that the three sub-projects of this project, *i.e.*: 1) Improving the data collection of the commercially-exploited aquatic species and threatened species; 2) Facilitating fisheries activity information gathering through introduction of community-based management; and 3) Harmonization of fishery statistics in the southeast Asian region, are meant to address the different aspects in enhancing the compilation and utilization of fishery statistics and information in the region.

51. In this connection, the Program Committee Member for Vietnam sought clarification on the involvement of countries in pilot activity on national data collection on sharks. In response, the Program Committee was informed that countries to serve as pilot sites under this activity are yet to be decided, and that countries willing to be involved could communicate with the project leader of SEAFDEC/TD to convey their requests.

52. The Program Committee Member for Vietnam also expressed the appreciation to SEAFDEC/TD for conducting on-site training on Facilitating Fisheries Information Gathering through Introduction of Community-based Fisheries Management. She informed the Meeting that Vietnam is planning to establish a coastal fisheries management scheme through decentralization of management to coastal provinces, and requested SEAFDEC/TD to continue providing assistance on community-based fisheries management to the country.

53. In addition, the Program Committee Member for Vietnam reiterated the country's request during the 35th Meeting of the SEAFDEC Program Committee for SEAFDEC to support the development of fisheries database, and informed the Meeting that Vietnam has already initiated the development of the software for database on fisheries data collection. She therefore proposed that the relevant sub-component of the project could be conducted in 2014, by making use of the software for the database that has been developed, once this is finalized and approved by the Ministry of Agriculture and Rural Development of Vietnam.

(18) Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region

54. The Program Committee Member for Malaysia congratulated SEAFDEC for carrying out this project which is intended to explore alternative methods for scientific stock assessment and resource management. He also expressed his support for the continuation of the project considering that it could address various concerns on the Total Allowable Catch (TAC) system which is widely used by many developed countries in the world.

55. For the implementation of this project in 2014, the Program Committee was informed that the use of microsatellite or mtDNA in the genetic study under this project has not been finalized, as the details will still be discussed and decided upon during the core experts meeting on TAC in early 2014.

(19) Research and Management of Sharks and Rays in the Southeast Asian Waters

56. The Program Committee was informed that this project provides technical materials on identification of sharks and rays to the Member Countries.

Program Thrust V: Addressing International Fisheries-related Issues from a Regional Perspective

(20) Assistance for Capacity Building in the Region to Address International Trade-related Issues

57. In connection with this project which is meant to enhance the capacity of the Member Countries in addressing international fisheries-related issues, the representative from Sweden offered to also pave the way for the successful implementation of this project for the benefit of the countries in the region. In response to his query on the mode of collaboration that is required from Sweden, it was suggested that this could be focused on the implementation of activities to follow-up the regional recommendations developed under this project, including capacity building of the Member Countries to address international-related issues. Considering that at present, most of the capacity building activities under this project are funded by Japan through the JTF, follow-up actions such as the conduct of research corresponding to the common positions developed by and recommendations of the countries could also be supported by Sweden and other funding sources. As regards the utilization of funds from various sources and donors, the Meeting was assured by SEAFDEC that this would be handled in the most efficient and transparent manner.

(21) Strengthening SEAFDEC Network for Sustainable Fisheries

58. Since the project include activities that aim to monitor and evaluate the JTF Projects implemented by SEAFDEC, the Program Committee Member for Japan expressed his view on the need to effectively organize the annual Meetings to review the achievements of the JTF projects and the activities proposed to be conducted in the following years. In this connection, the Meeting was informed that SEAFDEC will organize the next JTF Review Meeting on 25-26 February 2014 to evaluate the JTF-V projects implemented by the SEAFDEC Departments which are scheduled to be completed in 2014. In order to facilitate the review of the projects, external fisheries experts from the region and the SEAFDEC National Coordinators for the Member Countries would be invited to sit as evaluators during the Meeting.

59. In this regard, the Program Committee for Japan commended SEAFDEC for the conduct of the review and evaluation meetings considering that these fora could offer good opportunities for the Government of Japan to listen to the needs of the Member Countries. He also informed the Program Committee that Japan will exert efforts to ensure that the JTF projects would be useful to the Member Countries.

60. Regarding the method of conducting the review and evaluation processes, and in responding to the query of the Program Committee Member for Vietnam, the Meeting was informed that evaluation indicators are being developed in coordination with the External Evaluators to ensure that the projects are relevant to the Member Countries. In future evaluation processes, SEAFDEC also planned to coordinate with the Member Countries through the National Coordinators by sending the evaluation indicator sheets at least one month before the review meetings. In this connection, the Program Committee Member for Cambodia reiterated that the full reports of the JTF projects should also be provided together with the evaluation sheets to facilitate the review of JTF activities by the National Coordinators.

61. While also expressing the appreciation to donors for continued the support extended to this project, the Program Committee Member for the Philippines commended SEAFDEC for the effective implementation of the activity on Strengthening the Regional Fisheries Policy Network (RFPN) as this has served as mechanism to improve the coordination and collaboration between SEAFDEC and the Member Countries as well as with other partners. While this activity has enhanced the capacity of the members of the RFPN, he therefore appreciated the support provided by the SEAFDEC-Sweden Project and JTF for the secondment of representatives from the Member Countries to the SEAFDEC Secretariat to serve as RFPN

members. In this connection, he expressed the hope that Japan and Sweden would continue to provide the necessary assistance for the sustained implementation of this important activity.

62. In this connection, the SEAFDEC Secretary-General informed the Program Committee that the aforementioned views would be relayed to the Council Director for Japan, who had earlier expressed the interest to increase the JTF for SEAFDEC in the coming years.

4.1.2 Special Project

(1) Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia

63. The representative from NOAA informed the Program Committee that NOAA had recently come up with the publication on “Climate Change Adaptation for Coral Triangle Communities: Guide for Vulnerability Assessment and Local Early Action Planning (LEAP Guide)” which could be used as a reference for the implementation of climate change related activities in the region under this special project.

64. In addition, the representative from MRC Fisheries Programme (FP) informed the Meeting that MRC has also published a series of publications, including the recently launched publications on An Introduction to the Fisheries in Lao PDR (Mekong Development Series No. 6); Atlas of Deep Pools in the Lower Mekong River and Some of Its Tributaries (MRC Technical Paper No. 31); The Stationary Trawl (Dai) Fisheries of the Tonle Sap-Great Lake System, Cambodia (MRC Technical Paper No. 32); Integrated Analysis of Data from MRC Fisheries Monitoring Programmes in the Lower Mekong Basin (MRC Technical Paper No. 33); and A Guide to Larvae and Juveniles of some Common Fish Species from the Mekong River Basin (MRC Technical Paper No. 38). He expressed the hope that these publications, which are available through the MRC Website (www.mrcmekong.org), could be useful for the relevant activities of SEAFDEC.

65. The Program Committee Member for Cambodia suggested that during the implementation of the project, specifically the activities in the Mekong Basin sub-region, local initiatives and local NGOs should be involved in order to harmonize local perspectives in eco-conservation with those of the fisheries activities under the project. In this regard, the SEAFDEC Secretary-General assured the Program Committee that local agencies and NGOs would be involved in the implementation of the activities at local levels of the project to enhance the effectiveness of the implementation of such activities.

66. While supporting the implementation of the project, the Program Committee Member for the Philippines expressed the need to improve the performance indicators on the impact of climate change which could be included as an activity under this project.

67. Moreover, the representative from NOAA informed the Meeting that it has an ongoing project supported by USAID on the development of multi-model ensembles based on the Intergovernmental Panel on Climate Change (IPCC) analysis for predicting the weather conditions in the region in cooperation with Philippines, Indonesia and Timor Leste. He suggested that the model could be referred to by SEAFDEC during the implementation of the project.

68. Furthermore, the representative from MRC FP also informed the Meeting that MRC FP is planning to conduct a number of survey, namely: 1) Survey of fisheries yield at landscape scale; 2) Survey of yield and value of fisheries in rice field ecosystem in the Mekong Delta, Viet Nam; and 3) Socio-economic impact and social implications from reduced capture fisheries in the Lower Mekong Basin, and if fund is made available, MRC FP is also planning to monitor market prices of key fish species and other aquatic animals in the Lower Mekong Basin. These studies could be useful for the implementation of the abovementioned project especially with regards to the understanding of value of inland fisheries and their implications to social well-being.

69. With regards to the ongoing establishment of the SEAFDEC Inland Fishery Resources Development and Management Department (SEAFDEC/IFRDMD) in Indonesia, the Program Committee Member for Indonesia suggested that the inland fisheries activities under this project could be referred to during the planning of the proposed activities of IFRDMD. In this connection, the SEAFDEC Secretary-General

expressed the view that such effort would eliminate possible duplication of efforts among the SEAFDEC Departments.

70. The Program Committee Member for Malaysia added the information that Malaysia would actively participate in all relevant activities under the project. In summary, the representative from Sweden therefore expressed the view that this project is the core to regional cooperation in fisheries through SEAFDEC, to address the issues on sustainable fisheries in the Southeast Asian region.

71. The Program Committee Member for Myanmar expressed his appreciation to the SEAFDEC-Sweden project for supporting the implementation of this project, *e.g.* technical support on landing site survey of Indian mackerel in Myanmar in collaboration with Department of Fisheries of Thailand. He requested SEAFDEC to consider extending the project activities to cover in the country's adjacent waters especially in Myeik Archipelago.

4.1.3 New Special Projects for the Year 2014

(1) Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (UNEP/GEF/SEAFDEC)

72. The Program Committee Member for Brunei Darussalam informed the Meeting that Brunei Darussalam is implementing Marine Protected Areas (MPAs) which may include some critical habitats in the South China Sea. She looked forward to the implementation of the project and expressed the hope that the results of the project could be shared with the Member Countries. She also informed the Meeting that the lessons learned from the implementation of MPAs in Brunei Darussalam would be shared to the other countries in the region.

73. While also looking forward to the successful implementation of this project, the Program Committee Member for Malaysia informed the Meeting of the country's intention to support and be actively involved in this project, considering that the project could address the deterioration of fishery resources in the region.

(2) Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (ASEAN/IDB/SEAFDEC)

74. The representative from the ASEAN Secretariat provided the Meeting with updated information on this special project. He mentioned that the ASEAN Secretariat is still in the process of final reviewing the proposal by its legal officer, in order that the project contract could be signed. In this regard, the Program Committee Members for Brunei Darussalam and Malaysia requested the ASEAN Secretariat to expedite the process of formalizing this project, as its implementation has been postponed for many years and the expected outputs have been long overdue.

4.2 Departmental Programs

75. While considering the progress and achievements in the implementation of SEAFDEC Departmental Programs in 2013 and the proposed programs for 2014 (**Annex 5**), the Program Committee offered recommendations for the improvement of the programs and endorsed the proposed programs taking into consideration the following recommendations:

4.2.1 Aquaculture Department

76. The Program Committee was informed of the progress of R&D activities in 2013 and the corresponding plans for 2014 under the AQD Departmental Programs, namely: 1) Quality Seed for Sustainable Aquaculture; 2) Healthy and Wholesome Aquaculture; 3) Maintaining Environmental Integrity through Responsible Aquaculture; 4) Adapting to Climate Change; and 5) Meeting Social and Economic Challenges in Aquaculture. The progress of implementation of the activities in 2013 and plans for 2014 of AQD's Technology Verification and Demonstration Division as well as those of its Training and Information Division were also reported.



77. In responding to the concern of the Program Committee Member for Myanmar on the possible utilization of fishmeal substitutes for the culture of marine fishes, soybean meal can replace fishmeal in diet of herbivorous species. For instance, in milkfish, fishmeal component in the diet is now down to 15% since most of the fishmeal can be replaced by soybean meal.

78. The Program Committee Member for Thailand expressed the appreciation to AQD for successfully carrying out several projects on sustainable aquaculture development, and reiterated that concerns on the emerging issues in aquaculture such as the EMS in white shrimps and genetic improvement program of the economically-important species in the Southeast Asian region should also be addressed.

79. In response to the query of SEAFDEC/MFRDMD on whether the activities of SEAFDEC/AQD also cover the aspect on carbon emission from aquaculture activities, the Meeting was informed that AQD's program on Adapting to Climate Change is initially focused on identifying the effects of increasing temperature on the biology of economically-important aquaculture species especially during the critical phases of their life cycle. Nevertheless, AQD agreed to take into consideration the suggestion to also include the assessment of carbon emission from aquaculture in the planning of its future activities.

80. The representative from the ASEAN Secretariat informed the Meeting that based on the discussion during the last SOM-AMAF in Kuala Lumpur, Malaysia, the ASEAN is now developing its new goals and objectives to also put emphasis in the fisheries sector of the ASEAN. In addition, the ASEAN will request the Member States to nominate national focal points which could be transformed into a Working Group, the first meeting of which will be convened in January or February 2014. He added that SEAFDEC would be requested to work closely with the said Working Group especially in identifying the priority areas of the region's fisheries sector. In this regard, the SEAFDEC Secretary-General reiterated that SEAFDEC in collaboration with ASEAN had developed several policy frameworks including the Resolution and Plan of Action adopted by the ASEAN Ministers and Senior Officials in 2011 which include the important fisheries issues in region. He added that these documents could be used as basis for identifying the priorities of the fisheries sector of Southeast Asia.

81. The Program Committee Member for Cambodia conveyed the concern expressed by several ASEAN Member States that in previous meetings under the ASEAN Mechanism, *e.g.* ASWGF_i meetings, SEAFDEC is allowed to attend only in selected Agenda of such meetings. In this connection, he suggested that SEAFDEC should be allowed to fully attend the ASWGF_i fora together with all ASEAN Member States, as this would enable SEAFDEC to work closely with the ASEAN and its Member States in the future.

82. The Program Committee Member for Myanmar requested SEAFDEC/AQD to consider sharing of information and also providing technical assistance to support the rural aquaculture development activities in Myanmar.

4.2.2 Training Department

83. The Program Committee took note of the Departmental Programs implemented by SEAFDEC/TD, namely: 1) Promotion on Strengthening of SEAFDEC Visibility and Image; 2) Tailor-made Training Programs; and 3) Improvement of Fisheries Technology and Reduction of the Impacts from Fishing.

84. The representative from NATC informed the Program Committee that NATC is conducting basic skills training especially for the young generation to upgrade their knowledge from using traditional fisheries methods to become modern fishers. In this connection, he suggested that SEAFDEC could consider undertaking activities in collaboration with the private sector in order to come up with applicable and practical procedures and systems in fisheries, as well as to pool relevant information under a SEAFDEC inventory/directory which could include lists of suitable technologies in constructing fishing vessels, responsible fishing gear and practices, most suitable fisheries practices, most prospective training and formal fisheries courses, among others, from which prospective clients especially the young generation could just pull out the most appropriate information when necessary.

85. The Program Committee Member for the Philippines reiterated the significance of the activity on improving post-harvest handling onboard fishing vessels since the percentage of post-harvest losses in the region is very high. In this connection, he encouraged the SEAFDEC Departments concerned to verify and validate the relevant activities in order to address the high incidence of post-harvest losses in capture fisheries as well as in aquaculture.

86. While agreeing with the Committee Member for the Philippines, the SEAFDEC Secretary-General informed the Program Committee that this concern is being addressed by SEAFDEC considering the indirect impact of high post-harvest losses on the resources as fishers would tend to fish more to increase their incomes, thus, threatening the health of the resources.

4.3 Other Programs

87. The Program Committee considered and endorsed progress of implementation in 2013 and the corresponding 2014 plans for the following programs:

(1) Coastal Area Capability Enhancements in Southeast Asia (SEAFDEC/RIHN Collaborative Project)

88. The Program Committee took note of the activities under the abovementioned collaborative project between SEAFDEC and the Research Institute on Humanity and Nature (RIHN) of Japan (**Annex 6**) following the concept on “Area Capability” in pilot sites of four countries, namely: Japan, Philippines, Thailand and Vietnam. The Program Committee was also informed of the plans of activity for 2014. In this regard, the SEAFDEC Secretary-General emphasized that the lessons learned from this project will be disseminated to the other SEAFDEC Member Countries.

(2) Conservation and Management of Eel Resources in the Southeast Asia (New Project - FAJ)

89. The Program Committee was informed that Asian eel species might be proposed for listing under the Appendix II of CITES which could take effect during the CITES-CoP17 in 2016, making the trade of the species almost impossible. In order to come up with scientific information on the species, and demonstrate the alternative measures for conservation and management of Asian eel resources, the Committee Member from Japan presented a concept proposal for “conservation and management of eel resources in the Southeast Asia” for SEAFDEC to undertake (**Annex 7**), which comprises four activities, namely: 1) Compilation of basic information on eel species in Southeast Asia; 2) Research on eel biology; 3) Development of eel fishery management measures; and 4) Promotion of sustainable aquaculture of eels. It was also proposed that the detailed proposal of the project would be further discussed and presented during the JTF annual evaluation meeting. He added that the conduct of such project which is considered urgent would receive funding support from the JTF, and that the necessary project proposal would be submitted for endorsement during the next Meeting of the SEAFDEC Council.

90. While expressing the willingness to undertake the project, the Chief of MFRDMD suggested that this project could be carried out by the new SEAFDEC/IFRDMD which will focus on inland fisheries. In this regard, the Program Committee Member for Indonesia informed the Program Committee that this project could form part of the activities of IFRDMD in 2015, and he would inform IFRDMD to subsequently develop the necessary proposal based on the detailed outline as presented to the Meeting by the Program Committee Member for Japan.

91. In this regard, the Program Committee Member for Vietnam expressed the concern on the need to gather scientific evidence on the sustainability of eel species to serve as basis for discussion at relevant international fora, and suggested that information on the distribution of the species should be compiled prior to the conduct of further activities.

92. The SEAFDEC Secretariat suggested that at the start, collection of existing information about biological data, catch and aquaculture could be carried out. Then, an expert consultation would be convened to analyze the compiled information, the results of which would be used for the development of the plan of activities.



93. In responding to the query of the Program Committee Member for Cambodia on the status of this eel species in the Southeast Asian region, the Deputy Chief of MFRDMD informed the Meeting that in view of the high demand of the eel species in Japan, exploratory culture of the bicolor eel species is ongoing in Indonesia, therefore, some information on the culture of the species could already be made available. Moreover, he added that during the SEAFDEC consultation, experts on eel species from Japan could be invited to serve as resource persons.

94. The Program Committee Program for Myanmar requested SEAFDEC/AQD to consider implementing activities on the seed production of eel species in hatcheries, and suggested that representatives from the private sector should be invited to participate in proposed expert consultation on the eel species.

V. PIPELINE PROJECTS AND EMERGING NEEDS FOR PREPARATION OF FUTURE PROJECT PROPOSALS

95. The Program Committee was informed that there is no pipeline project for possible implementation in 2013 and 2014.

VI. IDENTIFICATION OF REGIONAL PRIORITIES FOR FUTURE PROGRAM FORMULATION

6.1 Country Inputs on Regional Priorities for Future Program Formulation

96. The Program Committee took note of the recommendations made by the Special Meeting of the SEAFDEC Council in early October 2013 for the Member Countries to set priorities for the fisheries issues, making use as basis the list of issues that was annexed to the Report of the Third SEAFDEC Review. The Program Committee also noted the initial priorities that had been indicated by the countries from the issues in the said list (**Annex 8**).

97. The Program Committee Member for Brunei Darussalam expressed the view that while the list had been circulated to the Member Countries by the SEAFDEC Secretariat, the Member Countries are obliged to add other priority areas. However, these additional inputs of priority areas were not incorporated in the calculation of ranking of the matrix. In this regard, the Program Committee was informed that additional priorities identified by the Program Committee Members would also be taken into consideration by SEAFDEC in obtaining the updated inputs from the Member Countries.

98. The Program Committee Member for Cambodia also suggested that the collaborating partners of SEAFDEC should also be invited to take note of the list and encourage the agencies and organizations to also consider working with SEAFDEC on activities based on the region's priorities.

99. The Program Committee Member for Singapore requested the SEAFDEC Secretariat to prepare a matrix placing the existing programs of SEAFDEC in the list of prioritized areas to see if these projects are in agreement with the regional priorities.

100. After the discussion, the Program Committee was of the view that it might still be premature for SEAFDEC to conclude on the prioritized areas at this stage, and suggested that a special consultation among the SEAFDEC National Coordinators should be conducted to discuss this matter before the next Meeting of the SEAFDEC Council.

6.2 Suggested Way Forward for Improving SEAFDEC's Work Efficiency

101. The Program Committee took note of the detailed proposal prepared by the Fisheries Agency of Japan (FAJ) on the suggested way forward for improving the work efficiency of SEAFDEC (**Annex 9**), which was presented by the Program Committee Member for Japan. The Program Committee was also informed that the proposal was initially raised during the Special Meeting of the SEAFDEC Council in October 2013.

102. The Program Committee Member for Vietnam expressed the apprehension that based on the abovementioned proposal on improving the work efficiency of SEAFDEC, there is a possibility that emerging issues identified by the countries annually could not be included in the program formulation by SEAFDEC since the review of regional priorities is proposed to be done every five years. However, the Program Committee Member for Japan explained that the JTF projects are prioritized every year in view of the limited budget available for such projects.

103. Moreover, while agreeing with the Program Committee Members for Vietnam, the Program Committee Member for Cambodia suggested that prioritizing the issues should be done every five years since it will be difficult to come out with new priorities every year, especially for the emerging issues.

104. After the discussion, the Meeting agreed to consider the proposal prepared by FAJ, and that this proposal would be discussed more thoroughly during the proposed special consultation among the SEAFDEC National Coordinators to be convened with support from the JTF. Considering the need to improve the formulation of the SEAFDEC programs, the Program Committee Member for Japan reiterated that the JTF projects for example should have clear outcomes, and for such reason it has become necessary to revise the mechanism for formulation of the SEAFDEC programs.

VII. OTHER MATTERS

7.1 Introduction of 2014 JTF Projects and New JTF-VI Projects for 2015

105. The Program Committee noted the status of the Japanese Trust Fund for 2014 (**Annex 10**), as presented by the Assistant Trust Fund Manager for SEAFDEC. The Program Committee also noted that starting in 2014, the JTF-V on Sustainable Aquaculture and Resource Enhancement will be combined with JTF-VI on Promotion of Sustainable Fisheries in the Region to be known as new JTF-VI. In this connection, the Program Committee Member for Japan informed the Program Committee that the Fisheries Agency of Japan is now in the process of requesting budget of JTF-VI projects for 2015 to the Ministry of Finance to support the sustainable development of fisheries in the region which includes four (4) components, namely: 1) enhancing sustainable utilization of fisheries resources; 2) sustainable development of fisheries; 3) sustainable development of aquaculture and promotion of stock enhancement; and 4) sustainable development of inland fisheries.

7.2 Monitoring and Reporting of SEAFDEC Program Thrusts

106. The Program Committee took note of the proposed monitoring and reporting of SEAFDEC program thrusts by the SEAFDEC Secretariat (**Annex 11**).

107. After the discussion, the Meeting agreed that the aforementioned proposal would be discussed during the proposed special consultation among the SEAFDEC National Coordinators.

7.3 Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC

108. The Program Committee considered the Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC (**Annex 12**), as presented by the SEAFDEC Secretariat.

109. While expressing support to the proposal and considering that Vietnam regards the fishery resources survey as the country's high priority, the Program Committee Member for Vietnam informed the Meeting that Vietnam will conduct internal discussions within the country in order to seek approval for the said activity. In this regard, the Program Committee Member for Cambodia cited that this concern will be referred to the country's Fisheries Administration before any concrete action could be taken.



7.4 Collaborative Program Framework for the Oceanic Tuna Resources in the Sulu-Sulawesi Seas Sub-region

110. The Program Committee considered the Proposed Collaborative Program Framework for the Oceanic Tuna Resources in the Sulu-Sulawesi Seas Sub-region (**Annex 13**), as presented by the SEAFDEC Secretariat. Considering that the proposal has been thoroughly discussed earlier, the Program Committee Members for the participating countries, namely: Indonesia, Malaysia and the Philippines, reiterated their support for the implementation of the activity.

VIII. COOPERATION WITH NON-MEMBER GOVERNMENTS AND INTERNATIONAL/ REGIONAL ORGANIZATIONS

111. Representatives from the collaborating partners of SEAFDEC attending the Program Committee Meeting were invited to inform the Program Committee of their relevant fisheries programs and potential areas of mutual cooperation with SEAFDEC.

112. The Deputy Chief of Party of the ASEAN-U.S. Maximizing Agriculture through Knowledge, Enterprise Development and Trade (MARKET) Project, *Mr. Timothy P. Moore*, informed the Program Committee on the Project which is funded by the U.S. Agency for International Development (USAID), and is part of “Feed the Future”, the U.S. Government’s Global Hunger & Food Security Initiative. The Project is working with ASEAN to promote more sustainable and efficient use of aquaculture and fishery resources in the region through the adoption of better production practices and fisheries management, building stronger public-private partnerships and improving the policy environment for sustainable and inclusive aquatic resources management. It is envisaged that SEAFDEC will be a key partner for the MARKET Project through March 2015, and that the collaboration between SEAFDEC and MARKET would complement the strengths of both agencies to meet a shared objective of improving the sustainability of fisheries and aquaculture in the ASEAN region. His Statement appears as **Annex 14**.

113. The Assistant Director for Agriculture Industries and Natural Resources Division of the Finance, Industry and Infrastructure Directorate of the ASEAN Economic Community Department of the ASEAN Secretariat, *Dr. Pham Quang Minh*, thanked SEAFDEC for the invitation extended to the ASEAN Secretariat to attend the Program Committee Meeting. He recalled the establishment of the ASEAN-SEAFDEC Fisheries Consultative Group (FCG) in 1999 which aims to promote the sustainable fisheries management and resource utilization in Southeast Asia and the ASEAN-SEAFDEC Strategic Partnership in 2007 which also aims to promote the sustainable fisheries management for food security. He then stressed on the report of the last Special-SOM in August 2013 which endorsed the issue on the implementation of Monitoring, Control and Surveillance (MCS) scheme as this plays a key role in combating IUU fishing, the concept note on development of ASEAN Catch Certification, the Development of Regional Fishing Vessel Record for Vessels 24 m in Length and Over, among others. He also summarized the strengthened cooperation in promoting sustainable fisheries and aquaculture for food security in Southeast Asian region. His statement appears as **Annex 15**.

114. The Program Manager for the Development Cooperation Bureau of the Embassy of Sweden in Bangkok, Thailand, *Mr. Göran Haag*, expressed his gratitude for SEAFDEC and the Member Countries for allowing Sweden to attend this Meeting. Having been impressed by the activities of SEAFDEC, he informed the Committee that Sweden and SEAFDEC has reached an agreement for cooperation for 5 years in collaboration with all ASEAN Member States. The areas of cooperation are in line with 5 Program Thrusts of SEAFDEC. He emphasized the importance for SEAFDEC to also work closely with the private sector, which is considered as key actors who could create changes in the actual situation/practices. In addition, regional cooperation is also necessary to tackle emerging challenges and ensuring sustainability of the resources. In its work for sustainable fisheries and aquaculture SEAFDEC was encouraged to actively work for gender equality and the rights of all stakeholders, the poor fisherfolks and coastal villagers in particular. He reiterated that almost all Member Countries are ASEAN Member States; therefore SEAFDEC should take leading roles in contributing to the ASEAN Community Building, and encouraged the ASEAN Secretariat and Member Countries to closely engage in programs supported by Sweden, *i.e.* Mangrove for the Future (MFF) and SEAFDEC to enhance benefit from the resources and results from these programs, as well as for SEAFDEC to work with other relevant organizations, *e.g.* ASEAN, MFF,

BOBLME, MRC, etc., in order to maximize the combined effects from the initiatives. In conclusion, he looked forward to the work of SEAFDEC to contribute to sustainability of ASEAN fisheries and aquaculture, in response to the increasing demand as well as the ASEAN Community Building in few years to come. His statement appears as **Annex 16**.

115. Although the Fishery Industry Officer of the FAO Regional Office for Asia and the Pacific, *Mr. Robert Lee* was unable to attend the Program Committee Meeting in view of an equally pressing activity assigned to him, he sent his Statement which appears as **Annex 17**. He expressed the appreciation, on behalf of the Assistant Director General and Resident Representative for the FAO Regional Office for Asia and the Pacific, *Dr. Hiroyuki Konuma*, to SEAFDEC for inviting FAO to the 36th Program Committee Meeting and to the Government of Malaysia and the Department of Fisheries for their warm hospitality. He cited the long cooperative relationship with SEAFDEC dating back to the 1970s and that since Singapore and Brunei Darussalam have joined the membership of FAO, both FAO and SEAFDEC now have a common membership. He commended SEAFDEC for its diverse and wide technical contribution to its members. He explained the significant importance of SEAFDEC's role and contribution to the jointly executed GEF funded "REBYC-II CTI" trawl management which is hosted by SEAFDEC and the large efforts made with SEAFDEC's organizational capacity and technical assistance. He thanked SEAFDEC also for hosting the 2013 Annual Meeting of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB) at SEAFDEC/TD and for their participation in and their contributions in developing the APFIC Regional Guidelines for the Management of Tropical Trawl Fisheries in the Asian Region. He also mentioned about FAO's appreciation of SEAFDEC's involvement with the Secretariat of the Bay of Bengal Large Marine Ecosystem and with APFIC, and the sincere hopes for stronger FAO-BOBLME-SEAFDEC collaboration in 2014. He stressed that FAO welcomes all opportunities for greater partnership to explore opportunities to secure funding to implement work of mutual interests which could enhance member state collaboration. Finally, he disclosed that FAO looked forward to joint collaboration on combating IUU fishing through the model port and implementation of the recently developed Port State Measures Inspectors Training Course and on the training program in EAFM, particularly since these courses complement the REBYC-II CTI and the forthcoming GEF/UNEP/SEAFDEC Fisheries *Refugia* project.

116. The Capture Fisheries Specialist from the Mekong River Commission (MRC) Fisheries Programme, *Mr. Ngor Peng Bun*, expressed his appreciation to SEAFDEC for inviting MRC to the 36th Program Committee Meeting and the gratitude to the Department of Fisheries of Malaysia for the excellent arrangements and superb hospitality. He informed the Meeting about the potential areas for future cooperation between MRC Fisheries Programme (MRC-FP) and SEAFDEC and its Member Countries which include: 1) Value and valuation of inland fisheries resources; 2) Impact mitigation measures of water development projects, including hydropower dams and irrigation schemes, *e.g.* fish passage; and 3) Exchange of data, information and knowledge on inland fisheries research, development and management. Cooperation in these important areas could be further explored, jointly planned and implemented with the new technical department of SEAFDEC, the Inland Fishery Resources Development and Management Department, which is currently being established in Indonesia. MRC-FP looked forward to enhanced exchange of information and dialogue on inland fisheries and expressed the hope that relevant experiences and lessons learnt from SEAFDEC Member Countries in this respect can form part of the process of developing a Basin-wide Fisheries Management Strategy for the Lower Mekong Basin. His statement appears as **Annex 18**.

117. The Fisheries Officer for Planning and Development of the National Agriculture Training Council (NATC) of the Ministry of Agriculture and Industry Malaysia, *Mr. Ganesan Vethiah*, reiterated the establishment of training collaboration between NATC and SEAFDEC since 2009, and that SEAFDEC has been assisting NATC in the conduct of a number of tailor-made training-for-trainers in Malaysia. After being informed on the various activities of SEAFDEC, he expressed the willingness of NATC to also involve in capacity enhancement activities on-board the M.V. SEAFDEC if possible. However, the information should be provided to NATC in advance in order to prepare sufficient budget for the activities. He then shared the updated information on the establishment of School of Fisheries, which is in good progress, and is expected to be operational by mid-2015 with 600 students under the scopes of fisheries, aquaculture and food processing. In addition to the general fisheries subjects, other subjects, *e.g.* emerging

issues, international fisheries law, etc., could also be included as these could contribute to sustainable utilization of fishery resources.

118. The Research Division Chief of the NOAA Technical Lead for an Ecosystem Approach to Fisheries Management of the U.S. National Oceanic and Atmospheric Administration (NOAA), *Dr. Rusty Brainard*, expressed his appreciation to SEAFDEC for extending the invitation to NOAA to attend the 36th Meeting of the SEAFDEC Program Committee. He gave a brief overview on the potential partnership between U.S. Agency for International Development (USAID)-NOAA-U.S. Department of Interior (DOI) and SEAFDEC in promoting sustainable fisheries for combating IUU fishing in the Southeast Asian region and in supporting the continued success of CTI-CFF. He also informed the Meeting that NOAA and DOI are scientific and technical agencies of the U.S. Government, which provide regional, multi-national, trans-boundary technical assistance, and capacity building. NOAA also conducts bilateral work with the USAID mission in Indonesia, Philippines and Timor Leste, and possibly Vietnam and Myanmar in the future. In this connection, he mentioned the draft workplan for 2014 with SEAFDEC which includes: 1) conduct of regional EAFM partnership development workshop; and 2) establishment of collaborative relationship in combating IUU fishing. In addition, NOAA looked forward to working closely with SEAFDEC in the implementation of regional projects in the future. His statement appears as **Annex 19**

119. The Senior Analyst of the International Coordination Unit of the Swedish Agency for Marine and Water Management (SwAM), *Mr. Peter Funegård*, expressed appreciation for the invitation extended to SwAM to attend in this Program Committee Meeting, and he looked forward to continued dialogue and cooperation with SEAFDEC in the future. Specifically, he expressed view that the Southeast Asian region should not attempt to copy all policies developed and applied by the European nations, but should learn from their experiences including successes and failures that could be applied as appropriate in this region.

IX. RECOMMENDATIONS OF THE THIRTY-SIXTH MEETING OF THE PROGRAM COMMITTEE

9.1 Adoption of Report of the Meeting

120. The Program Committee adopted the Report of its Thirty-sixth Meeting on 27 November 2013 that include recommendations for the enhancement of SEAFDEC programs for the benefit of the Member Countries. The Program Committee also took note that the Report of this Meeting would be submitted to the 46th Meeting of SEAFDEC Council and to ASEAN through the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP).

9.2 Date and Venue of the Thirty-seventh Meeting of the Program Committee

121. In considering the date and venue of the Thirty-seventh Meeting of the Program Committee, the Chief of Training Department informed the Program Committee that the Training Department would host the Thirty-seventh Meeting in Thailand. The Program Committee was also informed that the Training Department would seek the guidance of the SEAFDEC Secretariat in finalizing the schedule and related arrangements for the Meeting.

X. CLOSING OF THE MEETING

122. In his Closing Remarks, the Chairperson of the Program Committee thanked the Program Committee Members, representatives of SEAFDEC collaborating partners, SEAFDEC Secretariat and Departments, as well as observers for their active participation and contributions during the Meeting. He also thanked MFRDMD for hosting the Meeting and the hospitality extended to all participants. He expressed his appreciation to the meeting secretariat staff for their efforts in making the Meeting a success. He then declared the Meeting closed. His Closing Remarks appears as **Annex 20**.

LIST OF PARTICIPANTS

BRUNEI DARUSSALAM

Ranimah Haji A. Wahab (Mrs.)
Acting Deputy Director, SEAFDEC Alternate
Council Director and SEAFDEC National
Coordinator for Brunei Darussalam

Department of Fisheries
Ministry of Industry and Primary Resources
Jalan Menteri Besar
BB3910, Negara Brunei Darussalam
Tel: +673 2382862
Fax: +673 2382069
E-mail: ranimah.wahab@gmail.com

Munah Haji Lampoh (Mrs.)
Senior Fisheries Officer

Department of Fisheries
Ministry of Industry and Primary Resources
Jalan Menteri Besar
BB3910, Negara Brunei Darussalam
Tel: +673 2383412 Ext. 2326
Fax: +673 2382069
E-mail: munahlampoh@gmail.com

CAMBODIA

Ing Try
Deputy Director-General and SEAFDEC National
Coordinator for Cambodia

Fisheries Administration
#186 Preah Norodom Blvd.
Sangkat Tonle Basac,
Khan Chamca Mon,
P.O. Box 582, Phnom Penh, Cambodia
Tel: +855 12 995665
Fax: +855 23 215470
E-mail: ingtry@ymail.com

Em Puthy (Dr.)
Deputy Director, Department of Planning,
Accounting and International Cooperation

Fisheries Administration
#186 Preah Norodom Blvd.
Sangkat Tonle Basac,
Khan Chamca Mon,
P.O. Box 582, Phnom Penh, Cambodia
Tel: +855 16 850003
Fax: +855 23 215796
E-mail: emputhy@yahoo.com

INDONESIA

Andi Soesmono
Deputy Director for General Affairs

Center of Analysis for Marine and Fisheries
International Cooperation
Secretariat General
Ministry of Marine Affairs and Fisheries
Jl. Medan Merdeka Timur No. 16
Jakarta Pusat, 10110, Indonesia
Tel: +62 21 3519070
Fax: +62 21 3864293
E-mail: multilateralmmaf@yahoo.com

Taufiq Budiman Atmamihardja
Assistant Deputy Director for ASEAN
Cooperation

Center of Analysis for Marine and Fisheries
International Cooperation
Secretariat General
Ministry of Marine Affairs and Fisheries
Jl. Medan Merdeka Timur No. 16
Jakarta Pusat, 10110, Indonesia
Tel: +62 21 3519070
Fax: +62 21 3864293
E-mail: atmamihardja@yahoo.com

Martha Andriany Pattinaja (Mrs.)
Assistant Deputy Director for Non-Governmental
Cooperation

Center of Analysis for Marine and Fisheries
International Cooperation
Secretariat General
Ministry of Marine Affairs and Fisheries
Jl. Medan Merdeka Timur No. 16
Jakarta Pusat, 10110, Indonesia
Tel: +62 21 3519070
Fax: +62 21 3864293
E-mail: bidang_kal@yahoo.com

Emmi Simarmata (Mrs.)
Assistant Deputy Director for Institutional
Cooperation

Center of Analysis for Marine and Fisheries
International Cooperation
Secretariat General
Ministry of Marine Affairs and Fisheries
Jl. Medan Merdeka Timur No. 16
Jakarta Pusat, 10110, Indonesia
Tel: +62 21 3519070
Fax: +62 21 3864293
E-mail: bidangkal_puskita@yahoo.com

Aniza Suspita (Mrs.)
Analyst for ASEAN Cooperation

Center of Analysis for Marine and Fisheries
International Cooperation
Secretariat General
Ministry of Marine Affairs and Fisheries
Jl. Medan Merdeka Timur No.16
Jakarta Pusat, Indonesia
Tel: +62 81806561532
E-mail: asusupita@yahoo.com

Sari Rosliana Deffy (Mrs.)
Analyst for International Cooperation

Secretariat of the Agency of Marine and
Fisheries Research and Development
Jl. Pasir Putih I Ancol Timur
Jakarta Utara – 14430
DKI Jakarta, Indonesia
Tel: +62 21 64711583
Fax: +62 21 64711438
E-mail: sarie.saybia@gmail.com;
Kerjasama.litbangkp@gmail.com

JAPAN

Tsuyoshi Iwata
Assistant Director of Overseas Fisheries
Cooperation Office, International Affairs
Division, and SEAFDEC National Coordinator for
Japan

Fisheries Agency of Japan
1-2-1, Kasumigaseki, Chiyoda-ku
Tokyo, Japan
Tel: +81 3 67442367
Fax: +81 3 35020571
E-mail: tsuyoshi_iwata@nm.maff.go.jp

Kiyoshi Ikoma
Section Chief of Overseas Fisheries Cooperation
Office, International Affairs Division

Fisheries Agency of Japan
1-2-1, Kasumigaseki, Chiyoda-ku,
Tokyo, Japan
Tel: +81 3 67442367
Fax: +81 3 35020571
E-mail: kiyoshi_ikoma@nm.maff.go.jp

LAO PDR

Bounthong Saphakdy
Deputy Director General and SEAFDEC Alternate
Council Director for Lao PDR

Department of Livestock and Fisheries
P.O. Box 6644, Vientiane 01000
Lao PDR
Tel: +856 21 215243
Fax: +856 21 215141
E-mail: saphakdy@yahoo.com

Akhane Phomsouvanh
Deputy Director of Fisheries Division, and
SEAFDEC National Coordinator for Lao PDR

Department of Livestock and Fisheries
P.O. Box 6644, Vientiane 01000
Lao PDR
Tel/Fax: +856 21 217869
E-mail: akhane@live.com

MALAYSIA

Ahmad Hazizi bin Aziz
Director of International, Trade and Investment
Division, and SEAFDEC National Coordinator for
Malaysia

Department of Fisheries Malaysia
Level 2, Tower Block 4G2, Wisma Tani,
Precinct 4, 62628 Putrajaya, Malaysia
Tel: +603 8870 4212
Fax: +603 8889 1195
E-mail: ahazizi@dof.gov.my

Abu Talib bin Ahmad
Director

Fisheries Research Institute Pulau Pinang
Department of Fisheries Malaysia
Jalan Batu Maung, 11960 Batu Maung
Pulau Pinang, Malaysia
Tel: +604 626 3925
Fax: +604 626 2210
E-mail: abutalib01@dof.gov.my

MYANMAR

Kyaw Kyaw (Dr.)
Fishery Officer and SEAFDEC National
Coordinator for Myanmar

Department of Fisheries
Ministry of Livestock, Fisheries and Rural
Development
Building No.(36), Ministerial Zone
Nay Pyi Taw, Myanmar
Tel.: +95 9 250189720 and +95 67408059
E-mail: kyaw.72@gmail.com,
kyawkyaw71@hotmail.com

PHILIPPINES

Dennis V. Del Socorro
Regional Director

Bureau of Fisheries and Aquatic Resources
Regional Field Office No. 5, San Agustin,
Pili 4418 Camarines Sur, Philippines
Tel.: +63 54 4777365
Fax: +63 54 4773741

Sammy A. Malvas
Officer-In-Charge, Fisheries Policy and
Economics Division

E-mail: region5@bfar.da.gov.ph
Bureau of Fisheries and Aquatic Resources
PCA Bldg., Elliptical Road
Diliman, Quezon City, Philippines
Tel/Fax: +63 2 9297673
E-mail: formerwgrfp@yahoo.com

SINGAPORE

Lim Huan Sein
Director, Aquaculture Technology Department
and SEAFDEC National Coordinator for
Singapore

Agri-Food & Veterinary Authority (AVA)
5 Maxwell Road, #01-01 Tower Block
MND Complex, Singapore 069110
Tel: +65 63257323
Fax: +65 63257677
E-mail: lim_huan_sein@ava.gov.sg

THAILAND

Malinee Smithrithee (Mrs.)
Director of Fisheries Foreign Affairs Division and
SEAFDEC National Coordinator for Thailand

Department of Fisheries
Kaset Klang, Chatuchak
Bangkok 10900, Thailand
Tel: +66 25798215
Fax: +66 25797940
E-mail: malinee_pom@hotmail.com

Chuanpid Chantarawarathit (Mrs.)
Fishery Biologist (Senior Professional Level)

Department of Fisheries
Kaset Klang, Chatuchak
Bangkok 10900, Thailand
Tel: +66 25798214
Fax: +66 25620529
E-mail: ch_chuanpid@yahoo.com

Chalermchai Suwannarak
Plan and Policy Analyst (Senior Professional
Level) and Acting Director of Planning Division

Department of Fisheries
Kaset Klang, Chatuchak
Bangkok 10900, Thailand
Tel: +66 25620539
Fax: +66 25620531
E-mail: chalerm06@yahoo.com

VIETNAM

Nguyen Thi Trang Nhung (Ms.)
Deputy Director of Science, Technology and
International Cooperation Department, and
SEAFDEC National Coordinator for Vietnam

Fisheries Administration
10 Nguyen Cong Hoan, Ba-Dinh,
Hanoi, Vietnam
Tel: +84 912153865
E-mail: trangnhungicd@gmail.com

Nguyen Thi Hong Nhung (Ms.)
Science, Technology and International
Cooperation Department

Fisheries Administration
10 Nguyen Cong Hoan, Ba-Dinh,
Hanoi, Vietnam
Tel: +84 912153865
E-mail: nhung.doa@gmail.com

SEAFDEC

Secretariat

Chumnarn Pongsri (Dr.) Secretary-General and Chief of SEAFDEC/TD	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29405682 Fax: +66 29406336 E-mail: sg@seafdec.org
Hajime Kawamura Deputy Secretary-General and Deputy Chief of SEAFDEC/TD	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29406331 Fax: +66 29406336 E-mail: dsg@seafdec.org
Magnus Torell (Dr.) Senior Advisor	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29551557 Fax: +66 29406336 E-mail: magnus@seafdec.org
Somboon Siriraksophon (Dr.) Policy and Program Coordinator	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29406333 Fax: +66 29406336 E-mail: somboon@seafdec.org
Nualanong Tongdee (Ms.) Information Program Coordinator	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29551517 Fax: +66 29406336 E-mail: nual@seafdec.org
Tadahiro Kawata Technical Expert on Trust Fund Project	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29406332 Fax: +66 29406336 E-mail: kawata@seafdec.org
Hidenao Watanabe Assistant Trust Fund Manager	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29406334 Fax: +66 29406336 E-mail: watanabe@seafdec.org
Pattaratjit Kaewnuratchadasorn (Ms.) Program Manager	P.O. Box 1046, Kasetsart Post Office Bangkok 10903, Thailand Tel: + 66 29406326 Fax: +66 29406336 E-mail: pattaratjit@seafdec.org

Training Department (TD)

Bundit Chokesanguan
Information and Training Division Head, and
Special Departmental Coordinator

P.O. Box 97, Phrasamutchedi Post Office,
Samutprakan 10290, Thailand
Tel: + 66 24256120
Fax : +66 24256110
E-mail: bundit@seafdec.org

Aquaculture Department (AQD)

Felix G. Ayson (Dr.)
Chief of SEAFDEC/AQD

Main Office:
Tigbauan Main Station (TMS)
Tigbauan 5021, Iloilo, Philippines
Tel/Fax: +63 33 5119174
Manila Office:
Rm. 102, G/F, PSSC Building
Commonwealth Avenue
Diliman, Quezon City 1101, Philippines
Tel/Fax: +63 2 9277825
E-mail: aqdchief@seafdec.org.ph;
fgayson@seafdec.org.ph

Teruo Azuma (Dr.)
Deputy Chief of SEAFDEC/AQD

Main Office:
Tigbauan Main Station (TMS)
Tigbauan 5021, Iloilo, Philippines
Tel/Fax: +63 33 5118878
Manila Office:
Rm. 102, G/F, PSSC Building
Commonwealth Avenue
Diliman, Quezon City 1101, Philippines
Tel/Fax: +63 2 9277825
E-mail: azuma@seafdec.org.ph

Belen O. Acosta (Ms.)
Senior Information Specialist, and Special
Departmental Coordinator

Rm. 102, G/F, PSSC Building, Commonwealth
Avenue, Diliman, Quezon City 1101, Philippines
Tel: +63 2 9275542
Fax: +63 2 9277825
E-mail: bacosta@seafdec.org.ph

Dr. Evelyn Grace DJ Ayson (Mrs.)
Training and Information Division Head

Tigbauan Main Station (TMS)
Tigbauan 5021, Iloilo, Philippines
Tel: +63 33 5119172
Fax: +63 33 5118709
E-mail: edjayson@seafdec.org.ph

Dr. Emilia T. Qunitio (Ms.)
Technology Verification and Demonstration
Division Head

Tigbauan Main Station (TMS)
Tigbauan 5021, Iloilo, Philippines
Tel/Fax: +63 33 5119029
E-mail: etqunit@seafdec.org.ph

Dr. Junemie Hazel Lebata-Ramos (Ms.)
Research Division Head

Tigbauan Main Station (TMS)
Tigbauan 5021, Iloilo, Philippines
Tel/Fax: +63 33 5119070
E-mail: jlebata@seafdec.org.ph

Marine Fisheries Research Department (MFRD)

Yeap Soon Eong
Chief of SEAFDEC/MFRD

2 Perahu Road, Off Lim Chu Kang Road,
Singapore 718915
Tel: + 65 6790 973
Fax: +65 68613196
E-mail : Yeap_Soon_Eong@ava.gov.sg

Marine Fishery Resources Development and Management Department (MFRDMD)

Mahyam Mohd Isa (Ms.)
Chief of SEAFDEC/MFRDMD

Taman Perikanan Chendering
21080 Kuala Terengganu, Terengganu Malaysia
Tel: +60 9 6175940
Fax: +60 9 6175136
E-mail: mahyam@seafdec.org.my

Masaya Katoh (Dr.)
Deputy Chief of SEAFDEC/MFRDMD

Taman Perikanan Chendering
21080 Kuala Terengganu, Terengganu Malaysia
Tel: +60 9 6175940
Fax: +60 9 6174042
E-mail: katoh@seafdec.org.my

Raja Bidin Raja Hassan
Special Departmental Coordinator

Chendering Fisheries Garden
21080 Kuala Terengganu, Malaysia
Tel: +60 9 6175940
Fax: +60 9 6175136
E-mail: rbidin@seafdec.org.my

OBSERVERS

ASEAN Secretariat

Pham Quang Minh (Dr.)
Assistant Director

The ASEAN Secretariat
Jl. Sisingamangaraja 70 A,
Jakarta, Indonesia 10220
Tel: +62 21 7262991
Fax: +62 21 7398234
E-mail: pham.minh@asean.org

ASEAN-U.S. Market Project

Timothy P. Moore
Deputy Chief of Party,
ASEAN-U.S. Market Project

Kenan Institute Asia Office
Queen Sirikit National Convention Center
2nd Fl, Zone D, Room 201/2
60 New Ratchadapisek Road, Klongtoey
Bangkok, Thailand
Tel: +66 22293131
Fax: +66 22293130
E-mail: tmoore@nathaninc.com

Pradeep A. Liyanamana
Consultant,
ASEAN-U.S. Market Project

Jl. Melawai Raya No. 67-68
3rd Fl, Kebayoran Baru, Jakarta Selatan
Indonesia 12130
Tel: +62 21 72788608
Fax: +62 21 72788609
E-mail: pliyanamana@yahoo.com

MRC

Ngor Peng Bun
Capture Fisheries Specialist, FP/MRCS

Mekong River Commission Secretariat
576 National Road #2, Chak Angre Krom
PO. Box 623, Phnom Penh, Cambodia
Tel: +855 77 366689
Fax: +855 23 425363
E-mail: pengbun@mrcmekong.org

NATC

Daud Bin Othaman
Director, National Agriculture Training Council

Majlis Latihan Pertanian Kebangsaan (NATC)
Kementerian Pertanian dan Industri Asas Tani,
Aras 3, Wisma Tani, No. 28,
Persiaran Perdana, Presint 4,
62624 Putrajaya, Malaysia
Tel: +603 88701802
Fax: +603 88701699
E-mail: daudo@moa.gov.my

Ganesan Vethiah
Fisheries Officer, Planning And Development,
National Agriculture Training Council

Majlis Latihan Pertanian Kebangsaan (NATC)
Kementerian Pertanian dan Industri Asas Tani,
Aras 3, Wisma Tani, No. 28,
Persiaran Perdana, Presint 4,
62624 Putrajaya, Malaysia
Tel: +603 88701677
Fax: +603 88701699
E-mail: ganesan@moa.gov.my

NOAA

Rusty Brainard (Dr.)
Research Division Chief, NOAA Technical Lead
for an Ecosystem Approach to Fisheries
Management (EAFM)

U.S. National Oceanic & Atmospheric
Administration (NOAA)
National Marine Fisheries Service
Pacific Islands Fisheries Science Center
Coral Reef Ecosystem Division
1125B Ala Moana Boulevard
Honolulu, Hawaii
USA 96814
Tel: +1 808 9833719
Fax: +1 808 9833730
E-mail: rusty.brainard@noaa.gov

Kelvin D. Gorospe (Dr.)
Quantitative Ecologist

U.S. National Oceanic & Atmospheric
Administration (NOAA)
National Marine Fisheries Service
Pacific Islands Fisheries Science Center
Coral Reef Ecosystem Division
1125B Ala Moana Boulevard
Honolulu, Hawaii
USA 96814
Tel: +1 808 9833719
Fax: +1 808 9833730
E-mail: kelvin.gorospe@noaa.gov

Swedish Government

Göran Haag
Programme Manager,
Development Cooperation Section

Embassy of Sweden
One Pacific Place, 11th floor
140 Sukhumvit Road, Bangkok 10110
Thailand
Tel: +66 899684506
Fax: +66 22637255
E-mail: goran.s.haag@gov.se

Peter Funegård
Senior Analyst,
International Coordination Unit

Swedish Agency for Marine and Water
Management (SwAM)
E-mail: peter.funegard@havochvatten.se

Government of Malaysia

Hamdan bin Jaafar
Head of Fisheries Bio-security Centre

Fisheries Biosecurity Centre, Kuala Lumpur
Lot 82, Jalan Carruthers
Off Jalan Sultan Salahuddin
50480 Kuala Lumpur, Malaysia
Tel: +603 2697 0045, 26970307
Fax: +603 2202 8856
E-mail: hamjaa01@dof.gov.my

Hj. Munir bin Hj. Mohd. Nawi
Head of Marine Aquaculture Section,
Aquaculture Development Division

Department of Fisheries Malaysia
Level 1, Podium 2, Tower Block 4G2, Wisma
Tani, Precinct 4
62628 Putrajaya, Malaysia
Tel: +60 19 2756001
Fax: +603 88891794
E-mail: munir@dof.gov.my

Mohd. Ghazali bin Abd. Manap
Head of Audit and Certification Section,
Fisheries Bio-security Division

Department of Fisheries Malaysia
Aras 3, Blok Podium 2-4G2, Wisma Tani
30, Persiaran Perdana, 62628 Putrajaya, Malaysia
Tel: +603 8870 4671
Fax: +603 8890 3794
E-mail: ghazalimanap@dof.gov.my;
ghazalimanap@gmail.com

Anis Mazidah bt. Abd. Samad (Mrs.)
Fishery Officer

Pejabat Perikanan Negeri Terengganu
21080 Chendering, Kuala Terengganu, Malaysia
Tel: +60 9 6163442
Fax: +60 9 6173351
E-mail: anis@dof.gov.my

Adilah Hani bt. Yusuf (Mrs.)
Fisheries Officer, Fisheries Information
Management Division

Department of Fisheries Malaysia
Wisma Tani, Level 3, Block 4G2
No.30, Persiaran Perdana, Precinct 4,
Federal Government Administrative Centre 62628
Putrajaya, Malaysia
Tel: +603 8870 4035; +60193802659
Fax: +603 8889 2498
E-mail: adila@dof.gov.my

Haryati bt. Abdul Wahab (Mrs.)
Fisheries Officer, Licensing and Resource
Management Division

Department of Fisheries Malaysia
Level 1, Tower Block 4G2, Wisma Tani,
Precinct 4, 62628 Putrajaya, Malaysia
Tel: +603 8870 4437
Fax: +603 8889 1233
E-mail: haryati@dof.gov.my

Ong See Ling (Mrs.)
Fisheries Officer, International Relations Section,
International Trade and Investment Division

Department of Fisheries Malaysia
Level 2, Tower Block 4G2, Wisma Tani,
Precinct 4, 62628 Putrajaya, Malaysia
Tel: +603 8870 4379
Fax: +603 8889 1195
E-mail: see_ling@dof.gov.my

Nur Fadhlina Chan bt. Mahadie Chan (Ms.)
Fisheries Officer, International Relations Section,
International Trade and Investment Division

Department of Fisheries Malaysia
Level 2, Tower Block 4G2, Wisma Tani,
Precinct 4, 62628 Putrajaya, Malaysia
Tel: +603 8870 4321
Fax: +603 8889 1195
E-mail: fadhlina@dof.gov.my

Zahir bin Zakaria
Fisheries Officer, Licensing and Resource
Management Division

Department of Fisheries Malaysia
Level 1, Tower Block 4G2, Wisma Tani,
Precinct 4, 62628 Putrajaya, Malaysia
Tel: +603-8870 4787
Fax: +603-8889 1233
E-mail: zahir@dof.gov.my

Halimah Mohamed (Ms.)
Research Officer

Fisheries Research Institute Pulau Pinang
Department of Fisheries Malaysia
Jalan Batu Maung,
11960 Batu Maung
Pulau Pinang, Malaysia
Tel: +604 6263925
E-mail: halimahm@dof.gov.my

MFRDMD

Mohammad Faisal bin Md. Saleh
Fisheries Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu, Terengganu Malaysia
Tel: +609-6175 940
Fax: +609-6172 361

Noorul Azliana binti Jamaludin (Ms.)
Fisheries Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu, Terengganu Malaysia
Tel: +609-6175 940
Fax: +609-6175136
E-mail: noorul@seafdec.org.my

Wahidah binti Mohd. Arshaad (Ms.)
Fisheries Research Officer

SEAFDEC/MFRDMD
Taman Perikanan Chendering
21080 Kuala Terengganu, Terengganu Malaysia
Tel: +609-6175 940
Fax: +609-6175136

Technical Secretaries

Virgilia T. Sulit (Mrs.)
Fisheries Technical Officer

P.O. Box 1046, Kasetsart Post Office
Bangkok 10903, Thailand
E-mail: sulit@seafdec.org

Sawitree Chamsai (Ms.)
Policy and Program Officer-I

P.O. Box 1046, Kasetsart Post Office
Bangkok 10903, Thailand
E-mail: sawitree@seafdec.org

Suwanee Sayan (Ms.)
Policy and Program Officer-II

P.O. Box 1046, Kasetsart Post Office
Bangkok 10903, Thailand
E-mail: suwanee@seafdec.org

Saivason Klinsukhon (Ms.)
Information Officer-I

P.O. Box 1046, Kasetsart Post Office
Bangkok 10903, Thailand
E-mail: saivason@seafdec.org

Secretariat of the Meeting

Saowanee Wanothayarnchai (Mrs.)
Julasak Markawat
Aznan Hj Zainal

OPENING REMARKS

By Dr. Chumnarn Pongsri
SEAFDEC Secretary-General

Distinguished Members of the SEAFDEC Program Committee,
SEAFDEC Deputy Secretary-General and Advisor,
SEAFDEC Department Chiefs and Senior Officials,
Representatives from our Collaborating Partners,
Ladies and Gentlemen,

Good morning and welcome to the Thirty-sixth Meeting of SEAFDEC Program Committee in this beautiful City of Penang. First of all, I would like to extend our gratitude to the SEAFDEC/MFRDMD for hosting this meeting.

But before going any further, on behalf of SEAFDEC and the Member Countries, I would like to express our condolences to the Philippines, especially to all those who have been affected by the destruction brought about by Super Typhoon Haiyan on 8 November. We are really saddened not only of the devastations to homes and infrastructures but also of the loss of lives of many people in Leyte and nearby provinces as well as those in Panay Island. SEAFDEC is also grieved by the sufferings of the people from the affected provinces in the aftermath of Typhoon Haiyan.

Ladies and Gentlemen, to continue with the business of this Meeting, please be informed that we will start with the Programs under the FCG/ASSP Mechanism followed by Departmental Programs and other programs. Specifically, the Programs under the FCG/ASSP Mechanism have been grouped accordingly under the Program Thrusts of the SEAFDEC Program Framework adopted by the SEAFDEC Council in 2009. Moreover, we will also review the special projects and the proposed new project for the year 2014.

At this point in time, I would like to request the members of the Program Committee to take time to re-check/update the requirements of the ASEAN countries and to put special attention on Prioritizing Regional Issues to be Considered/Undertaken by SEAFDEC in the near future.

The list of components/issues of which was indicated by the Member Countries and compiled by the Third SEAFDEC Review Committee during their consultations with concerned officers and visits to the ASEAN countries from December 2012 to February 2013. As you can see, this was made part of the Report of the Third SEAFDEC Review, which was submitted to the Special Council Meeting in October 2013 in Bangkok, Thailand.

Ladies and Gentlemen, our schedule from today until Wednesday will be very hectic as we would review the results of implementation of the programs in 2013 as well as the proposed programs of activity for 2014. As before, such review would take into consideration the 2011 Resolution and Plan of Action, the needs of the Member Countries, and policy directives given by the SEAFDEC Council. The outputs of this Meeting together with your recommendations would be submitted to the forthcoming meeting of the SEAFDEC Council for consideration and approval as well as to the ASEAN Sectoral Working Group on Fisheries or ASWGFi as appropriate, through the Sixteenth Meeting of the FCG/ASSP to be held back-to-back with this Program Committee Meeting.

We are therefore inviting the members of the Program Committee to closely examine the programs of activity of SEAFDEC and if there is probable cause, to criticize the direction and objectives of the proposed programs of activity, as stipulated in the Terms of Reference of the SEAFDEC Program Committee. We would also welcome the advice, ideas, insights, and suggestions of our collaborating partners for the improvement of our programs to ensure that these are suitable enough to address the requirements of the region.



Ladies and Gentlemen, we are therefore asking for your utmost cooperation and active participation in the discussions. Your inputs are very crucial to enable this Meeting to come up with concrete results that would pave the way towards greater success for SEAFDEC in the years ahead of us. On that note, I now declare the Thirty-sixth Meeting of SEAFDEC Program Committee open.

Thank you very much and good day!

AGENDA

Agenda 1: Opening of the Meeting

Agenda 2: Adoption of Agenda and Arrangement of the Meeting

Agenda 3: Review of SEAFDEC Program Implementation for the Year 2013 and Proposed Programs for the Year 2014

3.1 Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism for the Year 2013-2014

3.1.1 Program Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security

- Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds for Resources Enhancement
- Human Resources Development (HRD) Programs on Fisheries Management Approaches for Sustainable Fisheries
- Optimizing Energy Use/Improving Safety Onboard in Fishing Activities
- Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release
- Promotion of Sustainable and Region-oriented Aquaculture

3.1.2 Program Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade

- Chemical and Drug Residues in Fish and Fish Products in Southeast Asia “Biotxin Monitoring in ASEAN” Extension work to: ASP, AZA and BTX
- Traceability Systems for Aquaculture Products in the ASEAN Region
- Utilization of Freshwater Fish for Value-added Products
- Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia
- Food Safety of Aquaculture Products in Southeast Asia

3.1.3 Program Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries

- Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)
- Promotion of Countermeasures to Reduce IUU Fishing Activities
- Combating IUU Fishing in the Southeast Asian Region through Application of EU Catch Certification for Trading of Fish and Fishery Products

3.1.4 Program Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries

- Fisheries Resource Survey & Operational Plan for M.V. SEAFDEC 2
- Offshore Fisheries Resources Exploration in the Southeast Asia
- Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters
- Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in the Southeast Asian
- Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region
- Research and Management of Sharks and Rays in the Southeast Asian Waters



- 3.1.5 Program Thrust V: Addressing International Fisheries-related Issues from a Regional Perspective
 - Assistance for Capacity Building in the Region to Address International Fisheries-related Issues
 - Strengthening SEAFDEC Network for Sustainable Fisheries
- 3.1.6 Special Project:
 - Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia
- 3.1.7 Proposed New Projects for the Year 2014
 - Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (TD/UNEP/GEF/SCS)
 - Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (ASEAN-SEC/IDB/SEAFDEC)

3.2 Departmental Programs

3.2.1 Aquaculture Department

- Adapting to Climate Change Impacts
- Healthy and Wholesome Aquaculture
- Maintaining Environmental Integrity through Responsible Aquaculture
- Meeting Socio-economic Challenges in Aquaculture
- Quality Seed for Sustainable Aquaculture

3.2.2 Training Department

- Promotion on Strengthening of SEAFDEC Visibility and Image
- Tailor-made Training Programs
- Improvement of Fisheries Technology and Reduction of the Impact from Fishing

3.3 Other Programs

- Coastal Area Capability Enhancements in Southeast Asia (SEAFDEC/RIHN Collaborative Project)
- Conservation and Management of Eel Resources in the Southeast Asia (New Project-FAJ)

Agenda 4: Pipeline Projects and Emerging Needs for Preparation of Future Project Proposals

Agenda 5: Identification of Regional Priorities for Future Program Formulation

- 5.1 Country Inputs on Regional Priorities for Future Program Formulation
- 5.2 Suggested Way Forward for Improving SEAFDEC's Work Efficiency

Agenda 6: Other Matters

- 6.1 Introduction of 2014 JTF Projects and New JTF-VI Projects for 2015
- 6.2 Monitoring and Reporting of SEAFDEC Program Thrusts
- 6.3 Proposed Collaborative Program on Fisheries Resources and Environmental Survey in the Gulf of Thailand Using the M.V. SEAFDEC
- 6.4 Collaborative Program Framework for the Oceanic Tuna Resources in the Sulu-Sulawesi Seas Sub-region

Agenda 7: Cooperation with Donors, Non-member Government and International/Regional Organizations

Agenda 8: Conclusions & Recommendations of the Thirty-sixth Meeting of the Program Committee

8.1 Adoption of Report of the Meeting

8.2 Date and Venue of the Thirty-seventh Meeting of the Program Committee

Agenda 9: Closing of the Meeting

**PROGRAMS UNDER THE FISHERIES CONSULTATIVE GROUP
OF THE ASEAN-SEAFDEC STRATEGIC PARTNERSHIP (FCG/ASSP) MECHANISM FOR THE
YEAR 2013-2014**

I. Existing Projects

Appendix No.	Program Thrust/ Project Title	Lead Department	2013	2014
Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation & Food Security				
1	Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement	TD	Y	Y
2	Human Resource Development for Sustainable Fisheries	TD	Y	Y
3	Optimizing Energy Use/Improving Safety Onboard in Fishing Activities	TD	Y	Y
4	Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD	Y	Y
5	Promotion of Sustainable and Region-oriented Aquaculture	AQD	Y	Y
Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade				
6	Chemical and Drug Residues in Fish and Fish Products in Southeast Asia "Biotoxin Monitoring in ASEAN": ASP, AZA and BTX	MFRD	Y	Y
7	Traceability Systems for Aquaculture Products in Southeast Asian Region	MFRD	Y	Y
8	Utilization of Freshwater Fish for Value-added Products	MFRD	Y	N
9	Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD	Y	Y
10	Food Safety of Aquaculture Products in Southeast Asia	AQD	Y	Y
Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries				
11	Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)	TD	Y	Y
12	Promotion of Counter Measures to Reduce IUU fishing activities	TD	Y	Y
13	Combating IUU Fishing in the Southeast Asian Region through Application of EU Catch Certification for Trading of Fish and Fishery Products	MFRDMD	Y	Y
Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries				
14	Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2	TD	Y	Y
15	Offshore Fisheries Resources Exploration in Southeast Asia	TD	Y	Y
16	Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters	MFRDMD	Y	Y
17a-17c	Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region	TD	Y	Y
18	Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region	MFRDMD	Y	Y
19	Research and Management of Sharks and Rays in the Southeast Asian Waters	MFRDMD	Y	Y
Thrust V: Addressing International Fisheries Related Issues from a Regional Perspective				
20	Assistance of Capacity Building in the Region to Address International Trade Related Issues	SEC	Y	Y
21	Strengthening SEAFDEC Network for Sustainable Fisheries	SEC	Y	Y

II. Special Project

Appendix No.	Project Title	Lead Department	Period
22	Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia	SEC	2013-2017

III. Proposed New Special Projects

Appendix No.	Project Title	Lead Department	Period
23	Establishment and Operation of a Regional System of Fisheries <i>Refugia</i> in the South China Sea and Gulf of Thailand (UNEP/GEF/SEAFDEC/SCS)	TD	2014-2017
24	Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (ASEAN-SEC/IDB/ SEAFDEC)	MFRDMD	2014-2015

Y = Program proposed/implemented during the year

N = Program not proposed/implemented during the year

PROJECT DOCUMENT

				Project id: 011001
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism			
Project Title:	Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement			
Program Thrust:	I	Total Duration:	5 yrs (2010-2014)	
Lead Department:	Training Department	Lead Country:	Thailand	
Project Sponsor:	Japanese Trust Fund	Project Partner:		
Proposed Budget:	USD 65,500	This year budget:	[2013] USD 65,500	
Prepared by	Taweekiet A. /Fisheries Resource Enhancement Section Head	Project Leader	Yuttana T./Coastal and Small-scale Fisheries Management Division Head	

1. INTRODUCTION/BACKGROUND

The quality of coastal and inshore ecosystems has been deteriorated significantly as a result of continued and increasing human activities. These areas are critical to a broad range of aquatic organisms during their life cycles including spawning, nursery areas and feeding zones and many of these species are of economic importance. The areas serve as important sources of recruitment to, and the sustainability of, commercial fisheries. It is suggested that the productivity of these ecosystems can be enhanced through human intervention leading to improved livelihoods for coastal communities. Immediate action is required to prevent further loss of habitat and damage to fish stocks. A range of effective community-level mechanisms must be developed to assist fishers to restore habitats and rebuild stocks. These mechanisms are likely to be specific to different stocks and habitats.

TD will be the responsible SEAFDEC Department for this project and will manage and coordinate all project activities. Other ASEAN Member Countries identified as core countries will be involved in implementing the relevant project activities on a cost-sharing basis to develop Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement program and to conduct pilot projects to implement the program in their respective countries.

The project involves the identification of appropriate resource enhancement tools for the region in order to develop management measure and formulate strategies and guideline through the regional consultative meeting. Regional training programs will be conducted to build up capacity in ASEAN Member Countries for promote sustainable fisheries resources enhancement.

Project monitoring and evaluation will include annual progress reports, and end-of activity workshops.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

This Project titled “Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds though Resources Enhancement” is being proposed to aim at;

- 1) Investigate/diagnose the fishery resource status of critical fishing grounds and fishery *refugia* sites;
- 2) Evaluate feasibilities and environmental/socio-economical impacts by resource enhancement practices; and
- 3) Develop regional management approach of coastal fisheries in the rehabilitated habitats in ASEAN Region.



2.2 Expected Outcomes and Outputs:

The program for the fourth year involves development of diagnoses of critical fishing grounds and evaluation by resources enhancement practices, technical assistance led by pilot project sites for suitable resources enhancement practices and information dissemination on rehabilitation of fisheries resources and habitat/fishing grounds in ASEAN Region.

The expected outputs for the project include development of strategies for implementing resources enhancement program to promote sustainable fisheries resources enhancement, and development of human resources in ASEAN Member Countries for the implementation of resources enhancement programs. A series of the previous surveys and practices in the years 2010-2012 could greatly contribute distinct results and views.

The expected outputs for the project include development of strategies and guide line for implementing resources enhancement program to promote sustainable fisheries resources enhancement, developing human resources in ASEAN Member Countries for the implementation of resources enhancement programs.

2.3 Project Description/Framework

The project will be implemented through the following activities and sub-activities:

Activity 1: Development on diagnoses of critical fishing grounds and evaluation by resources enhancement practices

Sub-Activity 1.1 Investigation/review of the status of critical fishing grounds in the Southeast Asian region

Investigation of the existing basic information and research works in identifying the critical fishing grounds as well as spawning and nursery grounds known also as “Fishery *Refugia*” for commercial fishes including bottom and pelagic species, will be conducted. Information collection would be conducted through deskwork and visit to the Member Countries. The results of the information gathering will be used for mapping and assessment by indices of the status of the critical fishing grounds in the region.

No Activity in 2013

Sub-Activity 1.2 Information collection on suitable designs of resource enhancement practices including their evaluation and promotion

Investigation of existing information and research works on the effective designs/models and methodologies for the resource enhancement tools/practices used in various fisheries habitat will be conducted. Information collection would be conducted through deskwork and designs/models experiment.

Sub-Activity 1.3 Workshop/Expert consultation on resource enhancement practices

This activity includes workshops as well as expert consultations to identify appropriate and effective resources enhancement tools for various fishery habitats.

No Activity in 2013

Sub-Activity 1.4 Workshop/Expert consultation on identification of critical fishing grounds and on regional habitat rehabilitation and management approach

The workshops/expert consultative meetings will be conducted on identification of critical fishing grounds and fishery refugia. This activity will also be developed based on recommendations during the organized regional workshops. Local people’s indigenous knowledge and participation will be major factors to bring about and sustain an active fisheries habitat rehabilitation and management program. Scientific data and

information will be supported by the views of the local people who will choose the right means or methods to strengthen their activities.

No Activity in 2013

Activity 2: Technical assistance led by pilot project sites and capacity building on rehabilitation of fisheries resources and habitats/fishing grounds

Sub-Activity 2.1 Technical assistance in a pilot site for suitable designs of resource enhancement practices

In this activity, selected onsite study and evaluation on enhancement practices including artificial reefs impact to fisheries resources and environment are conducted in Rayong province, Thailand.

Sub-Activity 2.2 Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management

In order to develop strategies and actions in rehabilitating the critical fishing grounds as practical management measures, critical fishing grounds will be selected for diagnosing fishing grounds and monitoring the achievements of rehabilitation program in selected pilot sites such as sea grass beds for dog conch in Krabi Province, Thailand.

Also Case studies on the selected priority important fisheries ecosystem identified and evaluated in cooperation with Member Countries will be conducted including a case study by SEAFDEC on identification and evaluation of fisheries ecosystem in the freshwater reservoir in Nam Houm, Lao PDR.

Sub-Activity 2.3 Capacity building on rehabilitation practices of fisheries resources and habitats/fishing grounds

Capacity building on rehabilitation practices of fisheries resources and habitats/fishing grounds would be provided through a training course and study trip to transfer of assistance both in terms of technical and management aspects to Member Countries in order to enhance their capacities and awareness of fishery resources rehabilitation and habitats/fishing grounds practices

Sub-Activity 2.4 Capacity building on identification of critical fishing grounds and on regional habitat rehabilitation and management approach

Regional training course, which will strongly support the transfer of assistance both in term of technical and management aspects to promote the enhancement of fisheries habitat among Member Countries, to improve their capacities in the preservation and rehabilitation of critical fishing grounds and fishery *refugia*.

Activity 3: Promotion and extension on rehabilitation of fisheries resources and habitat/ fishing grounds in ASEAN Region

Sub-Activity 3.1 Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness

Documentation of the best practices of the project implementation will be carry out, which can be used as inputs in the preparation of IEC (information, education and communication) materials for dissemination in the region.

Sub-Activity 3.2 Regional seminar for end of the project

No Activity in 2013

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>Activity 2: Technical assistance led by pilot project sites and capacity building on rehabilitation for fisheries resources and habitats/fishing grounds</p> <p>Sub-Activity 2.1 Technical assistance in a pilot site for suitable designs of resource enhancement practices</p> <ul style="list-style-type: none"> - Installation of Fish/Resource Enhancing Devices in the Artificial Reefs 	Tentatively scheduled to be carried out by 2013	
<p>Sub-Activity 2.2 Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management</p> <ul style="list-style-type: none"> - Sea grass beds for dog conch conservation and rehabilitation, Sriboya Island, Krabi Province - Attended a Seminar on the Dog Conch Resource Management Measures in Krabi Province, Thailand - Attended by 70 participants from stakeholders (Representatives from 6 provinces in the Andaman Sea namely; Krabi, Pang Nga, Phuket, Trang and Satun Provinces - 3 Representatives from SEAFDEC/TD - The meeting agreed to ban the harvesting of under-sized dog conch and this would also extend to ask full cooperation from the fishing communities, restaurants and markets not to harvest and sale dog conch in the system - Allowable harvestable size of the dog conch is above 6-7 cm of its shell length - Only hand collecting of the dog conch is allowed. Using dredges or net with or without motorized boat is prohibited - Air supplied equipment or tanks to collect the dog conch is prohibited - Declaration of a conservation area for dog conch should be made for each area - Will be taken into consideration for the next meeting on the Resource Conservation in the Andaman Sea by the end of the year 	31 August 2013	
<p>Sub-Activity 2.3 Capacity building on rehabilitation practices of fisheries resources and habitats/fishing grounds</p> <ul style="list-style-type: none"> - A short term regional training course on the rehabilitation practices of fisheries resources and habitats/fishing grounds is under consideration for the time period by the end of 2013 	Tentatively scheduled to be carried out by 2013	

3.2 Evaluation of the Project Outcomes Till the Year 2013 <in general>

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement</p>
<p>(2) Issues in the region at the beginning of the study: The quality of coastal and inshore ecosystems has been deteriorated significantly as a result of continued and increasing human activities. These areas are critical to a broad range of aquatic organisms during their life cycles including spawning, nursery areas and feeding zones and many of these species are of economic importance. The areas serve as important sources of recruitment to, and the sustainability of, commercial fisheries. It is suggested that the productivity of these ecosystems can be enhanced through human intervention leading to improved livelihoods for coastal communities. Immediate action is required to prevent further loss of habitat and damage to fish stocks. A range of effective community-level mechanisms must be developed to assist fishers to restore habitats and rebuild stocks. These mechanisms are likely to be specific to different stocks and habitats.</p>

3.2.2 Expected Final Goal of the Project:

- | |
|---|
| <ul style="list-style-type: none"> - To optimize the use of fishing ground through resource enhancement programs - To develop human resources for the implementation of resource enhancement programs - To develop a guideline for implementing resources enhancement program - To formulate strategies and actions plan in rehabilitating the selected critical fishing grounds - To enhance cooperation and collaboration among Member Countries to improve capacity building in rehabilitation of the critical fishing grounds - To provide a guidance on multifaceted fisheries habitat rehabilitation and management to enhance the fishing communities practicing in the importance of harmonization between sustainable fisheries management and environmental concerns - To facilitate community's initiative practicing on the coastal habitat rehabilitation and management particularly through the applicable practice of responsible fisheries in order to achieve sustainable coastal fisheries and environment friendly |
|---|

3.2.3 "Steps" Toward Achieving Final Goal:

- | |
|--|
| <p>Step 1:</p> <ul style="list-style-type: none"> - Information survey & method validation - Case study on selected sites in Thailand (Rayong and Krabi Provinces), and Lao PDR (Nam Houm Reservoir) - Workshop/Seminar |
| <p>Step 2:</p> <ul style="list-style-type: none"> - Data analysis and evaluation - Continue case study on selected site - Workshop/seminar - Technical transfer by capacity building to Member Countries |
| <p>Step 3:</p> <ul style="list-style-type: none"> - Evaluation of the impact to resources enhancement methodology - Update of Baseline data - Continued sample analyses and preparation/submission of reports - Guideline preparation /publication |

3.2.4 Activities in the Current Project:

- | |
|---|
| (1) Current position of the project: (Step 2-3) |
| (2) Program duration: (2010-2014) |
| <p>(3) Main activities:</p> <ul style="list-style-type: none"> - Development on diagnoses of critical fishing grounds and evaluation by resources enhancement practices - Technical assistance led by pilot project sites and capacity building on rehabilitation of fisheries resources and habitats/fishing grounds - Promotion and extension on rehabilitation of fisheries resources and habitat/ fishing grounds in ASEAN Region |

3.2.5 Progress and Achievements of the Current Project:

- | |
|--|
| <p>(1) Main activities conducted in the current project</p> <ol style="list-style-type: none"> 1. Investigation/review of the status of critical fishing grounds in the Southeast Asian Region 2. Information collection on suitable designs of resource enhancement practices including their evaluation and promotion 3. Workshop/Expert consultation on resource enhancement practices 4. Workshop/Expert consultation on identification of critical fishing grounds and on regional habitat rehabilitation and management approach 5. Technical assistance in a pilot site for suitable designs of resource enhancement practices 6. Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management 7. Capacity building on rehabilitation practices of fisheries resources and habitats/fishing grounds 8. Capacity building on identification of critical fishing grounds and on regional habitat rehabilitation and management approach |
|--|

9. Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness
10. Regional seminar for ending of the project

- (2) Main achievements till the end of 2013 (tentative)**
1. Investigation /review of the present status of critical fishing grounds in the Southeast Asian Region
 2. Information collection on suitable designs of resource enhancement practices including their evaluation and promotion
 3. Workshop/Expert consultation on resource enhancement practices
 4. Workshop/Expert consultation on identification of critical fishing grounds and on regional habitat rehabilitation and management approach
 5. Technical assistance in a pilot site for suitable designs of resource enhancement practices
 6. Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management
 7. Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness and through the region

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)

Expected outcomes/outputs	Achievement rate (%)
- To optimize the use of fishing ground through resource enhancement programs;	45%
- To develop human resources for the implementation of resource enhancement programs	50%
- To develop a guideline for implementing resources enhancement program	45%
- To formulate strategies and actions plan in rehabilitating the selected critical fishing grounds	40%
- To enhance cooperation and collaboration among Member Countries to improve capacity building in rehabilitation of the critical fishing grounds	55%
- To provide a guidance on multifaceted fisheries habitat rehabilitation and management to enhance the fishing communities practicing in the importance of harmonization between sustainable fisheries management and environmental concerns	45%
- To facilitate community's initiative practicing on the coastal habitat rehabilitation and management particularly through the applicable practice of responsible fisheries in order to achieve sustainable coastal fisheries and environment friendly.	60%

3.2.6 Evaluation of Project Activities in 2013

Investigations and inspection on the present status of the critical fishing grounds (*e.g.* sea grass beds, artificial reefs, reservoirs) have been carried out to identified and diagnosed. Some implementation on the rehabilitation, conservation measures have been made and push forward to the communities.

For marine resources, the selected sites (*e.g.* Sriboya Island, Krabi Province) are considered in the state of 'Declination' and needs to be conserved. Since the harvest of dog conch in the sea grass beds are commonly made in the area both by hands and/or labor saving equipment as motorized boats, dredges and nets. Such massive methods could easily induce the drastic degradation of the habitats and the populations of the sea grass and dog conch.

An idea to conserve and optimize the utilization of the dog conch resource is to do a public awareness the importance of them. Several management schemes may be applied to the area such as limitation of the harvestable size, limited type of allowable fishing gear as well as to ban motorized boats.

Selected sites Artificial reefs have also been examined the present condition, the resource abundance, conditions of their structures and their usage to the local fishermen. Man-made reservoir such as Nam Houm Reservoir in Lao PDR. Conservation areas have been declared and demarcated for nursery grounds. Training on Mobile Hatchery Unit to breed a selected commercially-important fish species (Common Silver barb, *Barbonymus gonionotus*) to the fishing communities around the Nam Houm Reservoir, Lao PDR in order to sustain the livelihoods of the fisher folks have been carried out. A follow-up phase on the nursery techniques

has been also made.

The next step to fulfill the goal is to evaluate socio-economical impacts and the feasibilities to develop regional management approach for the ASEAN region.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Development on diagnoses of critical fishing grounds and evaluation by resources enhancement practices</p> <p><i>Sub-Activity 1.2</i> Information collection on suitable designs of resource enhancement practices including their evaluation and promotion. Investigation of existing information and research works on the effective designs/models and methodologies for the resource enhancement tools/practices used in various fisheries habitat will be conducted. Information collection would be conducted through deskwork and designs/models experiment.</p> <p>Activity 2: Technical assistance led by pilot project sites and capacity building on rehabilitation of fisheries resources and habitats/fishing grounds</p> <p><i>Sub-Activity 2.1</i> Technical assistance in a pilot site for suitable designs of resource enhancement practices In this activity, selected onsite study and evaluation on enhancement practices including artificial reefs impact to fisheries resources and environment are conducted in Rayong province, Thailand.</p> <p><i>Sub-Activity 2.2</i> Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management In order to develop strategies and actions in rehabilitating the critical fishing grounds as practical management measures, critical fishing grounds will be selected for diagnosing fishing grounds and monitoring the achievements of rehabilitation program in selected pilot sites such as sea grass beds for dog conch in Krabi province, Thailand.</p> <p>Also Case studies on the selected priority important fisheries ecosystem identified and evaluated in cooperation with Member Countries, will be conducted including a case study by SEAFDEC on identification and evaluation of fisheries ecosystem in the fresh water reservoir in Nam Haum, Lao PDR.</p> <p>Activity 3: Promotion and extension on rehabilitation of fisheries resources and habitat/ fishing grounds in ASEAN Region</p> <p><i>Sub-Activity 3.1</i> Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness Documentation of the best practices of the project implementation will be carry out, which can be used as inputs in the preparation of IEC (information, education and communication) materials for dissemination in the region.</p> <p><i>Sub-Activity 3.2</i> Regional seminar for end of the project.</p>	<p>Apr.-Sep.</p> <p>Mar.-Sep.</p> <p>Feb.-Oct.</p> <p>Jan.-Dec.</p> <p>Oct.</p>	

4.2 Expected Outcomes/Outputs of the Year 2014

The expected outputs for the project include development of strategies for implementing resources enhancement program to promote sustainable fisheries resources enhancement, and development of human resources in ASEAN Member Countries for the implementation of resources enhancement programs.

PROJECT DOCUMENT

			Project id: 011102
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Human Resources Development (HRD) Programs on Fisheries Management Approaches for Sustainable Fisheries		
Program Thrust:	I	Total Duration:	5 yrs (2013-2017)
Lead Department:	Training Department	Lead Country:	
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:	USD 53,300	This year budget:	[2013] USD 65,000
Prepared by	Panitnard (TRESH)	Project Leader	Bundit (ITRDH)

1. INTRODUCTION/BACKGROUND

As SEAFDEC/TD has been conducted training for the trainer courses with aiming to introduce and disseminate knowledge and technology for improvement of fisheries management for sustainable fisheries to Member Countries in accordance with Member Countries' request. The effective of MCS in combating IUU fishing and the Ecosystem Approach for Fisheries Management that both training courses were conducted at SEAFDEC/TD in the year 2012. The regional training for the trainer course on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region was also conducted in the year of 2013 and to accelerate in introducing and disseminating trained knowledge and technology to each Member Country, each Member Country is expected to conducted follow up domestic training with continue in giving of partly support by SEAFDEC, this with aiming to achieve success to introduce and disseminate of trained knowledge and technology to the domestic training.

In referring to the Plan of Action on Sustainable Fisheries for Food Security Towards 2020 which was adopted in ASEAN-SEAFDEC Conference Fish for the People 2020 "Adaptation to a Changing Environment" in Bangkok, Thailand during 13-17 June 2011 emphasizes: 1) Accelerate the improvement of fisheries resource management activities with taking consideration of the ecosystem approach, for sustainable fisheries; 2). Strengthen national statistical mechanisms for fisheries through the practical cost effective way and the exchange of statistical data and related information; and 3) Enhance to improve regional fishery information systems and mechanisms to facilitate sharing, exchange and compilation of statistics and information that are required at the sub-regional and regional level.

So that the key element of this HRD proposal is to continue in strengthen capability of fishery officers of the Member Countries to implement sustainable fisheries management through the application of the appropriate Monitoring Control and Surveillance (MCS) and the Ecosystem Approach to Fisheries Management (EAFM) as well as to strengthen knowledge, skill and techniques of the fishery officers for the fisheries information improvement as the basement of monitoring resources utilization throughout the region.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

This project aim to continue in strengthen the understanding of Member Countries on the applicable of MCS activities for sustainable fisheries with taking consideration Ecosystem Approaches, to support the Member Countries to build up the applicable cost effective fishery data collection, analysis and sharing systems and to strengthen knowledge of the fishers of Member Countries on the importance of fisheries resource management for the sustainable fisheries through the use of training toolkits, promotion materials; posters, cartoon booklets, VCD, etc.

2.2 Expected Outcomes and Outputs:

- Build up/strengthen capacity and increase the number of trainers (government officers) who are strengthened on the knowledge/experience on
 - Application of EAFs and MCS for fisheries management
 - Applicable and Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region
- Production of series/items of promotion materials (posters/cartoon booklets/VCD) which relevance to the sustainable fisheries management

2.3 Project Description/Framework

To achieve the mentioned of the project objectives so that this project proposal propose to implement and make follow up on the activities as follow: 1) Fellow up and onsite training activity of knowledge and experience gained from the previous Regional training for the trainer course on applicable MCS activities with taking consideration of ecosystem approaches for sustainable fisheries; 2) Fellow up and onsite training activity on Improvement of fisheries information collection for sustainable fisheries management; and 3) Production of promotional materials.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1: Follow up and onsite training activity of knowledge and experience gained from the previous Regional Training for the Trainer Course on Applicable MCS activities with taking consideration of Ecosystem Approaches for sustainable fisheries		
- The onsite training on Applicable Fisheries Management Approaches for Sustainable Fisheries was conducted in Cambodia.	5 days (3 to 7 June 2013)	
- The National training on Offshore and High Sea Fisheries Management in Vietnam is conducted in Hai Phong, Vietnam	4 days (15-18 October 2013)	
Activity 2: Phase I: Regional training for the trainer course on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region		
- The regional training for the trainer course on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region was conducted at SEAFDEC/TD	5 days (from 1-5 July 2013)	
Activity 3: Production of promotional materials		
- A training toolkit on “Understanding Sustainable Fisheries Resource Management and Community-based Management” is under the producing process.		Processing
- A comic cartoon booklet on “Story of a Fisherman” was published, this booklet aims to enhance the awareness of the fishers on the basic checklist for safety at sea.		Completed
- A comic cartoon booklet to enhance the importance of natural ecosystems is also under the producing process.		Processing

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Human Resource Development for Sustainable Fisheries

(2) Issues in the region at the beginning of the study:

- Inadequate of the knowledge and understanding of the fisheries management for sustainable utilization,

- Inadequate on the application of the existed tools and approaches for suitable fisheries management in each specific area/country,
- Inadequate of understanding on the importance of fisheries data/information as information baseline for the suitable and effective of the fisheries management,
- Inadequate of the skill fisheries officers in dealing with fisheries data/information in making use for sustainable fisheries management.

3.2.2 Expected Final Goal of the Project:

- The use of the ecosystem and MCS approaches for fisheries management will be understood and applied throughout the region,
- Fisheries information collection scheme for monitoring to fisheries activities; data collection, analysis and sharing information will be improved in the region.

3.2.3 “Steps” Toward Achieving Final Goal:

- Step 1:** Regional Human Resource Development for Sustainable Fisheries through the application of existing fisheries management tools and approaches:
- Conduction of the Regional Training for the Trainers on the effective of MCS in combating IUU fishing
 - Conduction of the Regional Training for the Trainers on the Ecosystem Approach for Fisheries Management
 - Conduction of the Regional Training for the Trainers on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region
- Step 2:** Follow up and onsite training activity of knowledge and experience gained from the previous Regional Training for the Trainer Courses on two main aspects as categorized:
- 1) The Applicable MCS activities with taking consideration of Ecosystem Approaches for sustainable fisheries;
 - 2) The Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region.
 - Conduction of the onsite training programs in the Member Countries
(the specific activity/program of each propose site/countries in conducting the follow up and onsite training on the mention topics areas will be adjusted from case by case which base on the countries condition, situation, need and requirement)
- Step 3:** Production of the training toolkits and awareness building materials and distribute to Member Countries
- 1) Production of the training toolkit on:
 - “Understanding Sustainable Fisheries Resource Management and Community-based management”
 - “Method for fisheries information collection which will be used as information baseline for sustainable fisheries management”.
 - 2) Production of the awareness building materials which are related to the project title:
 - A comic cartoon booklet to build up awareness of fishers on safety at sea “Story of a Fisherman”
 - A comic cartoon booklet to enhance on the importance of natural ecosystems
- Step 4:** Project evaluation
- Conduct the regional workshop on the evaluation of the project activities.

3.2.4 Activities in the Current Project:

- | |
|--|
| (1) Current position of the project: Step 2 and 3 |
| (2) Program duration: (2013-2017) |
| (3) Main activities: |
| 3.1 Human Resource Development for Sustainable Fisheries through the application of existing fisheries management tools and approaches at the regional and national levels |

3.2.5 Progress and Achievements of the Current Project:

- | |
|---|
| (1) Main activities conducted in the current project |
| <ul style="list-style-type: none"> - Regional HRD on the Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region - Follow up and onsite training activity of knowledge and experience gained from the previous Regional |

Training for the Trainer Courses on two main aspects of: a) The Applicable MCS activities with taking consideration of Ecosystem Approaches for sustainable fisheries, b) The Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region.	
(2) Main achievements till the end of 2013 (tentative) 1. The regional training course on the Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region was conducted from 26 February to 3 March 2013, at SEAFDEC/TD. 2. The on-site training on Applicable Fisheries Management Approaches for Sustainable Fisheries was conducted in Cambodia from 3 to 7 June 2013. 3. The on-site training course on Information Gathering through Introduction of Community-based Fisheries Management was conducted from 1-5 July 2013, Can Tho city, Vietnam. 4. The on-site training on Offshore and High Sea Fisheries Management in Vietnam is conducted in Hai Phong, Vietnam from 15-18 October of 2013.	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (Tentative)	
Expected outcomes/outputs	Achievement rate (%)
- Build-up/strengthen capacity and increase the number of trainers (government officers) who are strengthened on the knowledge/experience on - Application of EAFs and MCS for fisheries management - Application and improvement of fisheries information collection in coastal small-scale and inland fisheries of the Southeast Asian region	35%
- Series/items of promotion materials (posters/cartoon booklets/VCD) which relevance to the sustainable fisheries management.	25%

3.2.6 Evaluation of Project Activities in 2013

In 2013, one regional training course on improvement of fisheries information was conducted: Base on the courses evaluation 85% of the participants fulfilled with their course expectation and the courses objectives. Moreover, three onsite training courses were conducted, the title are as following: 1) The onsite training on Applicable Fisheries Management Approaches for Sustainable Fisheries was conducted in Cambodia; 2) The onsite training course on Information Gathering through Introduction of Community-based Fisheries Management was conducted in Vietnam; and 3) The onsite training on Offshore and High Sea Fisheries Management in Vietnam. In this regard, the total of 95 of local participants was trained in the above-mentioned training courses.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Follow up and onsite training activity of knowledge and experience gained from the previous Regional Training for the Trainer Course on Applicable MCS activities with taking consideration of Ecosystem Approaches for sustainable fisheries		
The program is proposed to be carried out in continuing to provide technical support and contribution to the Member Countries, the selection of the implementation countries will be based on the country's requirement, need and propose. Two countries will be given the technical and advice support in this year. Base on the onsite-training, these will be implemented in collaboration with the host governments which propose the onsite training activities under the cost sharing basis.	5 days for each on-site training	

Activity 2: Follow up and onsite training activity on Improvement of Fisheries Information Collection for Sustainable Fisheries Management		
For the year 2014, Two countries will be given technical and advice support base on the improvement of fisheries information collection for sustainable fisheries management. The selection of the implementation countries will be based on the country's requirement need and propose. Furthermore, the specific activity of each propose site/countries in conducting the follow up and onsite training on the mention topic areas will be adjusted case by case which base on the countries condition, situation and requirement. The focal points will coordinate in their own countries, such as the selection of local participants, translation of basic information and preparation of tailored made training tools and materials, etc.	5 days for each onsite training	
Activity 3: Production of promotional materials		
In 2014, under this activity, the program is proposed to produce a training toolkit on "Method for fisheries information collection which will be used as information baseline for sustainable fisheries management".	Jan. to Dec.	

4.2 Expected Outcomes/Outputs of the Year 2014

<ul style="list-style-type: none"> • Continue in building up/strengthening capacity and increase the number of trainers (government officers) who are strengthened on the knowledge/experience on <ul style="list-style-type: none"> - Application of EAFs and MCS for fisheries management - Application and improvement of fisheries information collection in coastal small-scale and inland fisheries of the Southeast Asian region <p>In this regards, the onsite training programs for each of the mentioned topics will be conducted effectively in meeting the need and expectation of the target Member Countries. (The target countries will be based on the need and requirement of the mentioned training programs from the project)</p> <ul style="list-style-type: none"> • Production of series/items of promotion materials (posters/cartoon booklets/VCD) which relevance to the sustainable fisheries management <ul style="list-style-type: none"> - The training toolkit on "Method for fisheries information collection" which will be used as information baseline for sustainable fisheries management" and - A comic cartoon booklet to enhance on the importance of natural ecosystems will be produced in 2014.

PROJECT DOCUMENT

			Project id: 011303
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Optimizing Energy Use and Improving Safety in Fishing Activities		
Program Thrust:	I	Total Duration:	5 years (2013 to 2017)
Lead Department:	Training Department	Lead Country:	Thailand
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	USD 37,000
Prepared by	Mr. Worawit Wanchana, Head of Capture Fisheries Technologies Division	Project Leader	Mr. Suthipong Thanasansakorn, Fisheries Marine Engineer

1. INTRODUCTION/BACKGROUND

In the Southeast Asian countries, the major concerns on the use of energy include: over-power of the main engine, heavy-wooden constructed in hull structure, low maintenance of the engine and equipment, inappropriate fishing operations/practices. This project deals with fuel efficiency measures that require modification of existing equipment and optimize energy use for fishing vessels. It is therefore, the main activities under the project are to transfer appropriate ways to optimize the use of energy for the fishing vessels. It includes adjustment/improvement of current practices of the vessels, for example, optimization of energy usage considering utilization of the vessels' engine and maximum fuel efficiency and tools.

In the capturing process, the cost is almost entirely dependent on fuel for its operations and has no alternative source of energy in very soon future. In this connection, this project aims at transferring appropriate and applicable technology and knowledge to fishers and fisheries officials on optimizing energy use in fishing activities and safety at sea for fishing vessels. With regard to the issues on optimizing energy and safety at sea, the following paragraphs provide the reference to the ASEAN-SEAFDEC Resolution and Plan of Action 2020.

With regard to the issues on optimizing energy and safety at sea, the following paragraphs provide the reference to the ASEAN-SEAFDEC Resolution and Plan of Action 2020.

Resolution:

- #12 Support ASEAN efforts to promote low carbon development by minimizing the contribution of the fisheries sector to greenhouse gas emissions, with emphasis on **promoting energy efficiency** and use of alternative energy sources
- # 13 Improve the working conditions of people engaged in fisheries activities, and strengthen measures for **safety of fishing vessels** taking into consideration regional specificity
- # 15 **Increase the efficient use of the alternative energy** and reduce the use of carbon fossil energy by using appropriate fishing gear and fishing boats designs in fishing operation.

Plan of Action – Fisheries Management:

- # 20 Adjust existing programs to take into consideration the effects of climate change, focusing on the programs for (i) managing fisheries and habitats; (ii) reducing fishing capacity and combating Illegal, Unreported and Unregulated (IUU) fishing; (iii) strengthening local organizations; and (iv) **promoting safety at sea** and other priority areas. Develop indicators and reporting measures to assess how actions of the programs build resilience to climate change

- # 30 Strengthen efforts to **address safety at sea**, including considerations of working conditions and socio-economic development, and ensure that these considerations are addressed by all concerned authorities while improving monitoring and control of the status of conditions, especially on small fishing boats.

In this connection, it is planned that SEAFDEC will undertake initiatives and efforts to promote optimization of energy use for fishing operation and improvement of safety conditions of the fishing vessels.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

Goal of the project is to optimize the use of fossil fuel in fishing operation, especially for the small trawlers which are major fishing vessels operating in the region. This is due to the fact that fishing practice of the trawlers consumes more fuel when compared to the other type of fishing operation. This will result in lower cost for fishing operation with less carbon emission. Long-term achievements of this project/activity can be measured by increasing of income and living condition of the small fishing vessels' operators.

The overall objective of the project is:

- 1) To promote optimizing energy and improving safety at sea for fishing vessels in the Member Countries;
- 2) To transfer appropriate knowledge and enhance awareness on optimizing energy use in fishing and safety at sea for small-scale fishing vessels in the Member Countries.

2.2 Expected Outcomes and Outputs

Fishers and fisheries extension officials of the Member Countries obtained knowledge and further apply for their extension work. Training and promotional materials disseminated to skippers, fisheries extension officials. For long-term achievements, it is expected that household income and living condition of the small fishing boats' owners will be improved.

2.3 Project Description/Framework

Under this project, three (3) main activities will be implemented. The summary of the activities is as follows:

Activity 1 Regional and national training/workshop on optimizing energy and safety at sea for fishing vessels

A series of activities to promote the optimization of energy use and safety at sea for fishing vessels has been carried out. The project organized the regional training workshop, in collaboration with FAO and other technical agencies, on optimizing energy use and safety at sea for small-scale fishing vessels in 2011 to compile existing international documents (guidelines, handbooks, handouts, etc.) on optimizing energy and safety at sea. Subsequently, the project translated international guideline, national guidelines, and other relevant training materials to the national languages. Such training materials were used for onsite training program to enhance awareness of fishers and fisheries officials (to further transfer the knowledge) for fuel efficiency and safety at sea for the fishing vessels. Two onsite trainings were organized in 2013, including Vietnam and Myanmar. It is planned that onsite training will be organized in Semarang of Indonesia.

Activity 2 Information dissemination

Major outputs from the implementation of project activities and their progress will be disseminated to the Member Countries and other relevant agencies through project's website, training and promotional materials, etc. The outputs from this activity could be used as the regional reference for optimizing energy and safety at sea for fishing vessels in the Member Countries.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Regional training workshop on optimizing energy and safety at sea for small-scale fishing vessels	23 to 25 July	Onsite training on optimizing energy and safety at sea for small fishing vessels was conducted in collaboration with Department of Fisheries Myanmar, during 23 to 25 July 2013 in Myeik of Myanmar. During the training course, basic and applicable knowledge on energy saving and safety at sea were transferred. Participants of the training included extension officers of coastal provinces of Myanmar, and from central office of the Department. In collaboration with Fishing Technology Development Center and Ministry of Marine Affairs and Fisheries, survey for the facilities of the shipyard and venues of the training in Semarang, Indonesia was carried out around the end of 2013.
Information dissemination	July	Translated guidelines published by SEAFDEC on optimizing energy and safety at sea for small fishing vessels were disseminated during the onsite training in Myanmar.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme: Promotion of optimizing energy and safety at sea for fishing vessels in Southeast Asia
(2) Issues in the region: There is a need to support ASEAN efforts to promote low carbon emission to the environment by minimizing the contribution of fisheries sector to greenhouse gas emission, with emphasis on promoting energy efficiency. In addition, the working conditions of fishers' onboard fishing vessels are considered poor, it is therefore necessary to strengthen measures for safety of fishing vessels by taking into account regional/national specificity.

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> Delivered a set of manuals/guidelines for optimizing energy and safety at sea for fishing vessels to fisheries officials engaging with design and safety at sea of the fishing vessels. Transferred methods to improve energy efficiency of the fishing vessels to fisheries officials engaging with modification of the fishing vessels.
--

3.2.3 "Steps" Toward Achieving Final Goal:

Step 1: Translation of the existing guidelines/manuals on energy optimization and safety at sea for fishing vessels into national languages
Step 2: Organization of the training program on energy optimization and safety at sea for fishing vessels

3.2.4 Activities in the Current Project:

(1) Current position of the project: step 1 and 2
(2) Program duration: 2013 to 2017
(3) Main activities <ul style="list-style-type: none"> Translation of the guidelines/handbooks of FAO and FRA on optimizing energy and safety at sea for fishing vessels Organization of the regional/national training on optimizing energy and safety at sea for fishing vessels

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> Regional training on optimizing energy and safety at sea for small fishing vessels (2012) Onsite training on optimizing energy and safety at sea for small fishing vessels <ul style="list-style-type: none"> - Da Nang – Vietnam (2013) - Myeik – Myanmar (2013) Revision of the guidelines on safety at sea for fishing vessels: Philippines and Thailand 	
(2) Main achievements till the end of 2013	
<ul style="list-style-type: none"> Translated guidelines/manual on optimizing energy and safety at sea for fishing vessels Transferred knowledge on optimizing energy and safety at sea for fishing vessels to fisheries officials of the Member Countries – Vietnam and Myanmar Disseminated guidelines/handbooks on optimizing energy and safety at sea for fishing vessels to fisheries officials of the Member Countries – Vietnam and Myanmar 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013	
Expected outcome	Achievement rate (%)
Two (2) technical documents entitled “Energy saving measures and rational energy consumption in fishing industry” and “IMO-ILO-FAO Safety Recommendations for Decked Fishing Vessels of Less than 12 meters in Length and Undecked Fishing Vessels” were completed translated into Philippines and Thai languages.	100
Pre-survey for organizing the onsite training on optimizing energy and safety at sea for fishing vessel, Semarang – Indonesia in 2014	100

3.2.6 Evaluation of Project Activities in 2013

Translated guidelines to national language (Myanmar) on optimizing energy and safety at sea for small fishing vessels were completely disseminated to the key stakeholders in the countries, including provincial fisheries officials at local and central; owners of the fishing vessels from coastal provinces; and shipyard’s owner. It is appeared that the owners of the fishing vessels in Myanmar interested in using the fuel flow meter to monitor the amount of fuel used. With the aim to reduce the use of fuel for fishing, it was also observed that some modifications were made, including enlargement of the propeller size, and enlargement of the flywheel in the engine.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

Under this project, two (2) main activities will be implemented. The summary of the activities is as follows:

Regional and national training/workshop on optimizing energy and safety at sea for fishing vessels

It is planned that onsite training will be organized in Semarang of Indonesia in early 2014.

Information dissemination

In similar to the onsite training conducted in Vietnam and Myanmar, all information related to optimizing energy and safety at sea will be disseminated to the target participants at the onsite training in Indonesia.

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Regional training workshop on optimizing energy and safety at sea for small-scale fishing vessels	Jan/Feb	Onsite training on optimizing energy and safety at sea for small fishing vessels will be organized in collaboration with Fishing Technology Development Center, Ministry of Marine Affairs and Fisheries. The 4-days training will be organized in Semarang of Indonesia. Main resource persons of the training include Marine Engineering staff of TD and inviting experts from JRA.

Activity/inputs	Duration	Remarks
Information dissemination	Jan ~	Translated guidelines published by SEAFDEC on optimizing energy and safety at sea for small fishing vessels will be disseminated during the onsite training in Indonesia.

4.2 Expected Outcomes/Outputs of the Year 2014

Onsite training on the optimizing energy and safety at sea for fishing vessels will be completely organized in collaboration with MMAF through technical cooperation with Fishing Technology Development Center, Semarang, Indonesia. Guidelines and promotional materials for optimizing energy for fishing vessels and safety at sea will be completely disseminated to the key stakeholders.

PROJECT DOCUMENT

		Project id: 021001	
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release		
Program Thrust:	I	Total Duration:	5 years (2010-2014)
Lead Department:	Aquaculture Department	Lead Country:	Philippines
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	
Prepared by:	Teruo Azuma, Deputy Chief	Project Leader:	Teruo Azuma, Deputy Chief

1. INTRODUCTION/BACKGROUND

The Southeast Asian region has highly diverse marine flora and fauna. Many aquatic species have been utilized for human food and trade, and yet continuously over-exploited especially for decades. As a consequence, many species in the region have been threatened or endangered and some have been listed in CITES (the Convention on International Trade in Endangered Species of Wild Fauna and Flora) which has regulated capture, collection, trade and utilization of these species. Public concern in environment protection and marine resource conservation has also increasingly heightened around the world. Immediate actions toward replenishment of the CITES-listed species as well as over-exploited species are needed to secure a wholesome ecosystem, which supports sustainable fisheries inevitable for food security and livelihood in the region.

Stock enhancement including releasing programs is one of the most effective measures to restore the concerned species together with the appropriate fishing regulation. SEAFDEC/AQD has been involved in the stock enhancement project under the financial support of the Government of Japan Trust Fund 4 (TF-4) in 2005-2009. Although not a few precious outcomes such as basic methodologies of seed production, release strategies, *etc.* have been obtained through the project, practical information and technologies on stock enhancement are still lacking in the Southeast Asian countries. Involvement of fisherfolks to the stock enhancement activities should also be more strongly encouraged because the stock levels could not be effectively enhanced without their understanding and actual corporation.

Based on the progress of TF-4 and the up-to-date concept and policies of stock enhancement, more practical approaches need to be implemented to replenish marine resources of internationally threatened and over-exploited species in Southeast Asia. Particularly, baseline data collection of the wild stocks, refinement of hatchery and nursery technologies supporting release programs, and community-based management of the resources could be main components. The approaches will contribute both to the world-wide concern on the resource conservation and to their sustainable utilization based on environment-friendly manners with harmonizing the tropical aquatic ecosystem.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The project goal is to enhance resources of international threatened and over-exploited species in Southeast Asia.

The project objectives are to:

- 1) Establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES);
- 2) Establish release strategies of regionally over-exploited species and verify the effectiveness of community managed sea ranching and socioeconomic strategies;

- 3) Establish adaptive measures for a changing environment supporting resource enhancement; and
- 4) Disseminate and demonstrate resource enhancement practices.

The performance indicators are as follows.

- 1) Gathering information about the population of the species concerned, their habitats and fisheries conditions;
- 2) Establishment of seed production technologies that take into account the preservation of the genetic diversity and release procedures;
- 3) Development of release strategies such as tagging methods, optimum size-at-release, site selection, conditioning animals prior to release, and securing shelters;
- 4) Establishment of appropriate community-based strategies for successful implementation of stock enhancement program;
- 5) Implementation of on-site seminars/lectures for various stakeholders to enhance local awareness about and cooperation in stock enhancement activities;
- 6) Securing environmental capacity and healthiness to maximize the effectiveness of resource enhancement; and
- 7) Establishment of strategies and guidelines of stock enhancement through sustainable, responsible and environment-friendly approach.

2.2 Expected Outcomes and Outputs:

Expected outcomes are:

- 1) Refinement of seed production technology and stock enhancement strategies for internationally threatened and locally severely exploited species;
- 2) Promotion of community-based resource management under the collaboration with LGUs and academe;
- 3) Establishment of protective measures for aquatic environments under climate changes; and
- 4) Practice of sustainable fisheries management through stock enhancement and regulated harvesting protocols.

Expected outputs are:

- 1) Biological, ecological, and/or socio-economic base-line data on target species, aquatic environment and fisheries communities;
- 2) Growth and survival characteristics of wild and hatchery-reared released stocks of over-exploited species;
- 2) Methodologies for stock monitoring, tagging and releasing activities.
- 3) Effective scheme for seed mass production of target species
- 4) Stock enhancement strategy disseminated to local fisherfolks through information, education and communication
- 5) Blue print on environmental conservation toward recovery of healthiness and resilience of aquatic environment.

2.3 Project Description/Framework (for total duration of the project)

Activity 1: Stock enhancement of internationally threatened species (species listed in CITES)

Stock enhancement of seahorses and Napoleon wrasse is focused as the representative of CITES-listed species because of their extreme susceptibility to overexploitation and increasing interest to rear and culture owing to their high-value market in Southeast Asian region.

Sub-activity 1.1: Stock enhancement of seahorses, *Hippocampus comes* and *H. barbouri*

The survival of new-borne seahorses was successfully increased through technical development attained during TF-4 such as appropriate treatments of the rearing water and sterilization of the food organisms. However, more advanced research to optimize culture efficiency and to refine mass production technology is needed for stable, high-quality seed production of seahorse juveniles. The present sub-activity also tries to develop release strategies and establish guidelines for stock enhancement practice.

Sub-activity 1.2: Stock enhancement of Napoleon wrasse, *Cheilinus undulatus*

Wild stock of Napoleon wrasse is facing near extinction due to illegal fishing. The seed production technology for the releasing program has not been developed successfully in Southeast Asia. In order to prevent further declines in natural populations, this sub-activity tackles with the establishment of effective resource management with the collaboration with LGUs having a potential habitat within the jurisdictions. Networking to share the information on wild stock population will be established. Campaign to disseminate significance of resource protection to local forks will be done. In addition, the eco-tourism targeting Napoleon wrasse as a key species will be promoted as sustainable measure to protect the wild stock. Furthermore, this activity tries to get broodstock and develop breeding and seed production techniques for culture as well as for restocking its natural population.

Activity 2: Stock enhancement of regionally over-exploited species

The intense, unregulated and high reliance of the fishery on natural stocks continue to challenge the sustainability of the fishery and conservation of sandfish, donkey's ear abalone and mud crab in Southeast Asian region, all of which have lucrative prices in the export market. The present activity will aim to establish resource enhancement technology of the said species, and also to solve socioeconomically dynamic interactions between the biological characteristics of the resource, the technical intervention of stock enhancement and the people who use and manage it towards community-based stock management.

Sub-activity 2.1: Community managed sandfish *Holothuria scabra* sea ranching and stock release

Sea cucumbers are high-value marine products but its fishery is over-exploited on a global-scale. They are detritivorous feeders and could help clean and improve sediment quality. Sea ranching and stock release of sandfish is expected to complement the promotion of environment-friendly resource enhancement. The present sub-activity will package, pilot and verify the effectiveness of community-managed sea-ranching and stock enhancement initiatives for managing a depleted sea cucumber fishery.

Sub-activity 2.2: Stock enhancement of donkey's ear abalone, *Haliotis asinina*

Although SEAFDEC/AQD had successfully developed hatchery techniques for producing the present species, the technology to rebuild collapsed populations is yet to be developed. The present study will establish release strategies through development of tagging methodology, clarification of genetic structure of wild stock, and assessment of the impacts of released abalone on the wild population.

Sub-activity 2.3: Stock enhancement of mud crab, *Scylla* spp.

The declining mud crab landing from capture fisheries is being supplemented by increasing production from aquaculture. However, mud crab aquaculture is usually in ponds constructed in former mangrove areas which are natural habitat of wild mud crabs. To resolve the contradicting situation, stock enhancement is needed to address the problem of declining populations.

Sub-activity 2.4: Socioeconomic analysis and identification of strategies for managing released stocks of abalone and sea cucumber in the Philippines

High-value fishery species such as abalone and sea cucumber are sourced from rural fishing areas where low-income fishers are driven towards unsustainable harvest practices. This sub-activity aims to assess some socioeconomic strategies acceptable to stakeholders and suitable for the resources being enhanced and identify policies at the local and national level that would support stock enhancement activities.

Activity 3: Establishment of adaptive measures supporting resource enhancement for a changing environment

The efficacy of resource enhancement largely depends on environmental capacity. Nowadays however, natural habitats for tropical aquatic life rapidly deteriorate due to a changing environment, through not only anthropological repercussion but also due to climate change. To maximize the effectiveness of resource enhancement, this project will seek adaptive measures to maintain a healthy environment.

Sub-activity 3.1: Adaptive measures for coral replenishment

To develop the robust seed production technology of corals and refinement of artificial planting technology, baseline data on community structure of coral reefs and temperature profile as a basic environmental factor will be monitored. Species specific resilience to environmental change is determined through analyses of zooxanthellae as well as the above data. Coral reef healthiness is also diagnosed as a

Achievements based on Activities	Duration	Remarks
<ul style="list-style-type: none"> Sea cucumber fishery profiling Sandfish fishery management 	May – Aug May – Aug	
2.2 Stock enhancement of donkey’s ear abalone, <i>Haliotis asinina</i> (This sub-activity was finished in December 2012)		
2.3 Stock enhancement of mud crab, <i>Scylla</i> spp. <ul style="list-style-type: none"> Collect broodstock of the most dominant mud crab species in the study site 	Jan – Aug	
2.4 Socioeconomic analysis and identification of strategies for managing released stocks of abalone and sea cucumber in the Philippines	Jan – Aug	
<ul style="list-style-type: none"> Monitor the participation of stakeholders in the community-based resource enhancement demo-site 	Jan – Apr Mar – Apr	
<ul style="list-style-type: none"> Monitor the overall performance of the released stocks 	Jun	
<ul style="list-style-type: none"> Conduct ocular survey of Sitio Punta Romain and a meeting with SMR, BFARMC, and local peoples’ organization 	July	
<ul style="list-style-type: none"> Conduct periodic release of hatchery-bred juveniles originating from local stock to sustain harvest and maintain stocks 		
<ul style="list-style-type: none"> Conduct training and policy advise to support livelihoods 		
3. Establishment of adaptive measures supporting resource enhancement for a changing environment	Jan – Aug	
3.1 Adaptive measures for coral replenishment <ul style="list-style-type: none"> Sampling of coral for experimental analyses Zooxanthellae Microscopy for the density determination Exp. on growth & survival of corals under warming and acidification 	August September	
4. Publication (No activity scheduled in 2013)		
5. Annual progress meeting and international workshop	Feb 2014 Mar 2014	
5.1 Annual progress meeting	August	
5.2 International workshop <ul style="list-style-type: none"> Posting the prospectus, call for papers, and registration in the homepage of SEAFDEC Aquaculture Department. 		
6. Coordination by the project leader	August	
<ul style="list-style-type: none"> Semi-annual progress meeting 		

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Resource enhancement of internationally threatened and over-exploited species in Southeast Asia through stock release/ I. Developing and promoting responsible fisheries for poverty alleviation and food security
(2) Issues in the region at the beginning of the study: The problem of diminishing populations of the CITES-listed, threatened and endangered species as well as the high value, commercially important but over-exploited species needs immediate attention in the Southeast Asian region. To address the issue on environment protection and resource conservation, SEAFDEC has implemented the project on “Stock Enhancement of Threatened Species of International Concern” under the financial support of the Government of Japan Trust Fund IV (TF-4). Under this project, SEAFDEC Aquaculture Department (AQD) has been conducting studies on basic methodologies of seed production and/or release strategies. However, basic technologies and information on stock enhancement are still lacking and further efforts are needed to enhance the said aquatic resources in the region.

3.2.2 Expected Final Goal of the Project:

- To establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES)
- To establish release strategies of regionally over-exploited species, and to verify the effectiveness of community-based management of the resources and socioeconomic strategies
- To establish adaptive measures supporting resource enhancement for a changing environment
- To disseminate and demonstrate resource enhancement practices

3.2.3 “Steps” Toward Achieving Final Goal:

- | |
|---|
| <p>Step 1:</p> <ul style="list-style-type: none"> • Refinement of seed production and reproduction technologies of CITES-listed species • Gathering baseline information of regionally over-exploited species and fisheries community • Gathering baseline information of environmental factors in selected study sites • Implementation of training course |
| <p>Step 2:</p> <ul style="list-style-type: none"> • Development of release technology and establishment of spawning induction technology • Habitat and population profiling, releasing experiments, and seminars and on-site training • Analyses of relationships between environmental factors and biological characteristics • Dissemination of resource enhancement practices |
| <p>Step 3:</p> <ul style="list-style-type: none"> • Biological and cost assessment for release program, and community-based farming and restocking • Continuing juvenile production, monitoring for stock releases, assessment of impact of releases, and identification of socioeconomic management strategies • Development of adaptive measures supporting resource enhancement for a changing environment • Workshop/seminar |

3.2.4 Activities in the Current Project:

- | |
|---|
| <p>(1) Current position of the project: Step 3</p> |
| <p>(2) Program duration: 2010 - 2014</p> |
| <p>(3) Main activities:</p> <ul style="list-style-type: none"> • Stock enhancement of internationally threatened species (species listed in CITES) <ul style="list-style-type: none"> - Stock enhancement of seahorses, <i>Hippocampus comes</i> and <i>H. barbouri</i> - Stock enhancement of Napoleon wrasse, <i>Cheilinus undulatus</i> • Stock enhancement of regionally over-exploited species <ul style="list-style-type: none"> - Community managed sandfish <i>Holothuria scabra</i> sea ranching and stock release - Stock enhancement of donkey’s ear abalone, <i>Haliotis asinina</i> - Stock enhancement of mud crab, <i>Scylla</i> spp. - Socioeconomic analysis and identification of strategies for managing released stocks of abalone and sea cucumber in the Philippines • Establishment of adaptive measures for a changing environment <ul style="list-style-type: none"> - Adaptive measures for coral replenishment • Technology and information transfer on resource enhancement practice through training, publication, and international workshop |

3.2.5 Progress and Achievements of the Current Project:

- | |
|---|
| <p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> • To establish resource enhancement strategies of CITES species and regionally over-exploited species • To establish stable seed production technologies appropriate for release, with genetic consideration • To develop stock enhancement strategies including site assessment, stock release, and monitoring, taking into consideration impact of release on wild population and other species • To develop a sustainable utilization and exploitation of natural coastal resources through stock enhancement • To establish management strategies suitable for adoption in fishing communities through lectures/ |
|---|

<p>practices on stock enhancement in Southeast Asia</p> <ul style="list-style-type: none"> To monitor changing environments and to establish adaptive measures supporting resource enhancement To transfer basic technologies and information on stock enhancement to Member Countries 											
<p>(2) Main achievements till the end of 2013 (tentative)</p> <p><i>1. Stock enhancement of internationally threatened species</i></p> <p><u>Stock enhancement of seahorses</u></p> <ul style="list-style-type: none"> Monthly on-site assessment at Molocaboc Island, Sagay City was conducted to monitor baseline population of wild seahorses. Seahorses were collected from fringing coral reefs during night time at low tide (~1.0-1.5 m). Gonad development stages of seahorse are graded. No seahorses were sampled in January and February 2013 due to strong waves in the sampling site. Collect samples for DNS study. <p><u>Stock enhancement of Napoleon wrasse</u></p> <ul style="list-style-type: none"> Fin clip samples were obtained from juveniles captured in Guimaras, Tawi-tawi, and Bohol for DNA analyses. Danajon bank having dual barrier reefs in Bohol was selected as a resource enhancement site and authorization of the research activities were issued by Mayors of municipalities facing the bank. <p><i>2. Stock enhancement of regionally over-exploited species</i></p> <p><u>Community managed sandfish sea ranching and stock release</u></p> <ul style="list-style-type: none"> Spawning trials using bloodstock obtained in the study site yielded 90,000 larvae. Wild stock monitoring survey showed that the density of wild sandfish with sexually mature size density was 4 per 100 sqm. A gratuitous permit is being worked out with the Protected Area Management Board for Sagay marine Reserve so that the local partner organization of the stock enhancement study could be given tenurial use rights over the sea ranching and nursery areas. <p><u>Stock enhancement of mud crab</u></p> <ul style="list-style-type: none"> No broodstock was available in the first quarter of 2013. One berried crab was obtained from the site last May but scratched off the embryos from its abdomen after less than a week in the hatchery. <p><u>Socioeconomic analysis and identification of strategies for managing released stocks</u></p> <ul style="list-style-type: none"> Monitoring of community-based resource enhancement is now being done every 2 months instead of monthly to train BFARMC (Barangay Molocaboc Fisheries and Aquatic Resources Management Council) to manage the project independently. Partially harvested abalones were sold to a buyer in Vito in the range of PhP270-300/kg live, while abalones captured outside the demo-site were traced to be sold by gleaners to buyer-stockers in Molocaboc at PhP230/kg. These buyer-stockers then sell to the buyer in Vito. Fishers in Punta Roma were assisted to plant seaweed which is essential food for abalone. Abalone hatchery was discussed and planned for Punta Roma. <p><i>3. Establishment of adaptive measures for a changing environment</i></p> <p><u>Adaptive measures for coral replenishment</u></p> <ul style="list-style-type: none"> Field surveys for coral reef substrates through line-intercept-transect and temperature profiling were done at the three layers of 5, 10, and 15 m depths in coral reef areas along Nogas Island, Anini-y, Antique, Philippines. Preliminary data analyses showed that both the coverage of substrates by any types of organisms and by Scleractinia decreased in the deeper layers. Among Scleractinia, <i>Porites</i> sp. occurred predominantly in all the depth layers. A new methodology for determination of density of zooxanthellae, symbiont of reef building corals, was developed using the fragments of <i>Porites</i> sp. 											
<p>(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)</p> <table border="1"> <thead> <tr> <th>Expected outcomes/outputs</th> <th>Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td> <ul style="list-style-type: none"> To establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES) </td> <td>80%</td> </tr> <tr> <td> <ul style="list-style-type: none"> To establish release strategies of regionally over-exploited species and to verify the effectiveness of community managed sea ranching and socioeconomic strategies </td> <td>80%</td> </tr> <tr> <td> <ul style="list-style-type: none"> To establish adaptive measures supporting resource enhancement for a changing environment </td> <td>80%</td> </tr> <tr> <td> <ul style="list-style-type: none"> To disseminate and demonstrate resource enhancement practices </td> <td>80%</td> </tr> </tbody> </table>		Expected outcomes/outputs	Achievement rate (%)	<ul style="list-style-type: none"> To establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES) 	80%	<ul style="list-style-type: none"> To establish release strategies of regionally over-exploited species and to verify the effectiveness of community managed sea ranching and socioeconomic strategies 	80%	<ul style="list-style-type: none"> To establish adaptive measures supporting resource enhancement for a changing environment 	80%	<ul style="list-style-type: none"> To disseminate and demonstrate resource enhancement practices 	80%
Expected outcomes/outputs	Achievement rate (%)										
<ul style="list-style-type: none"> To establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES) 	80%										
<ul style="list-style-type: none"> To establish release strategies of regionally over-exploited species and to verify the effectiveness of community managed sea ranching and socioeconomic strategies 	80%										
<ul style="list-style-type: none"> To establish adaptive measures supporting resource enhancement for a changing environment 	80%										
<ul style="list-style-type: none"> To disseminate and demonstrate resource enhancement practices 	80%										

3.2.6 Evaluation of Project Activities in 2013

The study plans are considered to be appropriately implemented as a whole of this project.
--

4. PROPOSED ACTIVITIES FOR THE YEAR 2014**4.1 Planning of the Project Activities**

Activity/inputs	Duration	Remarks
Activity 1: Stock enhancement of internationally threatened species (species listed in CITES)		
Sub-activity 1.1 Stock enhancement of seahorses, <i>Hippocampus comes</i> and <i>H. barbouri</i> 1) Refine tagging methods on seahorses; 2) Release and monitor F1 seahorse obtained from the local broodstock captured from Molocaboc Is., Sagay; and 3) Collect seahorse tissue samples and analyze the genotype (a collaborative study with Hokkaido Univ.).	Jan – Dec	
Sub-activity 1.2 Stock enhancement of Napoleon wrasse <i>C. undulatus</i> 1) Feeding trials of Napoleon wrasse larvae using potential food organisms which were found out in 2013; 2) Site assessment at Dnanajon reef in Bohol; 3) Collection of fin clip samples from various sites (Guimaras, Bohol, and Tawi-tawi) and the genetic analysis for population structure (a collaborative study with Hokkaido Univ.); and, 4) Establishment of collaboration with LGU for protection of the wild stock including promotion of eco-tourism targeting the local stock of this species.	Jan – Dec	
Activity 2: Stock enhancement of regionally over-exploited species		
Sub-activity 2.1: Community managed sandfish <i>Holothuria scabra</i> sea ranching and stock release 1) Work for passing of a resolution on size regulation of sandfish in the project site; 2) More advocacy campaign; 3) Continuing monitoring of habitat and population; 4) Impact evaluation of sandfish stock enhancement in Molocaboc.	Jan – Dec	
Sub-activity 2.2: Stock enhancement of donkey's ear abalone, <i>Haliotis asinine</i> (This sub-activity was terminated at the end of 2012)	Jan – Dec	
Sub-activity 2.3: Stock enhancement of mud crab, <i>Scylla</i> spp. 1) Mud crab juveniles will be collected from the study site in Brgy. Nanding Lopez in Dumangas, in case no broodstock is available in the 3 rd quarter of 2013. 2) Regardless of source, crabs will be tagged using micro-wire tagger and released to the mangroves in Brgy. Rojas, Ajuy. 3) Through monitoring survey after release, all crabs (wild and released) will be sampled, and population density and growth between release and recapture will be analyzed. 4) Tissue of both wild and released crabs will be sent to Tohoku University for genetic analysis c/o Dr. Eguia (SEAFDEC/AQD counterpart) and Dr. Ikeda (Tohoku University counterpart).	Jan – Dec	
Sub-activity 2.4: Socioeconomic analysis and identification of strategies for managing released stocks of abalone and sea cucumber in the Philippines 1) Conduct post-project survey to assess overall impacts of stock enhancement among stakeholders in Sagay. 2) Conduct cost-benefit analysis of stock enhancement by analyzing the project cost profile and the value of benefits identified by stakeholders. 3) Establish exit strategies with BFARMC, LGU and the local traders to ensure practice of sustainable fisheries management through stock enhancement and regulated harvesting	Jan – Dec	

Activity/inputs	Duration	Remarks
<p>protocols.</p> <p>Activity 3: Establishment of adaptive measures supporting resource enhancement for a changing environment Sub-activity 3.1: Adaptive measures for coral replenishment 1) The tank-based pH experiments shall continue to grasp the effect of acidification on coral growth and survival. 2) Survival and health of coral exposed to different temperature shall be compared. 3) Genus/ species compositions in monitoring sites of coral reef will be determined. 4) Temperature profiles will be analyzed. 5) Species-specific susceptibility/ adaptability of coral to adverse environments will be analyzed through genotyping of zooxanthellae.</p> <p>Activity 4: Training course (No Activity scheduled in 2014)</p> <p>Activity 5: Publication (No Activity scheduled in 2014)</p> <p>Activity 6: Annual progress meeting and international workshop Sub-activity 6.1 Annual progress meeting Annual progress meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.</p> <p>Sub-activity 6.2 International workshop Although initially scheduled in 2013, it was postponed in the first quarter of 2014 in the form of a joint workshop with Sustainable Aquaculture due to the constraint of budget. New information on resource enhancement of internationally threatened and over-exploited species will be presented and discussed by participants from ASEAN Member Countries, resource persons as well as study leaders in this project. Emerging problems that require urgent solutions will also be discussed to pave the way to promote environment-friendly resource enhancement in the Southeast Asian region.</p> <p>Activity 7: Coordination by the project leader The project leader will coordinate and assist the research and dissemination, and also facilitate information exchange not only between activities but also among Member Countries so that environment-friendly resource enhancement will be effectively promoted in Southeast Asia. Semi-annual meeting will be held on July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.</p>	<p>Jan – Dec</p> <p>December</p> <p>March</p> <p>Jan – Dec</p>	

4.2 Expected Outcomes/Outputs of the Year 2014

The envisaged outcomes for the fifth year are: 1) refinement of seed production technology and stock enhancement strategies for internationally threatened and locally severely exploited species; 2) promotion of community-based resource management under the collaboration with LGUs and academe; 3) establishment of protective measures for aquatic environments under climate changes; and 4) practice of sustainable fisheries management through stock enhancement and regulated harvesting protocols.

PROJECT DOCUMENT

			Project id: 021002
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Promotion of Sustainable and Region-oriented Aquaculture		
Program Thrust:	I	Total Duration:	5 years (2010-2014)
Lead Department:	Aquaculture Department	Lead Country:	Philippines
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	
Prepared by:	Teruo Azuma, Deputy Chief	Project Leader:	Teruo Azuma, Deputy Chief

1. INTRODUCTION/BACKGROUND

Aquaculture is undoubtedly one of the practical ways for addressing the issues of food security and widespread poverty in the Southeast Asian region. To promote sustainable aquaculture practices, however, several issues should be solved through development of region-oriented technologies and knowledge as follows.

Broodstock and fry needed for aquaculture of high valued species still depend mostly on coastal wild resources. Fishing pressure on them has seriously affected the sustainability of the coastal resources. Domestication and selective breeding of commercially important species would provide stable and reliable supply of quality seeds and thus mitigate the pressure on coastal resources. Particularly, high quality strains obtained through selective breeding are expected to enable small-scale farmers to promote sustainable aquaculture, who are major members in the region.

Most aquaculture practices for commercially-important species necessitate aquaculture feeds, which are highly dependent on wild-caught small marine fish which is usually deemed not suitable for direct human consumption. This has seriously affected the sustainability of coastal fish resources. Improper feeding practices to the cultured species have also led to environmental pollution and degradation. Development of efficient/ low-pollution diets and optimum feeding practices would minimize the negative impacts of aquaculture feeds on the environment. Thus, the development of environment-friendly feeds is crucial to the promotion of sustainable aquaculture in the region.

Intensive aquaculture systems adopted on a large scale aiming to increase production have induced a number of serious problems, including environmental degradation and disease outbreaks, which continue to plague the aquaculture industry in the region. To avoid such problems, we need to design and develop the best farm management techniques in the culture system.

The successful adoption of aquaculture technologies in the ASEAN region may pave the way for livelihood improvement and poverty alleviation of rural communities. However, practical ordinances or policies are still lacking in the level of the local government units, particularly in rural communities. These may constrain the extension and adoption of sustainable aquaculture technologies. To secure livelihood and alleviate poverty in the region, not only technical but also socioeconomic instruction should be implemented.

Specified training focusing on the culture technology of important species such as giant freshwater prawn, mud crab, and black tiger shrimp as well as several marine fish is the pressing need for extending the technologies to the Member Countries to hasten economic development in the region. In addition, to address important role of freshwater aquaculture in providing means of livelihoods and ensuring sustainable food supply to the people particularly in the remote rural areas of Southeast Asia, active promotion of sustainable freshwater aquaculture for rural communities should be undertaken.

The present project including various activities mentioned above will promote sustainable aquaculture and contribute to livelihood improvement and poverty alleviation in the region.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The project goal is to promote the sustainable and region-oriented aquaculture practices. The project objectives are to:

- 1) Establish reliable mass production techniques for genetically improved strains of commercially important species and to establish seed production techniques for potential species for aquaculture;
- 2) Develop environment-friendly and cost-effective practical feeds using ingredients available in the Southeast Asian region and establish guidelines on feeding management for sustainable aquaculture;
- 3) Develop farm management strategies that eliminate the risk factors through epidemiological and environmental approaches to prevent and control diseases;
- 4) Identify clear policies for implementing sustainable aquaculture and to recommend policies for enhancing the adoption of suitable aquaculture technologies for the lesser developed countries in the region; and
- 5) Verify and disseminate the project achievements especially in the less developed countries in the region through demonstration, training, lecture/seminar and publication activities.

The performance indicators are as follows.

- 1) Genetic selection in mud crab *Scylla serrata*, black tiger shrimp *Penaeus monodon*, and giant freshwater prawn *Macrobrachium rosenbergii* based on criteria set for producing subsequent generations that exhibit faster growth, better reproductive performance and higher disease resistance, in which genetic monitoring to maintain high genetic variability and identification of possible genetic markers for the selected beneficial traits is applied;
- 2) Development of hatchery technology of potential species, including breeding, seed production and grow out techniques;
- 3) Surveys of the availability and quality assessment of feed resources in the Philippines and selected developing countries in Southeast Asia
- 4) Establishment of feeding management using plant-origin diet to obtain optimal feed performance and to reduce the negative impacts of improper feeding on the environment;
- 5) Establishment of management scheme to prevent or control shrimp diseases based on analysis of risk factors and epidemiological data;
- 6) Analyses of the socio-economic impact of the transfer and adoption of aquaculture technologies; and
- 7) Dissemination of knowledge and technologies for promotion of sustainable and region-oriented aquaculture practice through training courses and International workshop.

2.2 Expected Outcomes and Outputs:

Expected outcomes are:

- 1) Promotion of selective breeding technologies in mud crab, black tiger shrimp, and giant freshwater prawn;
- 2) Refinement of hatchery technology of pompano and spotted scat;
- 3) Establishment of practical methodology to utilize plant-origin diets for aquaculture production with special reference to giant fresh prawn;
- 4) Establishment of best farm management scheme for shrimp culture to manage technology of aquaculture environment, and
- 5) Implementation of training courses on marine fishes hatchery, abalone hatchery, aqua-nutrition on-site training, and rural aquaculture in order to enhance region-oriented sustainable aquaculture.

Expected outputs are:

- 1) Genetic improvement of commercially important species and development of hatchery technology for potential species;
- 2) Practical use of environment-friendly feeds for prawn culture;
- 3) Managing technology of aquaculture environment for shrimp culture;

- 4) Socioeconomic assessment and impact analysis of transfer and adoption of sustainable aquaculture technologies; and
- 5) Technology extension and demonstration

2.3 Project Description/Framework

Activity 1: Genetic improvement of commercially important species and development of hatchery technology

The genetic improvement based on the genetic characterization is focused on important aquaculture species. In addition, hatchery technology of potential species as identified during the 2010 RTC for Sustainable Aquaculture in Southeast Asia towards 2020 will also be developed.

Sub-activity 1.1: Selective breeding of mud crab *Scylla serrata*

It has been observed that growth of the wild seedstock was faster compared with the hatchery-reared seedstock when grown in brackish water ponds. The selection of *S. serrata* is tried based on set criteria aimed at producing subsequent generations that exhibit faster growth and better reproductive performance. In addition, genetic monitoring is employed to maintain high genetic variability and identify possible genetic markers for the selected beneficial traits.

Sub-activity 1.2: Selective breeding of black tiger shrimp *Penaeus monodon*

A breeding program that considers selection for beneficial heritable traits such as improved growth, disease resistance and breeding performance needs to be implemented to improve seed and broodstock quality and lessen the pressure on wild stocks. Through the selective breeding of black tiger shrimp, the heritability of survival, growth and disease resistance are determined in the local populations.

Sub-activity 1.3: Genetic improvement of giant freshwater prawns *Macrobrachium rosenbergii*

Low seed yield, slow growth, poor production output and other problems associated with inefficient broodstock management are commonly encountered in prawn hatcheries. This sub-activity will try to improve economically important traits such as breeding performance and growth in domesticated giant freshwater prawns. Information on effective broodstock management schemes that can be adopted on farm will be generated.

Sub-activity 1.4: Mass production of plantlets with improved traits

SEAFDEC/AQD has developed a technique enabling development of plantlets through tissue culture. However, there is a need to pursue further on the different strains available in the farming areas and in the natural waters. Through this activity tissue culture techniques will be developed so that mass production of the “new and improved” plants will be obtained for commercial farming.

Sub-activity 1.5: Development of hatchery techniques of Pompano and Spotted Scat

To preserve the sustainability of coastal wild fish resources, extreme utilization of the limited major species, of which the broodstock and fry are captured for aquaculture, should be restricted. The hatchery technologies of Pompano and spotted scat are developed not only to reduce the negative impact on the wild fish resources but also to benefit the fish farmers as well as the consumers.

Activity 2: Development of environment-friendly feeds using regionally available ingredients

The dwindling supplies of fishmeal, rising cost of feed ingredients, and incomplete information on alternative protein sources substitute for fishmeal are obstacles to sustainable aquaculture production. In addition, feed formulation and production are greatly influenced by availability, price, and quality of feed ingredients. The development of cost-effective and low pollution feeds based on plant protein sources is needed for aquaculture of the major marine fishes and crustaceans that are economically important in the Southeast Asian region. A survey of availability and quality assessment of feed resources in the Philippines and selected developing countries in Southeast Asia would also insure sustainable fish production in future.

Sub-activity 2.1: Development of efficient and low pollution feeds for grow-out and broodstock (freshwater prawn, milkfish, grouper, mud crab, and black tiger shrimp)

The present sub-activity tries to develop cost-efficient and low pollution aqua-feeds for the grow-out and broodstock stages of freshwater prawn, shrimp, grouper, milkfish and mud crab, through determination of

the qualitative and quantitative requirements for important micronutrients in the said species.

Sub-activity 2.2: Establishment of guidelines for optimum feeding management through survey of availability and quality assessment of feed resources

The project surveys the availability and assesses the quality of feed resources in the Philippines and in selected developing countries in Southeast Asia through concentrating on feed resources that are actually used or have potential use in feed production, on their nutritional quality, and on those toxins to which fish can be potentially exposed. Guidelines are established for optimum feeding management to reduce the impacts of feeding and promote sustainable aquaculture in the region.

Activity 3: Establishment of managing technology of aquaculture environment

The best shrimp farming strategy has yet to be determined. The present activity will develop pond management strategies to prevent and control viral and other disease of shrimp by eliminating the risk factors, and promote the implementation of disease-free shrimp farming by using environmental based management strategies.

Activity 4: Socioeconomic assessment and impact analysis of transfer and adoption of sustainable aquaculture technologies

Acceptability of the technology in the locality becomes an essential component of integrated rural development. Development of effective institutions is needed to respond to aquaculture rapid expansion with its new products and changing farming methods to foster responsible aquaculture in the region. The present activity elucidates difficulties, benefits and institutional constraints in technology adoption and establishes policy brief for enhancing technology adoption.

Activity 5: Technology extension and demonstration

SEAFDEC/AQD continues assisting the aquaculture sectors through technology extension and demonstration in the Southeast Asia region. The present activity under TF-5 includes the following training courses.

Sub-activity 5.1: Giant freshwater prawn production training program

Production techniques of *Macrobrachium* spp. are extended and demonstrated to the trainees.

Sub-activity 5.2: Regional dissemination of mud crab farming program

The farming program of mud crab, the Genus *Sylla*, of which widespread interest is increasing because of the high price both in domestic and international market, is disseminated.

Sub-activity 5.3: Regional dissemination black tiger shrimp farming program

The black tiger shrimp *Penaeus monodon* is one of the predominant aquaculture species in Southeast Asia. This training program extends and disseminates the selective breeding technology in this species.

Sub-activity 5.4: Marine fish hatchery training program

Aquaculture of high-value marine finfish species continues to develop rapidly in Southeast Asia. This training program extends and demonstrates the technologies on breeding, hatchery, seed production, nutrition and health management in grouper, seabass, snapper, etc.

Sub-activity 5.5: Abalone hatchery training program

The fundamental and essential hatchery technologies of donkey's ear abalone *Haliotis asinina* researched and developed at SEAFDEC/AQD since 1994 are disseminated.

Sub-activity 5.6: Seaweed farming training program

The fundamental and essential information on a red algae *Kappaphycus* farming technology and management are disseminated.

Sub-activity 5.7: On-line course on nutrition and on-site feed preparation training program

The fundamental and essential information on fish nutrition, feed formulation and feed management are disseminated.

Sub-activity 5.8: Rural aquaculture program

Promotion of community-based freshwater aquaculture for remote rural areas of Southeast Asia is targeted.

Activity 6: Publication

Manuals, posters, pamphlets and flyer describing sustainable strategies for stock enhancement will be published and distributed.

Activity 7: Annual progress meeting and international workshop

Annual progress meeting and International Workshop will be organized to review the progresses and check the appropriateness of the project, and to disseminate new information to each member country.

Sub-activity 7.1: Annual progress meeting

Annual progress meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.

Sub-activity 7.2: International workshop

New information on sustainable and region-oriented aquaculture practices will be presented and discussed by participants from ASEAN Member Countries, resource persons as well as study leaders in this project. Emerging problems that require urgent solutions will also be discussed to pave the way to promote and to assure sustainable aquaculture in the Southeast Asian region.

Activity 8: Coordination by the project leader

The project leader will coordinate and assist the research, training and dissemination, and also facilitate information exchange not only domestically but also among Member Countries so that sustainable aquaculture practices will be effectively promoted in Southeast Asia. Semi-annual meeting will be held on July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
1. Genetic improvement of commercially important species and development of hatchery technology		
1.1 Selective breeding of mud crab <i>Scylla serrata</i>		
• Quality evaluation for mud crab <i>S. serrata</i> zoea	Jan - Apr	
• Growth performance evaluation of various families	Jan - Apr	
• Quality evaluation for mud crab <i>S. serrata</i> juvenile	May - Aug	
1.2 Selective breeding of black tiger shrimp <i>Penaeus monodon</i>		
• Production of captive spawners from first batch of F ₁ for selective breeding of <i>P. monodon</i>	Jan - Aug	
• Growing of juvenile F ₁ to broodstock size and production of captive spawners of <i>P. monodon</i>	May - Aug	
1.3 Genetic improvement of giant freshwater prawns <i>Macrobrachium rosenbergii</i>		
• Evaluation of the effective broodstock management scheme to minimize inbreeding and maintain quality of hatchery-bred stocks using spawners from two distinct populations of giant freshwater prawn	Jan - Aug	
1.4 Mass production of plantlets with improved traits (This activity was finished in the end of 2011)		
1.5 Development of hatchery technology of Pompano and Spotted Scat		
• Spawning trial to determine optimum hormone dose for induced spawning in Spotted Scat <i>Scatophagus argus</i>	Feb - Mar	
• Potential use of copepod for hatchery culture of Pompano <i>Trachinotus blochii</i>	May - Aug	

Achievements based on Activities	Duration	Remarks
<p>2. Development of environment-friendly feeds using regionally available ingredients</p> <p>2.1 Development of efficient and low-pollution feeds for grow-out and broodstock: I. Partial replacement of fishmeal with cowpea meal in practical diets for giant freshwater prawn <i>M. rosenbergii</i></p> <ul style="list-style-type: none"> • Development of cost-effective and low-pollution aqua-feeds <p>2.2 Establishment of guidelines for optimum feeding management through survey of availability and quality assessment of feed resources (This activity was finished in the end of 2012)</p> <p>3. Establishment of managing technology of aquaculture environment</p> <ul style="list-style-type: none"> • Compare farm management techniques • Monitor soil/water parameters • Monitor disease incidence, growth, etc. <p>4. Socioeconomic assessment and impact analysis of transfer and adoption of sustainable aquaculture technologies (This activity was finished in the end of 2012)</p> <p>5. Technology extension and demonstration</p> <p>5.1 Giant freshwater prawn production training program (No activity was scheduled in 2013)</p> <p>5.2 Regional dissemination of mud crab farming program (No activity was scheduled in 2013)</p> <p>5.3 Regional dissemination black tiger shrimp farming program</p> <p>5.4 Marine fish hatchery training program</p> <p>5.5 Abalone hatchery training program</p> <p>5.6 Seaweed farming training program (No activity was scheduled in 2013)</p> <p>5.7 On-line course on nutrition and on-site feed preparation training program - Aqua Nutrition On-Line</p> <p>5.8 Rural aquaculture program</p> <p>6. Publication</p> <p>7. Annual progress meeting and international workshop</p> <p>7.1 Annual progress meeting</p> <p>7.2 International workshop - Posting the prospectus, call for papers, and registration in the homepage of SEAFDEC Aquaculture Department.</p> <p>8. Coordination by the project leader - Semi-annual progress meeting</p>	<p>Jan – Aug</p> <p>Jan - Apr May – Aug May – Aug</p> <p>November Jun – Jul May - Jun</p> <p>Jul – Dec November</p> <p>Feb 2014 Mar 2014 August</p> <p>August</p>	

3.2 Evaluation of the Project Outcomes Till the Year 2013 <in general>

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Promotion of Sustainable and Region-oriented Aquaculture/ I. Developing and promoting responsible fisheries for poverty alleviation and food security</p>
<p>(2) Issues in the region at the beginning of the study: Aquaculture is undoubtedly one of the practical ways for addressing the issues of food security and widespread poverty in the rural areas of the ASEAN region which exports a great amount of fisheries products to all over the world. However, aquaculture production in the region needs to be increased in a sustainable and environment-friendly manner as declared by the Ministers of the ASEAN-SEAFDEC Member Countries responsible for fisheries. Promotion of Sustainable and Region-Oriented Aquaculture Practices is vital not only to the promotion of sustainable aquaculture in the region but also to the stable supply of safe aquaculture products to the region.</p>

3.2.2 Expected Final Goal of the Project:

- | |
|---|
| <ul style="list-style-type: none"> • To ensure reliable and sustainable production through genetic improvement of commercially important species and to establish reliable breeding and mass seed production techniques for new species for aquaculture • To develop environment-friendly feeds for marine fish and crustaceans from regionally available ingredients • To establish managing technology of aquaculture environment • To assess and analyze impact of transfer and adoption of sustainable aquaculture technologies for fisherfolk in the region • To disseminate and demonstrate the aquaculture technology |
|---|

3.2.3 “Steps” Toward Achieving Final Goal:

- | |
|--|
| <p>Step 1:</p> <ul style="list-style-type: none"> • Production of various generations and families of commercially important species, evaluation of the impact of domestication selection on hatchery stocks, and collection of juveniles or adults for broodstock development of emerging species • Information survey, formulation and preparation of cost-effective and low pollution feeds • Gathering information on farm management techniques and best management practices • Assessment of the socioeconomic impact of the technology transfer and adoption • Implementation of training courses, demonstration farm and lecture/seminar |
| <p>Step 2:</p> <ul style="list-style-type: none"> • Selective breeding and genetic monitoring, formulation and assessment of different broodstock management protocols, and induction of spawning, seed production and grow-out trials of emerging species • Controlled feeding experiments and incorporate findings in test diets in the laboratory • Analysis and design of a management scheme and verification of the management scheme • Examination of property rights regimes impinging on technology adoption and adaptation • Transfer of technical through capacity building to Member Countries |
| <p>Step 3:</p> <ul style="list-style-type: none"> • Monitoring, assessment and refinement of heritability of selected traits, and promotion of hatchery, nursery and grow-out for emerging species • Feeding experiments in ponds, net cages or broodstock tanks • Refinement of scheme through farm trials and dissemination of knowledge and technology • Recommendation of policies for enhancing the adoption of sustainable aquaculture technologies suitable for developing countries in the region • Workshop/seminar |

3.2.4 Activities in the Current Project:

- | |
|---|
| (1) Current position of the project: Step 3 |
| (2) Program duration: 2010 - 2014 |
| <p>(3) Main activities:</p> <ul style="list-style-type: none"> • Genetic improvement of commercially important species and development of hatchery technology • Development of environment-friendly feeds using regionally available ingredients • Establishment of managing technology of aquaculture environment • Socioeconomic assessment and impact analysis of transfer and adoption of sustainable aquaculture technologies • Technology extension and demonstration |

3.2.5 Progress and Achievements of the Current Project:

- | |
|---|
| <p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> • To establish reliable mass production techniques for genetically improved strains of commercially important species and to establish seed production techniques for newly emerging species for |
|---|

aquaculture

- To develop environment-friendly and cost-effective practical feeds using ingredients available in the Southeast Asian region and establish guidelines on feeding management for sustainable aquaculture
- To develop farming management strategies that eliminate the risk factors through epidemiological and environmental approaches to prevent and control diseases
- To identify clear policies for implementing sustainable aquaculture and to recommend policies for enhancing the adoption of suitable aquaculture technologies for the lesser developed countries in the region
- To verify and disseminate the project achievements especially in the lesser developed countries in the region through training, publication, and international workshop

(2) Main achievements till the end of 2013 (tentative)

1. Genetic improvement of commercially important species and development of hatchery technology

Selective breeding of mud crab *Scylla serrata*

- The study was done to develop selective breeding techniques for the mud crab *Scylla serrata*, which were grown from hatchery to grow-out phase for the production of good quality domesticated stock.
- *S. serrata* juveniles were subjected to challenge test using luminescent bacteria *Vibrio harveyi* to evaluate the disease resistance of each family. Juveniles from family Sam2A (F1) ($3 \times 10^{5.6}$ cfu/crab) had the highest resistance to *V. harveyi* followed by family Sam2C ($2 \times 10^{5.5}$ cfu/crab), family Sam2D ($3 \times 10^{5.4}$ cfu/crab) and family CamB (F1) ($3 \times 10^{5.5}$).
- Juveniles from CamA ($2 \times 10^{4.4}$ cfu/crab) and Sam2B ($2 \times 10^{4.5}$ cfu/crab) had high mortality even at low levels of *V. harveyi*. The same pattern was observed in terms of duration to 100% cumulative mortality.
- There was no difference in the growth performance of juveniles among various families and generations reared either in ponds or tanks for 2 months.
- The present study showed bacterial challenge test can be used to assess the resistance of each family to luminescent bacteria. F1 families seemed to have improved resistance to *V. harveyi*. Growth among various families was comparable.

Selective breeding of black tiger shrimp *Penaeus monodon*

- Among nine F1 maturations, which had been grown to broodstock size, only two of these first maturations resulted in production of 100,800 and 75,800 nauplii (HR = 63 and 79%).
- Five rematurations, which were observed in the broodstock, comprised 40% regressed, 20% spawned but no eggs hatched. Another 40% resulted in nauplii production.

Genetic improvement of giant freshwater prawns *Macrobrachium rosenbergii*: III. Assessment of effective broodstock management schemes for improved growth and reproductive performance

- New prawn stocks (from Pampanga) were collected and have been set up for breeding. All other existing stocks (crossbreds, purebreds) have also been set up for spawning. Once same-age spawns are obtained from all five "strains", larvae will be grown until ready for the growth comparison run in cages for the next six months.

Development of hatchery technology of emerging species

- Spawning trials for Spotted scat *Scatophagus argus* was conducted to identify optimum hormone concentration to induce spawning. Spawning occurred in two successive injection of 50 µg of LHRH-a / kg of fish across the two-day period with the water salinity of 25 ppt, but the eggs released were unfertilized.
- Potential use of copepod for larval culture of was examined for the efficacy as larval diet of Pompano *Trachinotus blochii*. The inclusion of copepod in larval diet of Pompano promotes early metamorphosis, better survival and tolerance to hypoxic and high saline conditions.

2. Development of environment-friendly feeds using regionally available ingredients

Development of efficient and low-pollution diets for grow-out and broodstock: I. Partial replacement of fishmeal with cowpea meal in practical diets for giant freshwater prawn *Macrobrachium rosenbergii*

- While the inclusion of up to 30% cowpea meal protein improved the reproductive performance of *M. rosenbergii* broodstock, larval quality and survival have yet to determine in subsequent rearing trials.

3. Establishment of managing technology of aquaculture environment

Establishment of management technology for disease tolerant and sustainable aquaculture environment

- To monitor oil/ water parameters and disease incidence, growth, etc. in ponds at the UPV-BAC, Leganes, extensive culture of *Penaeus monodon* in ponds with and without tilapia is ongoing. Tentative data showed that *P. monodon* cultured in ponds with tilapia are bigger compared to those grown in ponds without tilapia.

4. Technology extension and demonstration

Abalone hatchery training program

- The International Training Course on Abalone Hatchery and Grow-out was conducted from 14 May to

04 June, 2013 with 3 participants. One (1) is from Indonesia and two (2) from the Philippines. The Filipino from BFAR Region 3 and the Indonesian had GOJ-TF grant while the other BFAR participant was sponsored by BFAR Region 9.

Marine fish hatchery training program

- The International Training Course on Marine Fish Hatchery was conducted at Tigbauan Main Station from 25 June - 31 July with 7 participants: Myanmar (1), Philippines (2) and Kenya (4). The participant from Myanmar and 1 from BFAR, Region 7 (Cebu), Philippines were awarded with GOJ-TF Training Fellowship Grant. The paying participants from Kenya were officers of the Kenya Marine Fisheries Research Institute and were sponsored by Kenya Coastal Development Project and World Bank. The lone privately-sponsored participant from the Philippines was sponsored by Island Prawn Company based in Saudi Arabia.

Aquanutrition On-line training program

- The on-going Distance Learning on the Principles of Aquaculture Nutrition Online started last July 22 and will end on the 13th of December 2013. The online course has 17 participants from Brunei Darussalam (1), Indonesia (1), Myanmar (1) and Philippines (14). Of the 17 participants, 3 from Brunei Darussalam, Indonesia and Myanmar were awarded with GOJ-TF Training Fellowship Grant. Three from the Philippines were SEAFDEC/AQD staff and the rest of the participants were sponsored by their company/agency or privately-funded.

Regional dissemination black tiger shrimp farming program

- The tentative schedule for this training course on hatchery and broodstock management is in November. Lectures will include topics on biology, broodstock management, larval rearing, selective breeding principles, genetics, etc. Grow-out culture and disease prevention and control are also included as special topics.

Community-based freshwater aquaculture for remote areas of Southeast Asia

- This training course is scheduled in late November 2013, which is now in preparation. Invitations for Japanese Training Grant to Member Countries were already sent. Nominations from Vietnam were already received. Reiteration letters for JTG to other Member Countries were also sent. Started coordinating with BFS staff regarding resource person and day-to-day schedule of training.

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)

Expected outcomes/outputs	Achievement rate (%)
<ul style="list-style-type: none"> • To ensure reliable and sustainable production through genetic improvement of commercially important species and to establish reliable breeding and mass seed production techniques for new species for aquaculture 	80%
<ul style="list-style-type: none"> • To develop environment-friendly feeds for marine fish and crustaceans from regionally available ingredients 	80%
<ul style="list-style-type: none"> • To establish managing technology of aquaculture environment 	80%
<ul style="list-style-type: none"> • To disseminate and demonstrate the aquaculture technology 	80%

3.2.6 Evaluation of Project Activities in 2013

The study plans are considered to be appropriately implemented as a whole of this project.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Genetic improvement of commercially important species and development of hatchery technology Sub-activity 1.1: Selective breeding of mud crab <i>Scylla serrata</i> The response of crabs to selection on growth and disease resistance will be evaluated. Reciprocal matings will be done and the performance of the succeeding generations will be compared with the previous generations. Paper on the criteria for selection of good quality larvae for stocking in the hatchery will be submitted for publication.</p>	Jan – Dec	

Activity/inputs	Duration	Remarks
<p>Sub-activity 1.2: Selective breeding of black tiger shrimp <i>Penaeus monodon</i> Further growing of F2 to broodstock size will be done. Regular monitoring through monthly samplings will be done. Heritability of growth in the families will be determined using body weight data that have been collected. Once the F2 females have attained broodstock size, these will be stocked with males of other F2 families and the reproductive performance noted. Final analysis of all data that have been gathered will be done. Families with better performance in terms of postlarval survival, growth rate, and reproductive performance will be identified.</p>	Jan – Dec	
<p>Sub-activity 1.3: Genetic improvement of giant freshwater prawn <i>Macrobrachium rosenbergii</i> After the growth experiment, same-aged breeders shall be selected from the stocks and subsequently used for the breeding experiments as planned, using the most effective broodstock management scheme.</p>	Jan – Dec	
<p>Sub-activity 1.4: Mass production of plantlets with improved traits (This sub-activity was terminated at the end of 2011.)</p>		
<p>Sub-activity 1.5: Development of hatchery techniques of Pompano and Spotted Scat Experiments to improve growth and survival of spotted scat <i>Scatophagus argus</i> larvae will be done. Articles on experiments done on Pompano will be published.</p>	Jan – Dec	
<p>Activity 2: Development of environment-friendly feeds using regionally available ingredients Sub-activity 2.1: Development of efficient and low-pollution diets for grow-out and broodstock (freshwater prawn, milkfish, grouper, mud crab, and black tiger shrimp) Feeding trials of giant freshwater prawn from a different source grown to broodstock size will be done. The effect of broodstock diets on the reproductive performance and larval production will be evaluated. Review of published information on fishmeal replacement by plant-based protein sources in feeds for other species will be continued.</p>	Jan – Dec	
<p>Sub-activity 2.2: Establishment of guidelines for optimum feeding management through survey of availability and quality assessment of feed resources (This sub-activity was terminated at the end of 2012.)</p>		
<p>Activity 3: Establishment of managing technology of aquaculture environment Refinement of the designed management scheme will be done using ponds at UPV-BAC or in collaboration with private shrimp farmers. Aquasilviculture of <i>P. monodon</i> will be repeated if budget permits.</p>	Jan – Dec	
<p>Activity 4: Socioeconomic assessment and impact analysis of transfer and adoption of sustainable aquaculture technologies (This sub-activity was terminated at the end of 2012.)</p>		
<p>Activity 5: Technology extension and demonstration Sub-activity 5.1: Giant freshwater prawn production training program (No activity scheduled in 2014)</p>	Jan – Dec	
<p>Sub-activity 5.2: Regional dissemination of mud crab farming program (No activity scheduled in 2014)</p>		

Activity/inputs	Duration	Remarks
<p>Sub-activity 5.3: Regional dissemination of black tiger shrimp farming program (No activity scheduled in 2014)</p> <p>Sub-activity 5.4: Marine fish hatchery training program The International Training Course on Marine Fish Hatchery will be offered to transfer and to disseminate improved technologies for broodstock management, seed production and grow-out culture of marine fishes such as milkfish (<i>Chanos chanos</i>), Asian sea bass (<i>Lates calcarifer</i>), groupers (<i>Epinephelus coioides</i>, <i>E. fuscoguttatus</i>), mangrove red snapper (<i>Lutjanus argentimaculatus</i>), rabbitfish (<i>Siganus guttatus</i>), or pompano (<i>Trachinotus blochii</i>) to various stakeholders: hatchery owners, technicians, extension workers and aquaculturists. Special topics on biotechnology; fish cage design and culture; and food safety and processing of highly-valued marine fishes could be included. Field trips to private farms and AQD stations will also be included to reinforce learning.</p> <p>Sub-activity 5.5: Abalone hatchery training program This training course aims to provide participants with technical knowledge and skills to operate a hatchery and to manage a grow-out culture of abalone. The course will cover an introduction on sustainable aquaculture; abalone biology and reproduction; broodstock management and spawning; larval rearing and grow-out techniques; hatchery design and construction; feeding of abalone; culture of benthic diatoms; biology and culture of <i>Gracilaria</i>; feed formulation, processing and preparation; financial feasibility and market potential; food safety in abalone production and processing. Special topics on stock enhancement and industry experience on commercial hatchery and grow-out of abalone will also be included. The incorporation of site visits to private abalone hatchery, seaweed farm and AQD stations will also be done.</p> <p>Sub-activity 5.6: Seaweed farming training program (Because of constraint of budget, this training course schedule in 2014 will be cancelled.)</p> <p>Sub-activity 5.7: On-line course on nutrition and on-site feed preparation training program The on-site training on feed preparation and feeding management is slated to be conducted in Lao PDR in late 2014. Arrangements will be made in coordination with appropriate government agencies in Lao PDR. Arrangements will be made in coordination with appropriate government agencies in Lao PDR.</p> <p>Sub-activity 5.8: Rural aquaculture program The 10-day course aims to enhance the knowledge and skills of the participants on appropriate and suitable freshwater aquaculture methods and practices so that they would be able to transfer and promote these technologies to rural communities for livelihood and poverty alleviation. The course is designed for fisheries/ aquaculture extension officers and those working at the rural fishery communities. The course will include lectures on various freshwater species such as tilapia, carp, catfish, freshwater prawn. Other than the lectures and practical sessions, the participants could also share with co-participants and resource persons their experiences on freshwater aquaculture practices and extension works through power point presentation/ reports.</p> <p>Activity 6: Publication Manuals, posters, pamphlets and flyer describing the sustainable aquaculture will be published and distributed.</p>	<p>Jun – Jul</p> <p>May – Jun</p> <p>November</p> <p>November</p>	

Activity/inputs	Duration	Remarks
<p>Activity 7: Annual progress meeting and international workshop Sub-activity 7.1: Annual progress meeting Annual progress meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.</p> <p>Sub-activity 7.2: International workshop Although initially scheduled in 2013, it was postponed in the first quarter of 2014 in the form of a joint workshop with those on Resource Enhancement due to the constraint of budget. New information on sustainable and region-oriented aquaculture practices will be presented and discussed by participants from ASEAN Member Countries, resource persons as well as study leaders in this project. Emerging problems that require urgent solutions will also be discussed to pave the way to promote and to assure sustainable aquaculture in the Southeast Asian region.</p> <p>Activity 8: Coordination by the project leader The project leader will coordinate and assist the research, training and dissemination, and also facilitate information exchange not only domestically but also among Member Countries so that sustainable aquaculture practices will be effectively promoted in Southeast Asia. Semi-annual meeting will be held on July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.</p>	<p>December</p> <p>March</p> <p>Jan – Dec</p>	

4.2 Expected Outcomes/Outputs of the Year 2014

The envisaged outcomes for the fifth year are: 1) Promotion of selective breeding technologies in mud crab, black tiger shrimp, and giant freshwater prawn; 2) Refinement of hatchery technology of pompano and spotted scat; 3) Establishment of practical methodology to utilize plant-origin diets for aquaculture production with special reference to giant fresh prawn; 4) Establishment of best farm management scheme for shrimp culture to manage technology of aquaculture environment, and 5) Implementation of training courses on marine fishes hatchery, abalone hatchery, aqua-nutrition on-site training, and rural aquaculture in order to enhance the region-oriented sustainable aquaculture.

PROJECT DOCUMENT

		Project id: 031301	
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Chemical and Drug Residues in Fish and Fish Products in Southeast Asia - Biotxin Monitoring in ASEAN Region: ASP, AZA and BTX		
Program Thrust:	II	Total Duration:	5 yrs (2013-2017)
Lead Department:	MFRD	Lead Country:	Singapore
Project Sponsor:	Japanese Trust Fund-VI	Project Partner:	Post-Harvest Technology Centre, Agri-Food and Veterinary Authority of Singapore (PHTC/AVA)
Proposed Budget:	USD 190,000	This year budget:	(2013) USD 35,000
Prepared by	Neo Shan Yu, Scientist (PHTC/AVA); Yeap Soon Eong, Chief of MFRD Programmes	Project Leader	Neo Shan Yu, Scientist (PHTC/AVA)

1. INTRODUCTION/BACKGROUND**1.1 Situation Analysis**

Consumption of a variety of shellfish and fish has been causing an increasing number of human intoxications around the world. Around 400 poisonous fish species exist and, by definition, the substances responsible for the toxicity of these species are biotoxins. Marine biotoxins represent a significant and expanding threat to human health in many parts of the world. The impact is visible in terms of human poisoning or even death following the consumption of contaminated shellfish or fish, as well as mass killings of fish and shellfish, and the death of marine animals and birds. The Codex Alimentarius Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) defined biotoxins as poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin producing algae, or in water containing toxins produced by such organisms.

MFRD has previously conducted a project on biotoxins monitoring in the ASEAN region under the Japanese Trust Fund II program from 2009 to 2012 to increase the attention in expanding and improving initiatives to monitor, detect and share information on marine biotoxins in order to reduce the public health risks associated with the consumption of contaminated shellfish and fish. The project had covered training in analytical methods for Diarrhoeic Shellfish Poisoning (DSP) toxins, lipophilic toxins, Paralytic Shellfish Poisoning (PSP) toxins and Tetrodotoxin (TTX) and a monitoring survey on PSP toxin in ASEAN Member Countries.

1.2 Stakeholder Analysis

The key stakeholders of this project are the relevant agencies in the fisheries department of the ASEAN-SEAFDEC Member Countries which are responsible for ensuring the safety of fish and shellfish for consumption and for monitoring and testing of fish and shellfish for biotoxins; the aquaculture farmers and harvesters of the fish and shellfish; as well as the consumers/buyers, international and domestic.

1.3 Problem Analysis

Monitoring seafood for toxicity is essential to manage the risks in consumption of contaminated fish and shellfish. However, there are several limitations in monitoring for toxicity such as the variation in toxin content between individual shellfish, different detection and even extraction methods for the various toxins, requiring a decision which toxins one is testing for, and the frequency of sampling to ensure that toxicity does not rise to dangerous levels in temporal or spatial gap between sampling times or locations.

Furthermore, the growing harvest of non-traditional shellfish (such as moon snails, whelks, barnacles, etc) may increase human health problems and management responsibilities. Member Countries have raised the need to continue with the capability building in biotoxins analyses and monitoring, with the proposed focus on other biotoxins like Amnesic Shellfish Poisoning (ASP) toxin and Azaspiracids (AZA). These 2 biotoxins were raised as part of the training needs by Member Countries during the RTC of the previous project in 2009. Brevetoxins (BTX) is also recommended to be included in the new project as ASP, AZA and BTX, along with DSP and PSP, should be regulated according to CODEX for shellfish.

1.4 Links to Regional Provisions

The project is in line with the following Resolution and Plan of Action as endorsed at the ASEAN-SEAFDEC Conference of 2011:

Resolution 21: Improve technologies and facilities to ensure fish quality assurance and safety management systems, taking into account the importance of traditional fishery products and food security requirements, and promote the development of fishery products as an alternative supplementary livelihood for fisheries communities

Plan of Action D61: Strengthen fish quality and safety management systems that support the competitive position of ASEAN fish products on world markets, including moving towards ISO/IEC 17025 accreditation of national fish inspection laboratories, strengthening capacity and acknowledging the recognized national laboratories, risk analysis and equivalence agreement such as the Mutual Recognition Agreement (MRA) and promote the implementation of the quality and safety management systems among small and medium enterprises in the ASEAN region.

Plan of Action D63: Promote and conduct training programs and develop training materials to upgrade the technical skills and competencies of personnel in the public and private sectors on fisheries post-harvest technology and food safety management system.

1.5 Links to SEAFDEC Program Thrust

Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-Regional Trade

1.6 Links with other SEAFDEC's Projects

This project is an extension of the previous Japanese Trust Fund II project (2009-2012) on biotoxins monitoring which focused Diarrhoetic Shellfish Poisoning (DSP) toxins, lipophilic toxins, Paralytic Shellfish Poisoning (PSP) toxins and Tetrodotoxin (TTX).

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The goal of the project is to enhance regional capability and knowledge in biotoxins testing and monitoring, and biotoxins occurrences and incidences in fish and shellfish in the ASEAN region. The objectives of the project are to:

- 1) Upgrade regional laboratory capabilities and credibility for testing of Amnesic Shellfish Poisoning (ASP), Azaspiracids (AZA) and Brevetoxin (BTX) biotoxins for fish and fisheries products through conduct of a regional training course on methodologies for Member Countries and 1.5 year biotoxins monitoring survey in Member Countries;
- 2) Establish biotoxins monitoring programmes for ASP, AZA and BTX biotoxins in Member Countries for routine surveillance testing of fish and fisheries products especially in those countries that do not have such programmes; and
- 3) Improve knowledge and understanding on levels of ASP, AZA and BTX biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries.

The performance indicators of the project are the establishment of methodologies for testing of the target biotoxins and the conduct of the biotoxins monitoring survey in Member Countries.

2.2 Expected Outcomes and Outputs:

The expected outcomes of the project are enhanced laboratory capabilities and knowledge in the testing of ASP, AZA and BTX biotoxins, establishment of monitoring programmes for ASP, AZA and BTX biotoxins in Member Countries for routine surveillance and, improved knowledge and understanding on ASP, AZA and BTX biotoxins occurrences and incidences in fish and shellfish in the ASEAN region. The expected outputs are:

- 1) A regional training course on AZA, ASP and BTX biotoxins analyses;
- 2) Biotoxin monitoring surveys in Member Countries; and
- 3) Technical Compilation of Biotoxins (ASP, AZA and BTX) Monitoring in ASEAN region.

2.3 Project Description/Framework

The Post-Harvest Technology Centre (PHTC) of the Agri-Food and Veterinary Authority (AVA) as the Collaborating Center for MFRD programmes will be responsible for the project and will manage and coordinate all project activities. The project will be conducted for a period of 5 years from 2013-2017 and funded under the Japanese Trust Fund-VI program on a cost-sharing basis with the participating ASEAN-SEAFDEC Member Countries. The project will be implemented through the following activities:

Activity 1: Regional Technical Consultation (RTC) in 2013

A RTC will be held in Singapore to initiate the project and plan for all project activities. The RTC will discuss the details of the regional training such as the venue and key trainers, the targeted biotoxins for the survey and the key project leaders in each country.

Activity 2: Regional Training Course in Biotoxins Analyses in 2014

The proposed biotoxins for training in this course will include ASP, AZA and BTX. It will include lectures and hands-on practical sessions and will be conducted by invited Japanese expert trainers, with two participants from each member country.

Activity 3: Biotoxins Monitoring Survey in 2015 and 2016

After the training course, Member Countries are encouraged to set up the biotoxins analyses methods and use these methods for the survey. The survey scope will cover regular monitoring of the biotoxins (AZA, ASP and BTX) levels in selected shellfish species at identified site(s) over a one and a half-year period. Biotoxins that were already covered in the previous project in 2010 (for example DSP and lipophilic toxins, TTX) can also be included in the present survey if Member Countries are interested.

Activity 4: Preparation and Publication of Technical Compilation in 2016 and 2017

A Technical Compilation of the project will be prepared and published to document the project outcomes/outputs. The Technical Compilation will include the biotoxins analyses methodologies, the biotoxins monitoring survey methodologies and the survey reports and results of participating Member Countries.

Activity 5: End-of-Project Seminar (EOP) in 2017

The EOP will be organized in the final year of the project to conclude the project and share the project results among Member Countries. The EOP will also discuss the progress achieved in the biotoxins analytical and monitoring capabilities in Member Countries over the years, the challenges faced and the plans for the future. The Technical Compilation will be discussed and finalized for publication at the EOP.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1: Regional Technical Consultation (RTC) - The RTC was conducted successfully in Singapore. It was attended by all 10 ASEAN Member Countries, SEAFDEC Secretariat and project resource person, Dr. Toshiyuki Suzuki, from the National Research Institute of Fisheries Science, Japan. - The RTC met its objectives to deliberate and discuss on the project activities and the project schedule as well as details of the regional training course on analysis of the biotoxins and the monitoring survey to be carried out in participating countries. The training needs in Member Countries, content, venue and trainers for the training course in 2014, and the key project leaders as well as the targeted biotoxins for the survey were all identified.	2 days	24-25 July 2013

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade</p>
<p>(2) Issues in the region at the beginning of the study: Consumption of a variety of shellfish and fish causes an increasing number of human intoxications around the world. Around 400 poisonous fish species exist and, by definition, the substances responsible for the toxicity of these species are biotoxins. Marine biotoxins represent a significant and expanding threat to human health in many parts of the world. The impact is visible in terms of human poisoning or even death following the consumption of contaminated shellfish or fish, as well as mass killings of fish and shellfish, and the death of marine animals and birds. The Codex Alimentarius Code of Practice for Fish and Fishery Products (CAC/RCP 52-2003) defined biotoxins as poisonous substances naturally present in fish and fishery products or accumulated by the animals feeding on toxin producing algae, or in the water containing toxins produced by such organisms.</p> <p>Monitoring seafood for toxicity is essential to manage the risks. However, there are several limitations in monitoring for toxicity such as the variation in toxin content between individual shellfish, different detection and even extraction methods for the various toxins, requiring a decision which toxins one is testing for, and the frequency of sampling to ensure that toxicity does not rise to dangerous levels in temporal or spatial gap between sampling times or locations. Furthermore, the growing harvest of non-traditional shellfish (such as moon snails, whelks, barnacles, etc.) may increase human health problems and management responsibilities.</p> <p>MFRD has conducted a project on biotoxins monitoring in ASEAN from 2009 to 2012 to increase the attention in expanding and improving initiatives to monitor, detect and share information on marine biotoxins in order to reduce the public health risks associated with the consumption of contaminate shellfish and fish. The project had covered training in analytical methods for Diarrhoetic Shellfish Poisoning (DSP) toxins, lipophilic toxins, Paralytic Shellfish Poisoning (PSP) toxins and Tetrodotoxin (TTX) and a monitoring survey on PSP toxin in ASEAN Member Countries.</p> <p>This new project is an extension of the previous project to address the needs of Member Countries and continue with capability building in biotoxins analyses and monitoring, with the proposed focus on other biotoxins like Amnesic Shellfish Poisoning (ASP) toxin and Azaspiracids (AZA). These 2 biotoxins were raised as part of the training needs by Member Countries during the RTC of the previous project in 2009. Brevetoxins (BTX) is also recommended to be included in the new project as ASP, AZA and BTX, along with DSP and PSP, should be regulated according to CODEX for shellfish. ASP (Domoic Acid) is produced by <i>Pseudo-nitzschia</i> algae (diatom). It is a neurotoxin that can cause stomach upset, disorientation and in severe cases, a loss of short term memory. AZA are lipophilic marine toxins and AZA poisoning results in symptoms like nausea, vomiting, diarrhea and stomach cramps. BTX are neurotoxins produced by a dinoflagellate (phytoplankton) known as <i>Karenia brevis</i>, resulting in typical neurotoxic shellfish poisoning (NSP) symptoms.</p>

3.2.2 Expected Final Goal of the Project:

- | |
|---|
| <ul style="list-style-type: none"> - Upgrade regional laboratory capabilities and credibility for testing of ASP, AZA and BTX biotoxins through conduct of a regional training course on methodologies for Member Countries and biotoxins monitoring survey in Member Countries. - Establish biotoxins monitoring programmes in Member Countries for routine surveillance testing of fish and fisheries products especially in those countries that do not have such programmes. - Improve knowledge and understanding on levels on biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries. |
|---|

3.2.3 “Steps” Toward Achieving Final Goal:

- | |
|--|
| <p>Step 1: Regional Technical Consultation Meeting in Biotoxins Monitoring in ASEAN</p> <ul style="list-style-type: none"> - Deliberate on the scope of the project, which includes the Biotoxins Monitoring Survey and the Technical Compilation. - Understand the status of biotoxins monitoring systems for fish and fisheries products in SEAFDEC Member Countries. - Identify the biotoxins analysis capabilities in Member Countries. - Assess the training requirements in biotoxins analysis. |
| <p>Step 2: Regional Training Course in Biotoxins Analyses</p> <ul style="list-style-type: none"> - To build up capacity in ASEAN Member Countries for ASP, AZA and BTX biotoxins detection and monitoring implementation. - To facilitate the setting up of biotoxins analyses methods in ASEAN countries. |
| <p>Step 3: Biotoxins Monitoring Survey</p> <ul style="list-style-type: none"> - To conduct biotoxins monitoring surveys in Member Countries to investigate the ASP, AZA and BTX levels in fish and fisheries products in the region. |
| <p>Step 4: Preparation and Publication of Technical Compilation</p> <ul style="list-style-type: none"> - To compile the biotoxins analyses and survey methodologies, monitoring survey results and reports into a Technical Compilation of Biotoxins (ASP, AZA and BTX) Monitoring in ASEAN Region and publish it for distribution to Member Countries. |
| <p>Step 5: End-of-Project Seminar</p> <ul style="list-style-type: none"> - To present the results of the biotoxins monitoring surveys conducted by Member Countries, discuss the challenges faced during the project implementation and plans for future projects or activities nationally and regionally. - To discuss and finalize the Technical Compilation of Biotoxins Monitoring in ASEAN Region for publication. |

3.2.4 Activities in the Current Project:

- | |
|--|
| <p>(1) Current position of the project: Step 1 Regional Technical Consultation Meeting in Biotoxins Monitoring in ASEAN</p> |
| <p>(2) Program duration: 2013 -2017</p> |
| <p>(3) Main activities:</p> <ul style="list-style-type: none"> - Regional Technical Consultation meeting to initiate the project. - Regional Training Course on biotoxins analyses. - Biotoxins monitoring surveys. Member Countries to set up analytical methods, identify suitable sampling sites and propose sampling plans for the survey and investigate the ASP, AZA and BTX biotoxins levels in selected fish and shellfish in respective Member Countries. - Preparation and publication of Technical Compilation of Biotoxins Monitoring in ASEAN Region. - End-of-Project Seminar. |

3.2.5 Progress and Achievements of the Current Project:

- | |
|---|
| <p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> - Regional Technical Consultation (RTC) Meeting, 24-25 July 2013 |
| <p>(2) Main achievements till the end of 2013 (tentative)</p> <ul style="list-style-type: none"> - The RTC was successfully held from 24-25 July 2013 in Singapore. The meeting decided on all the project activities and time schedule, venue, content and trainers of the regional training course, identified key project leaders in Member Countries. |

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
Upgrade regional laboratory capabilities and credibility for testing of Amnesic Shellfish Poisoning (ASP), Azaspiracids (AZA) and Brevetoxin (BTX) biotoxins for fish and fisheries products through conduct of a regional training course on methodologies for Member Countries and 1.5 year biotoxins monitoring survey in Member Countries.	0
Establish biotoxins monitoring programmes for ASP, AZA and BTX biotoxins in Member Countries for routine surveillance testing of fish and fisheries products especially in those countries that do not have such programmes.	0
Improve knowledge and understanding on levels of ASP, AZA and BTX biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries.	30

3.2.6 Evaluation of Project Activities in 2013

At the RTC, Member Countries presented an update on the status of biotoxins monitoring programs in their respective countries as well as any occurrences /incidences in fish and or shellfish. The project resource person gave presentations on the three biotoxins, AZA, ASP and BTX, detection and analytical methods and biotoxin monitoring system in Japan. As such, the RTC has helped to improve the knowledge and understanding on levels of ASP, AZA and BTX biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 2: Regional Training Course in Biotoxins (AZA, ASP, BTX) Analyses The course participants will be trained in detection and analytical methodologies for AZA, ASP and BTX biotoxins. The participants will then set up these methods in their laboratories to conduct the biotoxins monitoring surveys in 2015-2016. This will help contribute to the upgrading of laboratory capabilities and credibility in biotoxins analyses in Member Countries as well as the establishment of biotoxins monitoring programmes for routine surveillance in Member Countries.	5 days	2 nd quarter 2014

4.2 Expected Outcomes/Outputs of the Year 2014

The Regional Training Course in Biotoxins (AZA, ASP, BTX) Analyses is scheduled to be conducted in the 2nd quarter of 2014. The training course will be conducted by invited Japanese expert trainers and, include lectures and hands-on practical sessions in biotoxins analyses. Two participants from each member country will be invited. The participants will gain knowledge and skills on biotoxins analyses methodologies and will be able to set up these methods in their own countries to upgrade their laboratory capabilities to conduct the biotoxins monitoring programmes.

PROJECT DOCUMENT

			Project id: 031002
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Traceability Systems for Aquaculture Products in the ASEAN Region		
Program Thrust:	Thrust II	Total Duration:	5 yrs (2010-2014)
Lead Department:	MFRD	Lead Country:	Singapore
Project Sponsor:	Japanese Trust Fund-V	Project Partner:	Post-Harvest Technology Centre, Agri-Food and Veterinary Authority of Singapore (PHTC/AVA)
Proposed Budget:	USD 152,618	This year budget:	(2013) USD 28,800
Prepared by	Loh Tunxi, Felicia, Scientist (PHTC/AVA); Yeap Soon Eong, Chief of MFRD Programmes	Project Leader	Loh Tunxi, Felicia, Scientist (PHTC/AVA)

1. INTRODUCTION/BACKGROUND**1.1 Situation analysis**

Traceability has become a major concern of the aquaculture industry, especially since it has become a legitimate requirement in major international markets such as the EU and the US. Furthermore as aquaculture production becomes more market and consumer driven, the greatest pressure for product traceability has been coming from the general public. Consumers are getting more and more concerned on what they eat – whether the food comes from a safe and sustainable source, and whether production, transportation, and storage conditions can guarantee food safety and quality.

The Codex Alimentarius Commission (2004) defines traceability or product tracing as “The ability to follow the movement of a food through specified stage(s) of production, processing and distribution”. In an increasingly competitive food system, traceability has become a major tool in dealing with concerns of food safety, quality assurance, risk prevention, and gaining consumer trust. Traceability can be used to achieve different purposes or objectives, such as for food safety, bio-security and regulatory requirements or to ensure quality and other contractual requirements. For instance, external traceability allows the tracking of a product and/or attribute(s) of that product through the successive stages of the distribution chain (from farm to fork), while internal traceability (or enterprise traceability) is aimed at productivity improvement and cost reduction within a production unit (*e.g.* fish plant). Governments and organizations around the world have also been developing different systems on seafood traceability *e.g.* TraceFish (EU), TraceShrimp (Thailand).

1.2 Stakeholder analysis

The key stakeholders of this project are the relevant agencies in the fisheries department of the ASEAN-SEAFDEC Member Countries which are involved in the development of the aquaculture industry and ensuring the safety and quality of the aquaculture products; the fish and shrimp aquaculture farmers especially those who export their products; as well as the consumers/buyers, international and domestic.

1.3 Problem analysis

Some countries in the ASEAN region which are major exporters of seafood have began implementation of traceability systems for their aquaculture products such as Thailand (shrimps) and Vietnam (catfish). However, with increasing requirements for traceability in the international seafood markets, there is an urgent need for all countries in the region to implement traceability systems in their aquaculture industry so as to comply with the regulations of the importing countries. In addition, domestic consumers in the region

who are becoming more affluent and educated also demand that a higher level of food safety and quality in their seafood. In view of these developments, MFRD has proposed a project on traceability for aquaculture products in the ASEAN region to provide a platform for the sharing of information and experiences among the ASEAN Member Countries on traceability systems to better enable the regional aquaculture industries to implement appropriate traceability systems in aquaculture products and to meet international traceability requirements in the network of aquaculture production, marketing, and trade.

1.4 Links to regional provisions

The project is in line with the following Resolution and Plan of Action as endorsed at the ASEAN-SEAFDEC Conference of 2011:

Resolution 19: Support the competitiveness of the ASEAN fish trade through the development of procedures and programmes that would certify, validate or otherwise indicate the origin of fish to reflect the need for traceability, sustainable fishing practices and food safety, in accordance with international and national requirements.

Plan of Action D60: Develop traceability systems, with mechanisms as needed to certify or validate the information, for the whole supply chain, and establish regulations and enforcement schemes in line with international standards. Align Member Countries' inspection systems and incorporate strengthened port inspections in the process as a means to improve inspection systems.

Plan of Action D63: Promote and conduct training programs and develop training materials to upgrade the technical skills and competencies of personnel in the public and private sectors on fisheries post-harvest technology and food safety management system.

1.5 Links to the SEAFDEC Program Thrust

This project is in line with the SEAFDEC Program Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The goal of the project is to enhance the competitiveness of the region's aquaculture products through the implementation of traceability in the aquaculture production and supply chain. The objectives of the project are to:

- 1) Provide a platform for the sharing of information and experiences among ASEAN Member Countries on implementation of traceability systems for aquaculture products in the region as well as an overview of the status of implementation of traceability systems in the aquaculture industries in the ASEAN Region.
- 2) Enhance regional capability on implementation of traceability systems for aquaculture products and promote their implementation in the region.

The performance indicators of the project are the development of Regional Guidelines on Implementation of Traceability for Aquaculture Products and the establishment of traceability programmes for aquaculture products in Member Countries especially those which do not yet have such programmes in place.

2.2 Expected Outcomes and Outputs:

The expected outcomes of the project are envisaged to be the establishment of traceability programmes for aquaculture products in the Member Countries and enhanced capability and knowledge on the development and implementation of traceability systems for aquaculture products in the Member Countries. The expected outputs are:

- 1) Two regional on-site training workshops – 1st on-site in Vietnam and 2nd on-site in Thailand

- 2) Technical Compilation on traceability systems for aquaculture products in the ASEAN Region which will collate the information and data from the two on-site workshops and include Regional Guidelines on Implementation of Traceability for Aquaculture Products, difficulties faced and benefits of implementing traceability systems for aquaculture products.

2.3 Project Description/Framework

The Post-Harvest Technology Centre (PHTC) of the Agri-Food and Veterinary Authority (AVA) as the Collaborating Center for MFRD programmes will be responsible for the project and will manage and coordinate all project activities. The project will be conducted for a period of 5 years from 2010-2014 and funded under the Japanese Trust Fund-V program on a cost-sharing basis with the participating ASEAN-SEAFDEC Member Countries. The project will be implemented through the following activities:

Activity 1: Regional Technical Consultation (RTC)

A RTC will be held in Singapore to initiate the project. All ASEAN-SEAFDEC Member Countries will be invited to participate and to provide an overview on implementation of traceability systems for aquaculture products in their countries. The RTC will also discuss on the project and its activities.

Activity 2: Regional On-site Training Workshops on traceability systems for aquaculture products.

Sub-activity 2.1: 1st Regional On-site Training Workshop – The workshop program will include lectures on traceability systems and site visits to a fish aquaculture farm and a fish processing factory where the fish are processed into fillets to enable the participants to learn how traceability is implemented throughout the whole production chain. At the end of the workshop the participants will have a better understanding and knowledge on implementation of traceability systems for aquaculture fish.

Sub-activity 2.2: 2nd Regional On-site Training Workshop – The workshop program will include lectures on traceability systems and site visits to a shrimp aquaculture farm and a shrimp processing factory. Regional as well as local expertise will be engaged to conduct the workshop. At the end of the workshop the participants will have a better understanding and knowledge on implementation of traceability systems for aquaculture shrimp.

Activity 3: Mid-Term Project Review Meeting

To review the progress of the project and the activities conducted. At the review meeting, participants will be providing updates on the implementation status of traceability systems for aquaculture products in their respective countries. The meeting will also discuss and plan for the 2nd on-site regional training workshop.

Activity 4: Documentation and publication of Technical Compilation

After the conduct of the two on-site workshops, MFRD will compile the information and recommendations provided and use them to publish a Technical Compilation on traceability systems for aquaculture products in the ASEAN Region in 2014. The technical compilation will include Regional Guidelines on Implementation of Traceability for Aquaculture Products, difficulties faced and benefits of implementing traceability systems for aquaculture products.

Activity 5: End-Of-Project Seminar (EOP)

The EOP will be held in the third quarter of 2014 to conclude the project and to share the results of the project among Member Countries. The EOP will also discuss and finalize the Technical Compilation including the Regional Guidelines for publication. At the EOP, the participants will also present their proposed plans for implementing traceability systems for aquaculture products in their country.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 2.2: 2nd Regional On-site Training Workshop on traceability systems for aquaculture products (shrimp) - The 3-day training workshop was conducted on-site in Thailand and included lectures by a regional expert and	3 days	5-7 November 2013

<p>site visits to a shrimp aquaculture farm and a processing factory where the shrimps were processed.</p> <ul style="list-style-type: none"> - The participants were able to observe and learn how traceability is implemented throughout the whole production chain. - At the end of the workshop, the participants gained a better understanding and knowledge on implementation of traceability systems for aquaculture shrimp. <p>Activity 4: Documentation and publication of Technical Compilation</p> <ul style="list-style-type: none"> - Preparation of the Technical Compilation on traceability systems for aquaculture products in the ASEAN Region begun after the 2nd on-site workshop. - The Technical Compilation will incorporate the information and data from the two on-site workshops and include Regional Guidelines on Implementation of Traceability for Aquaculture Products, difficulties faced and benefits of implementing traceability systems for aquaculture products. - The technical compilation will be a useful resource for Member Countries to assist in their implementation of traceability systems for aquaculture products 	<p>6-8 months (begin in December 2013)</p>	<p>To be published in last quarter 2014.</p>
---	--	--

3.2 Evaluation of the Project Outcomes Till the Year 2013 <in general>

1.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade</p> <p>(2) Issues in the region at the beginning of the study: Traceability has become a major concern of the aquaculture industry, especially since it has become a legitimate requirement in major international markets such as the EU and the US. Furthermore as aquaculture production becomes more market and consumer driven, the greatest pressure for product traceability has been coming from the general public. Consumers are getting more and more concerned on what they eat – whether the food comes from a safe and sustainable source, and whether production, transportation, and storage conditions can guarantee food safety.</p> <p>The Codex Alimentarius Commission (2004) defines traceability or product tracing as “The ability to follow the movement of a food through specified stage(s) of production, processing and distribution”. In an increasingly competitive food system, traceability has become a major tool in dealing with concerns of food safety, quality assurance, risk prevention, and gaining consumer trust. Traceability can be used to achieve different purposes or objectives, such as for food safety, bio-security and regulatory requirements or to ensure quality and other contractual requirements. For instance, external traceability allows the tracking of a product and/or attribute(s) of that product through the successive stages of the distribution chain (from farm to fork), while internal traceability (or enterprise traceability) is aimed at productivity improvement and cost reduction within a production unit (e.g. fish plant). Governments and organizations around the world have also been developing different systems on seafood traceability e.g. TraceFish (EU), TraceShrimp (Thailand).</p> <p>In view of these developments, MFRD has proposed a project on traceability for the aquaculture products in the ASEAN region to provide a platform for the sharing of information and experiences among the ASEAN Member Countries on traceability systems to better enable the regional aquaculture industries to implement appropriate traceability systems for aquaculture products and to meet international traceability requirements in the network of aquaculture production, marketing, and trade.</p>
--

1.2.2 Expected final goals of the project:

- | |
|---|
| <ul style="list-style-type: none"> - Provide a platform for the sharing of information and experiences among ASEAN Member Countries on implementation of traceability systems for aquaculture products in the region as well as an overview of the status of implementation of traceability systems in the aquaculture industries in the ASEAN Region. - Enhance regional capability on implementation of traceability systems for aquaculture products and promote their implementation in the region. |
|---|

1.2.3 “Steps” toward achieving final goals:

- | |
|---|
| <p>Step 1: Regional Technical Consultation in Traceability Systems for Aquaculture Products in ASEAN Region</p> <ul style="list-style-type: none"> - Deliberate on the scope of the project, which covers technical compilation on traceability systems for aquaculture products in the ASEAN region and on site training on traceability systems for aquaculture products. - Identify regional expertise with knowledge and experience in developing and implementing traceability systems for aquaculture products to conduct on-site training and to develop the relevant training materials. - Identify suitable sites for the on-site training on traceability systems for aquaculture products (fish farm and shrimp farm) with suitable co-operants. |
| <p>Step 2: Regional On-site Training Workshops on Traceability Systems for Aquaculture Products in ASEAN Region</p> <ul style="list-style-type: none"> - To build up capacity in ASEAN Member Countries for knowledge in traceability systems for aquaculture products - To facilitate implementation of traceability systems for aquaculture products for interested parties from ASEAN Member Countries |
| <p>Step 3: Mid-Term Project Review Meeting</p> <ul style="list-style-type: none"> - To review the progress of the project and activities conducted. - To provide an update on the implementation status of traceability systems for aquaculture products in the ASEAN Region. - To discuss on the future project activities. |
| <p>Step 4: Documentation and Publication of Technical Compilation</p> <ul style="list-style-type: none"> - To prepare and compile technical information on traceability systems for aquaculture products in ASEAN region. The Technical Compilation will include Regional Guidelines on Implementation of Traceability for Aquaculture Products, challenges faced and benefits of implementing traceability systems for aquaculture products. |
| <p>Step 5: End-of-Project Seminar</p> <ul style="list-style-type: none"> - To conclude the project and provide a final update on the implementation status of traceability systems for aquaculture products in the ASEAN Region - To discuss and finalize for publication the Technical Compilation on traceability systems for aquaculture products in ASEAN region including the Regional Guidelines. - To discuss the challenges faced during the project implementation and discuss possible future projects. |

1.2.4 Activities in the current project:

- | |
|--|
| <p>(1) Current position of the project: Step 2 and Step 4</p> |
| <p>(2) Program duration: 2010-2014</p> |
| <p>(3) Main activities:</p> <ul style="list-style-type: none"> - Regional Technical Consultation in Traceability Systems for Aquaculture Products in ASEAN Region - 1st and 2nd Regional On-site Training Workshops on Traceability Systems for Aquaculture Products in ASEAN Region - Mid-Term Project Review Meeting - Documentation and Publication of Technical Compilation - End-of-Project Seminar |

1.2.5 Progress and achievements of the current project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> - The Regional Technical Consultation on Traceability Systems on Aquaculture Products in the ASEAN Region in 2010. - 1st Regional On-site Training Workshop on Traceability Systems for Aquaculture Fish in ASEAN Region in 2011. - Mid-Term Project Review Meeting in 2012. - 2nd Regional On-site Training Workshop on Traceability Systems for Aquaculture Shrimps in ASEAN Region in 2013. 	
(2) Main achievements till the end of 2013 (tentative)	
<ul style="list-style-type: none"> - The RTC Meeting was successfully conducted held from 12-14 October 2010 in Singapore. The meeting decided on all the project activities and time schedule. The meeting agreed to conduct the 1st on-site workshop on traceability systems for aquaculture fish in Vietnam in 2011 and the 2nd on-site workshop on traceability systems for aquaculture shrimp in Thailand in 2013. - The 1st Regional On-site Training Workshop was conducted in Vietnam from 28-30 Nov 2011 to provide training in implementation of traceability system for aquaculture fish to the Member Countries and help build up their capability and knowledge in this area. The workshop was attended by 23 participants from the 10 ASEAN Member Countries. The training comprised of key presentations by regional experts and consultants in aquaculture traceability and field trips to a fish processing factory and aquaculture fish farm to allow the participants to have hands-on experience on how traceability is implemented in an industrial setting. In addition, group discussions were held to deliberate on the challenges faced in implementing traceability for aquaculture products in their countries as well as possible solutions. The workshop concluded with the establishment of generic supply chains for the aquaculture industry in ASEAN and identification of key information that needs to be shared amongst the stakeholders in these supply chains to ensure that the aquaculture product can be traced back to the source. - The Mid-Term Project Review Meeting was successfully held on 7-8 Nov 2012 in Singapore. The meeting reviewed the progress of the project and the activities conducted thus far. The participants provided updates on the implementation status of traceability systems for aquaculture products in their respective countries. The meeting also discussed and planned for the 2nd on-site regional training workshop to be held in 2013 in Thailand taking into consideration the recommendations of the 1st regional on-site training workshop in 2011 to ensure that the training will be more effective and beneficial to the participants of the workshop. - The 2nd Regional On-site Training Workshop on Traceability Systems for Aquaculture Shrimp in ASEAN Region was held on 5-7 November 2013 in Bangkok, Thailand. The workshop was attended by 23 participants from the 10 ASEAN Member Countries. The training comprised of key presentations by a regional expert in aquaculture traceability and field trips to a shrimp aquaculture farm and processing factory to allow the participants to have hands-on experience on how traceability is implemented in an industrial setting. The workshop concluded with a discussion on generic supply chains for the aquaculture shrimp in ASEAN and identification of key information that needs to be shared amongst the stakeholders in these supply chains to ensure that the product can be traced back to the source. 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outputs/outcomes	Achievement rate (%)
Provide a platform for the sharing of information and experiences among ASEAN Member Countries on implementation of traceability systems for aquaculture products in the region as well as an overview of the status of implementation of traceability systems in the aquaculture industries in the ASEAN Region.	80%
Enhance regional capability on implementation of traceability systems for aquaculture products and promote their implementation in the region.	60%

1.2.6 Evaluation of Project Activities in 2013

The on-site training workshop provided the participants with a better understanding and knowledge on implementation of traceability systems for aquaculture shrimp to better equip them to establish such systems in their respective countries. The Technical Compilation on traceability systems for aquaculture products in the ASEAN Region which includes the Regional Guidelines on Implementation of Traceability for Aquaculture Products when published in 2014 will serve as a useful resource for Member Countries to assist in their implementation of traceability systems for aquaculture products. Product traceability has become a major

concern of the aquaculture industry as it has become a legitimate requirement in major international and regional markets. These two activities will thus help to achieve the project's objective to enhance regional capability in implementation of traceability systems for aquaculture products and promote their implementation in the region thereby contributing to the overall program thrust of enhancing capacity and competitiveness to facilitate international and intra-regional trade in aquaculture products.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 4: Documentation and publication of technical compilation</p> <ul style="list-style-type: none"> - Preparation of the Technical Compilation on traceability systems for aquaculture products in the ASEAN Region begun after the 2nd on-site workshop and will continue in 2014. - The Technical Compilation will incorporate the information and data from the two on-site workshops and include the Regional Guidelines on Implementation of Traceability for Aquaculture Products, difficulties faced and benefits of implementing traceability systems for aquaculture products. - The Technical Compilation will be a useful resource for Member Countries to assist in their implementation of traceability systems for aquaculture products. 	6-8 months (beginning in December 2013)	To be published in last quarter 2014.
<p>Activity 5: End –Of- Project (EOP) Seminar</p> <ul style="list-style-type: none"> - The EOP will be organized to conclude the project and to share the results of the project among Member Countries. - The EOP will serve as a sharing platform for the Member Countries to provide a final update on the implementation status of traceability systems for aquaculture products in their respective countries and or proposed plans for implementation, challenges faced during implementation and discuss possible future projects. - The EOP will also discuss and finalize the Technical Compilation including the Regional Guidelines on Implementation of Traceability for Aquaculture Products for publication. 	2 days	Third quarter 2014

4.2 Expected Outcomes/Outputs of the Year 2014

In 2014 which is the final year of the project, the main outputs will be the EOP seminar and the Technical Compilation which includes the Regional Guidelines on Implementation of Traceability for Aquaculture Products. Together with the two on-site training workshops, it is envisaged that these project activities will help enhance regional capability and knowledge on the development and implementation of traceability systems for aquaculture products in the Member Countries.

PROJECT DOCUMENT

			Project id: 031103
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Utilization of Freshwater Fish for Value-Added Products		
Program Thrust:	II	Total Duration:	3 yrs (2011-2013)
Lead Department:	Marine Fisheries Research Department	Lead Country:	Singapore
Project Sponsor:	Government of Singapore through MFRD Programmes	Project Partner:	Post-Harvest Technology Centre, Agri-Food and Veterinary Authority of Singapore (PHTC/AVA)
Proposed Budget:	USD 84,660	This year budget:	(2013) USD 26,380
Prepared by	Ong Yihang, Scientist (PHTC/AVA); Yeap Soon Eong, Chief of MFRD Programmes	Project Leader	Ong Yihang, Scientist (PHTC/AVA)

1. INTRODUCTION/BACKGROUND

1.1 Situation analysis

Freshwater fish is an important fisheries resource in many ASEAN Member Countries where it serves as a major source of animal protein especially for the marginalized and poorer segments of the population thereby contributing to improved livelihood for fishery communities and food security in these countries. Freshwater fish is also an important source of raw materials for processing into a variety of traditional fish products in the ASEAN Member Countries. With Lao PDR, Cambodia, Myanmar and Vietnam becoming members of SEAFDEC, freshwater fish utilization is becoming an important area to study as these Member Countries have significant freshwater fisheries.

1.2 Stakeholder analysis

The key stakeholders of this project are the relevant agencies in the fisheries department of the participating countries who are involved in the development of the freshwater fisheries as well as the industry/commercial cooperants of the project who will develop the value added products from the indigenous freshwater fish.

1.3 Problem analysis

Freshwater fish products as with other traditional products in the ASEAN region are largely processed by household producers and small and medium-sized establishments which are usually family-owned operations with little mechanization. Upgrading of processing and packaging technology for the freshwater fish products will help to improve their quality and safety with the possibility of commercialization. Under the previous SEAFDEC Special 5-year Programme (2001-2005), MFRD conducted a project on utilization of freshwater fish with Cambodia in 2003-2004. However, MFRD was not able to extend the project to the other countries due to budget constraints. Singapore through its Post-Harvest Technology Centre (PHTC) of the Agri-Food & Veterinary Authority (AVA) as the Collaborating Center for MFRD Programmes proposed to conduct a three-year project with Laos, Myanmar and Vietnam in order to transfer the technologies on development of value added products from freshwater fish in these countries for the improved livelihood of the fishery communities as well as for export. Indonesia requested to participate in the project at the 42nd Meeting of the SEAFDEC Council in 2010.

1.4 Links to regional provisions

The project is in line with the following Resolution and Plan of Action as endorsed at the ASEAN-SEAFDEC Conference of 2011:

Resolution 20: Optimize the utilization of catch from water to market by reducing post-harvest losses and waste to increase fish supply and improve economic returns through promotion of appropriate technologies and facilities along the supply chain

Plan of Action D58: Introduce and provide support for the development and application of technologies that optimize the utilization of catch, reduce post-harvest losses, wastes and discards in commercial and small-scale fisheries and processing operations, through improved processing, facilities and infrastructure development, on-board and on-shore handling, storage, distribution and marketing of fish and fishery products.

Plan of Action D63: Promote and conduct training programs and develop training materials to upgrade the technical skills and competencies of personnel in the public and private sectors on fisheries post-harvest technology and food safety management system.

1.5 Links to the SEAFDEC Program Thrust

This project is in line with the SEAFDEC Program Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade.

1.6 Links with other SEAFDEC's projects

This project is an extension of the previous SEAFDEC Special 5 year Programme (2001-2005) project on Utilization of Freshwater Fish with Cambodia which was not extended to other countries at that time due to budgetary constraints.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The goal of the project is to promote the optimum utilization of indigenous freshwater fish species including the reduction of discards and post-harvest losses to increase fish supply and improve economic returns. The objectives of the project are to:

- 1) Utilize freshwater fish species for the development of value-added products; and
- 2) Assist in upgrading the processing and packaging technology for freshwater fish products.

The performance indicators of the project are the number of value added products (at least two) developed by each participating country from the indigenous freshwater fish species and the participation of at least one industry/commercial co-operants in each country.

2.2 Expected Outcomes and Outputs:

The expected outcome of the project is the enhanced utilization of the indigenous freshwater fish species for human consumption in the participating countries. The expected outputs are:

- 1) Regional Training Course on Processing of Value Added Products;
- 2) A handbook on processing of value-added freshwater fish products; and
- 3) At least two value added products developed by each participating country from the indigenous freshwater fish species.

2.3 Project Description/Framework

The Post-Harvest Technology Centre (PHTC) of the Agri-Food and Veterinary Authority (AVA) as the Collaborating Center for MFRD programmes will be responsible for the project and will manage and coordinate all project activities. . The project will be conducted for a period of 3 years from 2011-2013. The

project will be funded using the MFRD Other Fund and will be on a cost-sharing basis with the participating countries namely Lao PDR, Myanmar, Vietnam and Indonesia. The project will be implemented through the following activities:

Activity 1: Project Inception and Planning Meeting

A 2-day Project Inception and Planning Meeting will be held in Singapore to discuss and plan for all project activities, identify the freshwater fish species to be utilized and the types of value-added products to be developed. Two participants each from Lao PDR, Myanmar, Vietnam and Indonesia who are involved in the freshwater fisheries industry will be invited to attend; one of whom should be from the private sector. The meeting will provide an opportunity for a better overview and understanding of the freshwater fisheries resources as well as the traditional freshwater fish products in Lao PDR, Myanmar, Vietnam and Indonesia. The meeting will also identify the key project leader in each country and commercial co-operants, if any, for the project. The budget for the Activity 3 (Product development and processing trials) will also be discussed and determined.

Activity 2: Regional Training Course on Processing of Value Added Products

A Regional Training Course on processing and packaging of value added products using freshwater fish will be organized and conducted by MFRD in Singapore. Two participants from each country will be invited to attend, one of whom should be from the private sector (industry/commercial co-operants). The training course will include lectures and hands-on practicals on the processing of value added products such as fish sweetmeat, fish otah, fish sausage, fish crackers, etc. using simple, inexpensive equipment and technology suitable for the village level and small to medium-sized industry. Good manufacturing and handling practices to ensure product safety and quality will also be emphasized in the course.

Activity 3: Product development and processing trials

Each country will conduct product development and processing (including packaging) trials to develop at least two value added products using their indigenous freshwater fish species. Shelf-life studies on the products should also be conducted. This activity will be conducted for a period of about one year.

Activity 4: Mid-term Evaluation and Progress Meeting

A 2-day Mid-term Evaluation and Progress Meeting will be held in Singapore to discuss and evaluate the progress of the project and to plan for the subsequent activities *i.e.* the preparation and publication of the processing handbook and the End-of-Project Seminar. Two participants from each country will be invited to attend.

Activity 5: Preparation and Publication of the Processing Handbook

A handbook on the processing of the value-added products developed by each of the country using the freshwater fish species will be prepared and published. Five hundred copies of the handbook will be printed.

Activity 6: End-of-Project Seminar

An End-of-Project Seminar will be conducted in Singapore to share the results of the project among the participating countries. The draft processing handbook will be discussed and finalized at the Seminar to be subsequently published for distribution all Member Countries. The value-added products will also be prepared for display and tasting at the seminar. Three participants from each country will be invited to attend of which at least one should be from the private sector.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>Activity 5: Preparation and Publication of the Processing Handbook</p> <p>- The participating countries have successfully developed value added products using their indigenous freshwater fish species following the training received at the regional training course in</p>	6 months	To be published in November 2013

<p>2011. Indonesia has developed 2 products from walking catfish; Myanmar, 2 products from rohu fish; Lao PDR, 2 products, one each from catfish and clown featherback fish and Vietnam, 2 products from catfish.</p> <ul style="list-style-type: none"> - The draft of the handbook has been prepared and includes description of freshwater fisheries in the country, the freshwater species used, the value added products developed, the processing steps and procedures, shelf-life studies. It will be distributed to all Member Countries once it is published to share the results of the project and to serve as a useful resource on utilizing freshwater fish to make value added products. 		
<p>Activity 6: End-of-Project Seminar</p> <ul style="list-style-type: none"> - An End-of-Project Seminar was conducted in Singapore to share the results of the project among the countries. - Three participants from each participating country was invited to attend of which at least one was from the private sector. - Twelve local (Singapore) industry participants also attended the seminar to learn about the freshwater fish value-added products developed and to network with the country participants for possible future business opportunities. - The draft processing handbook was also discussed and finalized for publication. 	<p>2 days</p>	<p>11-12 September 2013</p>

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Thrust II: Enhancing Capacity & Competitiveness to Facilitate International and Intra-regional Trade</p>
<p>(2) Issues in the region at the beginning of the study: Freshwater fish is an important fisheries resource in many ASEAN Member Countries where it serves as a major source of animal protein especially for the marginalized and poorer segments of the population thereby contributing to food security in these countries. Freshwater fish is also an important source of raw materials for processing into a variety of traditional fish products in the ASEAN Member Countries. Freshwater fish products as with other traditional products in the ASEAN region are largely processed by household producers and small and medium-sized establishments which are usually family-owned operations with little mechanization. Upgrading of processing and packaging technology for the freshwater fish products will help to improve their quality and safety with the possibility of commercialization. With Lao PDR, Cambodia, Myanmar and Vietnam becoming members of SEAFDEC, freshwater fish utilization is becoming an important area to study as these Member Countries have significant freshwater fisheries.</p>

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> - To utilize indigenous freshwater fish species for the development of value-added products in participating countries. - To assist in upgrading the processing and packaging technology for freshwater fish products
--

3.2.3 “Steps” Toward Achieving Final Goal:

<p>Step 1: Project Inception and Planning Meeting</p> <ul style="list-style-type: none"> - To discuss and plan for all project activities and time schedules. - To identify the freshwater fish species to be utilized and the types of value-added products to be developed.
--

<ul style="list-style-type: none"> - To provide a better overview and understanding of the freshwater fisheries resources as well as the traditional freshwater fish products in the participating countries. - To identify the key project leader in each country and commercial co-operants, if any, for the project.
<p>Step 2: Regional Training Course in Processing of Value Added Products</p> <ul style="list-style-type: none"> - To provide project participants with the knowledge and skills in processing, packaging and product development of freshwater fish products using simple, inexpensive equipment and technology suitable for the village level and small to medium-sized industry. - Good manufacturing and handling practices to ensure product safety and quality will also be emphasized in the course.
<p>Step 3: Product development and processing trials</p> <ul style="list-style-type: none"> - Each participating country to conduct product development and processing (including packaging) trials to develop at least two value added products using indigenous freshwater fish species. - Shelf-life studies on the products should also be conducted
<p>Step 4: Mid-term Evaluation and Progress Meeting</p> <ul style="list-style-type: none"> - To discuss and evaluate the progress of the project - To plan for the subsequent activities <i>i.e.</i> the preparation and publication of the processing handbook and the End-of-Project Seminar.
<p>Step 5: Preparation and Publication of the Processing Handbook</p> <ul style="list-style-type: none"> - A handbook on the processing of the value-added products developed by each of the country using the freshwater fish species will be prepared and published. Five hundred copies of the handbook will be printed.
<p>Step 6: End-of-Project Seminar</p> <ul style="list-style-type: none"> - To share the results of the project with the other ASEAN Member Countries. - To discuss and finalize the handbook on the processing of the value-added products for publication. - To discuss the challenges faced during the project implementation and discuss possible future projects.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 6
(2) Program duration: 2011-2013
<p>(3) Main activities:</p> <ul style="list-style-type: none"> - Project Inception and Planning Meeting - Regional Training Course on Processing of Value-Added Products - Product Development and Processing Trials - Mid-Term Evaluation and Progress Meeting - Preparation and Publication of the Processing Handbook - End-of-Project Seminar

3.2.5 Progress and Achievements of the Current Project:

<p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> - The Project Inception and Planning Meeting held in Singapore in 2nd quarter of 2011. - The Regional Training Course on processing of value added products using freshwater fish conducted in MFRD/Singapore in the last quarter of 2011. - The product development and processing trials using indigenous freshwater carried out by the participating countries in 2012. - The Mid-term Evaluation and Progress Meeting held in Singapore in 2012 - The End-of-Project Seminar was held in Singapore in 2013. - The processing handbook will be published in 2013.
<p>(2) Main achievements till the end of 2013 (tentative)</p> <ul style="list-style-type: none"> - The 2-day Project Inception and Planning Meeting was successfully held in Singapore on 26-27 Apr 2011. The meeting discussed and planned for all the project activities and project schedule, appointed the key project leaders and identified commercial co-operants in the participating countries, identified the freshwater fish species to be utilized and the types of value-added products to be developed by the participating countries. The meeting also deliberated on the product development and processing trials to be conducted in the participating countries as well as the publication of the processing handbook on the products developed. - MFRD successfully organized and conducted the 4-day Regional Training Course on processing of value added products using freshwater fish from 18-21 October 2011 to equip the project participants with the

- knowledge and skills to develop their value added products using simple, inexpensive equipment and technology suitable for the village level and small to medium-sized industry. The training course included lectures and hands-on practicals on the processing of six value added products which has been agreed to at the Project Inception and Planning Meeting. There were also lectures on GMP and HACCP in fish processing, shelf-life studies on fish products and a practical on sensory analyses.
- The participating countries have conducted product development and processing trials for two value added products each using the indigenous freshwater fish species agreed at the Project Inception and Planning Meeting. In addition, the countries have conducted shelf-life studies on the value added products developed.
 - The Mid-term Evaluation and Progress Meeting was successfully held in Singapore on 27-28 Jun 2012 and was attended by 2 participants from each of the participating countries of Indonesia, Myanmar, Lao PDR and Vietnam. Each country presented the status and results of their product development and processing trials. A sensory evaluation on the products made by the individual countries was also conducted to provide valuable feedback for product improvement. The meeting agreed that the product development and processing trials (including product shelf life studies) should be completed by end of 2012 with all the reports submitted to MFRD by 1st quarter of 2013.
 - The End-of-Project Seminar was successfully conducted in Singapore on 11 – 12 September 2013 and was attended by 3 participants from each of the participating countries. As facilitated by MFRD, interested companies in Singapore were invited to attend the seminar. This provided opportunities for networking with the project’s commercial co-operants which may lead to business opportunities. Sensory evaluation on the products made by the individual countries was also conducted to provide valuable feedback.
 - MFRD had prepared the draft handbook on the processing of the value-added products by each of the participating countries and publication of five hundred copies of the handbook is in progress. The handbook will be distributed to all ASEAN-SEAFDEC Member Countries to share the results of the project and to serve as a useful resource on using freshwater fish to make value added products.

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
To utilize freshwater fish species for the development of value-added products	100
To assist in upgrading the processing and packaging technology for freshwater fish products	100

3.2.6 Evaluation of Project Activities in 2013

The End-of-Project Seminar was successfully conducted on 11-12 September 2013 to conclude the project. The seminar served as a useful platform for the participating countries to present and discuss the results of the project *i.e.* the value added product developed from the indigenous freshwater fish species as well as shelf life studies. The participation of local Singapore industry provided the participating countries especially the project’s commercial co-operants with a good opportunity to network with interested parties which may lead to business opportunities. The product tasting session also provided valuable feedback for further improvements of the value added products and suggestions for new products. The handbook on the processing of value added products from freshwater fish will serve as a useful resource to other Member Countries to utilize their freshwater fish species for value added product development.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
None as the project has been completed in 2013.		

4.2 Expected Outcomes/Outputs of the Year 2014

None as the project has been completed in 2013.

PROJECT DOCUMENT

Project id: 021003			
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia		
Program Thrust:	II	Total Duration:	5 years (2010-2014)
Lead Department:	Aquaculture Department	Lead Country:	Philippines
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	
Prepared by:	Teruo Azuma, Deputy Chief	Project Leader:	Teruo Azuma, Deputy Chief

1. INTRODUCTION/BACKGROUND

The control of fish diseases and the promotion of fish health under farming conditions are essential components of aquaculture to ensure a stable supply of fish products. To meet the various standards required by the global market is also a growing pressure for developing countries. It is important to better understand the risks, impacts and management problems related to diseases because their quality greatly affects the commodities' chance for export. Better understanding of issues affecting disease occurrences and their control can promote the livelihood of small holders and aquafarmers specifically in rural communities.

The status of fish health management remains generally poor in some ASEAN countries, although remarkable technical advances in the diagnosis, prevention and control of fish diseases have occurred worldwide. This requires not only technical development, but also the urgent acceleration of awareness and capacity building in fish health management in the Southeast Asia region. The latter would provoke small farmers and family-based enterprises composing a large sector of aquaculture in the region to bring interest on fish health issues linking to the increases of productivity and food safety. Additionally, training and skills' development for researchers in counterpart countries on on-site samplings and disease identification should be promoted until such time that they can do the work independently.

On the technical aspect, establishment of preventive management strategies is needed to maintain the disease-free status of fish stocks. This will enable the aquafarmers to strictly monitor the health status so that early and effective intervention strategies can be implemented. The necessity to establish new methods to prevent fish disease, other than chemotherapy, is also increasing worldwide so as to guarantee food safety. Vaccine delivery by injection is not practical under field conditions. Immersion and oral administration have shown efficacy but the fate of the vaccine after uptake by epithelial and mucosal tissues and the duration of the protective response are uncertain. The study on the vaccine carrier, therefore, would be very important to increase productivity and food safety.

Regarding parasitic diseases, the study and expertise on mollusk diseases are still very scarce in spite of the increasing economic importance of these species. In addition, as for economically important freshwater fish species used as food fish, the fish-borne zoonotic parasites have not been fully investigated in Southeast Asian countries, especially in Cambodia, Lao PDR and Myanmar. Thus, these parasite studies should be undertaken.

The present project focuses on the acceleration of delivery of information and awareness building among the aquafarmers as well as on research and technology development which remain as the significant activities of SEAFDEC/AQD. An integrated fish-health-care system and management strategies are expected to be established through this project will ensure a holistic approach to a stable supply of safe aquaculture products.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The project goal is to accelerate awareness and capacity building in fish health management in Southeast Asia.

The project objectives are to:

- 1) Accelerate awareness about fish health management in resource-deprived countries through industry-wide capacity building;
- 2) Guarantee food safety and sustainable production through innovative research; and
- 3) Disseminate output of the project.

The performance indicators are as follows.

- 1) Compilation of case studies that explain the problems and challenges and possible solutions to the implementation of fish health care in rural aquaculture, and to boost staff capability as well as develop and produce learning materials to further disseminate and sustain the activity;
- 2) Surveillance on the fish-borne zoonotic parasites of freshwater fish along with on-site training for capacity building of fish health workers on disease management strategies to reduce or prevent the spread of zoonotic parasitic diseases;
- 3) Refinement and application of molecular diagnostic methods for the detection of fish and shrimp viral diseases and preventive approaches that will enable the farmers to monitor the health status of their crop so that early and effective intervention strategies can be made;
- 4) Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine fish;
- 5) Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important maricultured fish;
- 6) Evaluation of various carriers for shrimp vaccination and to establish practical delivery methods and efficacy under field conditions; and
- 7) Elucidation of parasitic and shell diseases of abalone with their diagnosis, pathogenicities and prevention methods.

2.2 Expected Outcomes and Outputs:

Expected outcomes are:

- 1) Increase in awareness of primary aquatic animal health care in small-scale aquaculture;
- 2) Formulation of prophylactic and control methods of zoonotic parasite of freshwater fishes;
- 3) Development of plasmid positive controls for IHNV, TSV, IMNV and VNN;
- 4) Determination of the level of neutralizing antibodies in the sera of booster vaccinated and unvaccinated sea bass broodstocks;
- 5) Evaluation of the antibacterial activity in vitro and in vivo;
- 6) Examination of a practical delivery system and optimize the administration method; and
- 7) Clarification of the reproductive characteristics and infection mechanisms of shell-boring polychaetes and formulate guidelines of prevention methods for parasite infections.

Expected outputs are:

- 1) Statistical data on the present status on awareness of primary aquatic animal health care by country;
- 2) Methodologies for control zoonotic parasite of freshwater fishes;
- 3) Molecular diagnose for virus diseases in fish and shrimp;
- 4) Effective scheme of immunization for the prevention of viral nervous necrosis;
- 5) Findings of prophylactic and therapeutic methods for the prevention of viral infections;
- 6) Practical delivery of vaccines to shrimp; and
- 7) Prevention of parasitic and shell diseases of abalone.

2.3 Project Description/Framework

Activity 1: Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building

Information on various diseases affecting various species of fish and their health management strategies are already available. However, they may not have been effectively disseminated to stakeholders, especially small-holder farmers in rural communities in resource-deprived and developing countries of Southeast Asia such as Myanmar, Lao PDR, Cambodia and the Philippines. Effective disease control is pursued through on-site surveillance and training courses, which are targeting on technology providers, technology practitioners, industry associations, regional and national governments and advisory organizations, especially in small-scale aqua-farms.

Sub-activity 1.1: Survey on the status and needs of primary aquatic animal health care in small-scale aquaculture

Accelerating awareness about aquatic animal health management is indeed needed in resource-deprived Member Countries of SEAFDEC. The present study will have components that are aimed to highlight the needs of health care in rural and small-scale aquaculture focusing on freshwater fishes, crustaceans and shellfishes. Through the survey on the status and needs of primary aquatic animal health care, staff capability in this field will be boosted through a training-for-trainers program that will further disseminate information within the respective countries.

Sub-activity 1.2: Surveillance and training on parasite fauna of economically important freshwater fish in some Southeast Asian countries

Pertinent data on the parasite fauna in economically important freshwater fish species used as food in some Member Countries in Southeast Asia (Myanmar, Lao PDR, and Cambodia) have not been fully investigated. The present study conducts investigation on occurrence of parasite fauna of freshwater fish not only utilizing available diagnostic methods but also developing the methods for new or emerging diseases. Additionally, it is also the aim of this sub-activity to train and enhance the skills of research collaborators of mentioned Member Countries on on-site samplings and parasite identification. Surveillance data will provide baseline information on parasite fauna and trainee will be able to carry out the research work independently.

Activity 2: Innovative Research to Guarantee Food Safety and Sustainable Production

Since current knowledge of fish health management is still inadequate compared with terrestrial animal industries, continued research is essential to expand this knowledge and improve management practices to prevent disease or limit its impact on the aquaculture. It is also recognized that new industries for novel species continue to emerge, and that health management within these industries is crucial to their sustainability. Thus, five broad categories of sub-activities in research are hereby included:

Sub-activity 2.1: Molecular diagnosis and prevention of economically-important viruses in fish and shrimp

Understanding of susceptibility and resistance to, and the threshold levels of viral diseases are essential components to accelerate awareness and capacity-building in fish health management. The present sub-activity will develop and optimize quantitative polymerase chain reaction (Q-PCR)-based detection method and loop-mediated isothermal amplification (LAMP) protocols for screening of fish and shrimp viruses. Information on species differences in susceptibility to WSSV among local shrimp species could be used as basis in choosing alternative species for culture.

Sub-activity 2.2: Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine broodfish

Serious mortality in seabass and several species of groupers caused by nervous necrosis virus (NNV) is a heavy challenge which should be overcome. Through vaccination study of potential broodstock candidates, vaccine safety and dosage will be optimized, and the correct booster vaccination schedule and the duration of protection in larvae conferred by maternal antibodies will be established and investigated in the present sub-activity. The expected outcomes will practically contribute toward establishment of sound fish health management program.

Sub-activity 2.3: Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important maricultured fish

Prophylactic and therapeutic approaches, which utilize antiviral substances extracted from not only ambient waters containing microorganisms but also aquatic organisms including fishes themselves, are strongly recommended as novel methods for fish health management in Southeast Asia. This sub-activity try to isolate indigenous bacteria from wild and cultured marine fishes possessing antiviral potential against important viral diseases and to screen antiviral substances from seaweeds that are indigenous in the Philippines. The isolation, purification and optimization of antiviral compounds from indigenous bacteria and seaweeds will be useful in controlling current and future viral infections especially affecting high-value marine fish species.

Sub-activity 2.4: Evaluation of carriers for practical delivery of vaccines to shrimp and other crustaceans

Studies on vaccine carriers have advanced in the last decade with the main objective of preventing bacterial diseases. However, they deserve further investigation to develop a practical and economically viable technology. The present sub-activity will screen various vaccine carriers such as live and inactivated recombinant bacteria, lactic acid bacteria, lipid vesicles, and chitosan, conduct booster-vaccination trials, test various delivery routes, test the vaccine in different species of shrimps and crabs, and to conduct field trials to verify efficacy under farm conditions. The availability of oral vaccines for shrimp would make booster-vaccination during grow-out culture possible. Reducing virus-associated mortality in shrimp culture will result in sustainable shrimp production.

Sub-activity 2.5: Parasitic and shell diseases of abalone (*Haliotis asinina*) in Philippines

Although abalone is becoming economically important recently, the occurrences of parasite fauna of abalone remain unknown. To increase the food safety level, understanding of infestation status and development of control method is a very urgent matter. The present study will survey parasites of wild and cultured abalone in the Philippines. Through the surveillance programs, the diagnosis of infection, pathology and the host-pathogen relationship will be described and used as a tool to develop effective solution of disease control.

Activity 3: Dissemination of Output of the Project

Dissemination of information on fish health is inevitable to the establishment of awareness and capacity-building in fish health management for productivity and food safety. This activity is comprised of the following two sub-activities.

Sub-activity 3.1: Publication of new information into popular materials

Manuals, posters, pamphlets and flyers describing disease prevention methods will be published and distributed.

Sub-activity 3.2: Maintenance and updating of website contents

Updated information on fish diseases management will be obtained from research results, scientific publications and the internet and help increase of productivity and food safety.

Activity 4: Annual Progress Meeting and International Workshop

Annual progress meeting and International Workshop will be organized to review the progresses and check the appropriateness of the project, and to disseminate new information to each member country.

Sub-activity 4.1: Annual progress meeting

Annual progress meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.

Sub-activity 4.2: International Workshop

New information on fish health management will be presented and discussed by participants from ASEAN Member Countries, resource persons as well as study leaders in this project. Emerging problems that require urgent solutions will also be discussed to pave the way to promote and to assure the fish health management practices in the Southeast Asian region.

Activity 5: Coordination by the Project Leader

The project leader will coordinate and assist the research, training and dissemination, and also facilitate information exchange not only domestically but also among Member Countries so that fish health management will be effectively promoted in Southeast Asia. Semi-annual meeting will be held on July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
1. Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building 1.1 Survey on the status and needs of primary aquatic animal health care in small-scale aquaculture - Survey of farming practices and fish health awareness - Document farming practices and fish health awareness, and onsite training 1.2 Surveillance and training of fishborne zoonotic parasites of commercially important freshwater fish in some Southeast Asian countries - Surveillance of Parasite Fauna of Commercially Important Freshwater Fish - Analyze zoonotic parasites of freshwater fishes	Jan - Apr May - Aug Jan - Apr May - Aug	Among target countries visited so far, Myanmar has the resources, and facilities to conduct a more focused on-site training aimed to further strengthen the capacity of fish health staff
2. Innovative Research to Guarantee Food Safety and Sustainable Production 2.1 Molecular diagnosis and prevention of economically-important viruses in fish and shrimp - Develop plasmid positive controls for economically important and emerging fish and shrimp viruses - Optimize q-PCR protocols for IHNV 2.2 Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine fish - Determine the levels of serum neutralizing antibodies in vaccinated and unvaccinated pompano (<i>Trachinotus blochii</i>) broodfish 2.3 Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important cultured fish - Determine the in vitro susceptibility of freshwater fish pathogens <i>Aeromonas</i> spp. and <i>Pseudomonas</i> spp. to <i>U. pertusa</i> aqueous extract 2.4 Evaluation of carriers for practical delivery of vaccines to shrimp and other crustaceans - Develop practical shrimp vaccination technologies- evaluate the loading efficiency of the different carriers - Examine the prophylactic and therapeutic efficacy of dried <i>U. pertusa</i> against the <i>Aeromonas hydrophila</i> in vivo through experimental infection 2.5 Parasitic and shell diseases of abalone (<i>Haliotis asinina</i>) in Philippines - Investigate parasites of the different stages of cultured and wild abalone-gross observation- - Investigate parasites of the different stages of cultured and wild abalone-histological observation- - Clarify pathogenicity of worms and other potentially pathogenic parasites	Jan - Aug Jan - Apr Jan - Sep Jan - Sep Jan - Apr May - Aug Jan - Apr May - Aug May - Aug	Part of the results featured in a National Newspaper Morphology and size of the microparticles were established. Alginate microparticles ranged in size from 30 to 100
3. Dissemination of Output of the Project 3.1 Publication of new information into popular materials - Distribute information materials on the International Workshop on Food Safety of Aquaculture Products in Southeast Asia held on 8-9	July August	

Achievements based on Activities	Duration	Remarks
May 2013 to SEAFDEC Member Countries and the meeting participants. 3.2 Maintenance and updating of website contents - Preparation of project progress updates for uploading 4. Annual progress meeting and international workshop 4.1 Annual progress meeting 4.2 International workshop - Posting the prospectus, call for papers, and registration in the homepage of SEAFDEC Aquaculture Department. 5. Coordination by the project leader - Semi-annual progress meeting	Feb 2014 Mar 2014 August August	μ with near spherical to ovoid to irregular morphology. Size and morphology of chitosan were less defined.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust:

Accelerating awareness and capacity-building in fish health management in Southeast Asia / II. Enhancing capacity and competitiveness to facilitate international and intra-regional trade

(2) Issues in the region at the beginning of the study:

Global aquaculture production is continuously increasing. However, outbreaks of fish diseases still significantly hinder healthy management of aquaculture animals, and continue to bring considerable economic losses in the fisheries and aquaculture sectors worldwide. The control of fish diseases and the promotion of fish health under farming conditions are essential components of aquaculture to ensure a stable supply of fish products. Aquaculture in the region is seen as a major sector that will augment the declining global fish production because it can feed not only the growing ASEAN population but it will also meet the demand for fish by global trade partners. The status of fish health management remains generally poor in some ASEAN countries, although remarkable technical advances in the diagnosis, prevention and control of fish diseases have occurred worldwide. This requires not only technical development, but also the urgent acceleration of awareness and capacity building in fish health management in Southeast Asia.

3.2.2 Expected Final Goal of the Project:

- To compile case studies that explain the problems and challenges and possible solutions to the implementation of health care in rural aquaculture, and to boost staff capability as well as learning materials to further disseminate and sustain the activity
- To investigate fish-borne zoonotic parasites of commercially important freshwater fish and its diagnosis, pathology and host-parasite relationship
- To implement molecular diagnostic method for the detection of fish and shrimp viral diseases and preventive approaches that will enable the farmer to monitor the health status of their crop so that early and effective intervention strategies can be made
- To establish immunization regimen for the prevention of viral nervous necrosis for high value marine fish
- To establish novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important maricultured fish
- To evaluate various carriers for shrimp vaccination and to establish practical delivery methods and efficacy under field conditions
- To elucidate the parasitic diseases as well as symbionts of abalone among wild and cultured populations
- To disseminate output of the project

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1:

- Improvement of awareness about fish health management in Member Countries through industry-wide capacity building
- Surveillance of health status program to assess the presence and prevalence of fish-borne zoonotic parasites in freshwater fish in Cambodia, Lao PDR and Myanmar

<ul style="list-style-type: none"> - Development and optimization of Q-PCR and LAMP protocols for detection of fish and shrimp viral diseases - Vaccination of potential broodstock of various marine fish and optimization of vaccine safety and dosage - Isolation of indigenous bacteria and viruses with antiviral potentials and screening of antibacterial and antiviral compounds from seaweeds - Field trial to determine the efficacy of formalin-killed vaccine against WSSW and screening of suitable carriers for vaccine delivery in shrimp - Epidemiological investigation of parasitic diseases in hatchery-reared abalone - Implementation of training course
<p>Step 2:</p> <ul style="list-style-type: none"> - Conduct training course to improve awareness about fish health management - Training of counterparts in host countries on on-site sampling and identification of disease or disease-causing organisms - Determination of threshold levels of Koi herpes virus, viral nervous necrosis and Iridovirus in fish and white spot syndrome virus, infectious hypodermal and hematopoietic necrosis virus, Taura syndrome virus and infectious myonecrosis virus in shrimp - Determination of the correct timing/schedule of booster vaccination - Screening of bacteria and bioactive compounds from seaweeds for their antiviral activity in vitro and in vivo - Tests of booster immunization schemes and various delivery methods - Epidemiological investigation of parasitic diseases in the grow-out of abalone in Igang Marine Station - Workshop/seminar
<p>Step 3:</p> <ul style="list-style-type: none"> - Plan and implement guided research and information dissemination - Completion of baseline information on fish-borne zoonotic parasite fauna found in wild and cultured freshwater fish in Southeast Asian region - Application of Q-PCR and LAMP optimized protocols in surveillance and diagnosis of fish and shrimp viruses and susceptibility experiment - Investigation on the duration of protection in larvae conferred by maternal antibodies and selection of less stressful routes of booster vaccine administration - Characterization and purification of the novel antiviral compounds from bacteria and seaweeds and assay of their efficacy - Test of vaccine efficacy in different shrimp species under laboratory conditions and verify the efficacy under farm conditions - Description of diagnosis of infection, accomplishment of infection bioassay and establishment of methods of prevention - Dissemination of output of the project

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 3
(2) Program duration: 2010 - 2014
<p>(3) Main activities:</p> <ul style="list-style-type: none"> - Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building <ul style="list-style-type: none"> • Survey on the status and needs of primary aquatic animal health care in small-scale aquaculture • Surveillance and training on parasite fauna of freshwater fish in some Southeast Asian countries - Innovative Research to Guarantee Food Safety and Sustainable Production <ul style="list-style-type: none"> • Molecular diagnosis and prevention of economically-important viruses in fish and shrimp • Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine broodfish • Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important maricultured fish • Evaluation of carriers for practical delivery of vaccines to shrimp and other crustaceans • Parasitic and shell diseases of abalone (<i>Haliotis asinina</i>) in Philippines - Dissemination of output of the project through publication and international workshop

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project

- To equip the Fish Health staff in target countries with capabilities to do disease surveillance and to conduct simple research related to diseases and food safety
- To investigate the fish-borne zoonotic parasite fauna in both wild and cultured freshwater fish of some Member Countries and to examine its diagnosis of infection, pathology and the host-parasite relationship
- To develop Q-PCR-based detection method for fish and shrimp viral pathogens
- To establish immunization regimen for the production of VNN-resistant sea bass and grouper brood stocks
- To isolate indigenous bacteria, fungi and viruses from wild and cultured freshwater and marine fishes, and indigenous seaweeds, that possess antiviral properties against important viral diseases
- To provide preliminary information for a later field trial with vaccines delivered by a vector/carrier
- To investigate shell abnormalities and diseases of abalone with particular reference to parasites
- To disseminate output of the project

(2) Main achievements till the end of 2013 (tentative)

1. Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building

Survey on the status and needs of primary aquatic animal health care in small-scale aquaculture

- Surveys were conducted in Cambodia, Lao PDR, Myanmar, and Philippines to identify the gaps and needs in order to equip and make them capable to monitor disease.
- Compared to Myanmar and the Philippines, small-scale farmers in Lao PDR and Cambodia had low level of awareness of fish health management and food safety, and other issues affecting fish production in ponds.
- There is a need to strengthen the expertise of government fish health staff in Myanmar, the Philippines, Lao PDR, and Cambodia to effectively disseminate the available information on fish health management.

Surveillance and training on parasite fauna of freshwater fish in some Southeast Asian countries

- Tissue samples of tilapia collected from Dumangas, Oton and Arevalo in April 2013 yielded negative results for zoonotic parasites. Further, no significant parasitic infestations of the skin mucus and gills were observed.
- The on-site basic training on freshwater fish health management will be conducted in October 2013 in Aquatic Animal Health and Disease Controlling Section, Tharketa, Department of Fisheries, Yangon, Myanmar.

2. Innovative research to guarantee food safety and sustainable production

Molecular diagnosis and prevention of economically-important viruses in fish and shrimp

- The plasmid positive control for WSSV was initially developed.
- Optimization of q-PCR protocols for WSSV, RSIV, KHV, VNN, IMNV and IHHNV were already completed.
- LAMP assay for WSSV showed that the optimum incubation is at 61°C for 58 min.

Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine broodfish

- Pompano broodstocks were intraperitoneally (IP) booster vaccinated with inactivated Philippine strain of NNV, while control fish were IP injected with L-15 medium. Determination of antibody titers in the sera of vaccinated/control fish collected is ongoing.

Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important maricultured fish

- *U. pertusa* extracts showed potent antibacterial activity against *Aeromonas hydrophila* and *A. sobria* at 100 and 50 mg.
- Determination of the minimum inhibitory concentration and minimum bactericidal concentration of the *U. pertusa* aqueous extract on *Vibrio alginolyticus*, *V. parahaemolyticus*, *Edwardsiella tarda*, and *Streptococcus* spp. is ongoing.
- Mortality for *A. hydrophila*-challenged fish fed *U. pertusa* supplemented diet (100 g *U. pertusa* leaves/kg feed, 5% BW) was not significantly different (40%) from those for *A. hydrophila*-challenged fish fed with SEAFDEC/AQD formulated diet (35%).

Evaluation of carriers for practical delivery of vaccines to shrimp and other crustaceans

- The carriers+vaccine were administered orally to the shrimp via the feed. The survival rates against WSSV challenge were 65.3%, 61.9%, 50% and 25.9% in inclusion bodies (IB)+chitosan, IB+alginate, naked IB, and inactivated recombinant bacteria groups, respectively, and 0% in the unvaccinated group. There were no apparent differences in survival among IB+chitosan, IB+alginate, and naked IB, but were significantly higher compared to inactivated recombinant bacteria and unvaccinated group.
- To determine appropriate dosages and vaccine: carrier ratios, a third trial is ongoing.

Parasitic and shell diseases of abalone (<i>Haliotis asinina</i>) in Philippines	
<ul style="list-style-type: none"> - Abalones are routinely infested by shell-infesting polychaete worm belonging to the family Dorvilleidae (prevalence, 20%). - The condition indices of infested abalone consistently yielded significantly lower condition indices than uninfested abalone. - In the presence of infested abalone, uninfested abalone becomes infested within 48-72 hours with an average of 5 worms (crawling larvae) per abalone. 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
- To accelerate awareness on fish health management in resource-deprived countries through industry-wide capacity building	80%
- To guarantee food safety and sustainable production through innovative research	80%
- To disseminate output of the project	80%

3.2.6 Evaluation of Project Activities in 2013

The study plans are considered to be appropriately implemented as a whole in this project.
--

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building</p> <p>Sub-activity 1.1 Survey on the status and needs of primary aquatic animal health care in small-scale aquaculture Follow-up training and information activities will be implemented either in Lao PDR or Cambodia.</p> <p>Sub-activity 1.2 Surveillance and training of fish-borne zoonotic parasites of commercially important freshwater fish in some Southeast Asian countries 1) Parallel sampling for zoonotic parasites will be continued in some regions in the Philippines, where freshwater fish farming activities are widely practiced; 2) Another re-visit to the Member Countries (Lao PDR or Cambodia) that still need intensive capacity building of fish health diagnosis through expanded training will be conducted; In addition, 3) guidelines and recommendations of prophylactic and control methods of these zoonoses will be formulated.</p>	<p>Jan – Dec</p> <p>Jan – Dec</p>	
<p>Activity 2: Innovative Research to Guarantee Food Safety and Sustainable Production</p> <p>Sub-activity 2.1 Molecular diagnosis and prevention of economically-important viruses in fish and shrimp 1) Susceptibility experiments will continue for <i>Penaeus monodon</i> on the first quarter, <i>Litopenaeus vannamei</i> on the second quarter, <i>P. indicus</i> on the third quarter and <i>P. merguensis</i> on the last quarter of 2014; and 2) Determination of infection /threshold level of TSV will be conducted on the first quarter, VNN on the second quarter, RSIV on the third quarter and KHV on the last quarter of 2014.</p> <p>Sub-activity 2.2 Establishment of immunization regimen for the prevention of viral nervous necrosis in high value marine fish 1) Monitor the kinetics of NNV-neutralizing antibodies in the sera of vaccinated and unvaccinated pompano <i>Trachinotus blochii</i> broodfish at scheduled intervals post-vaccination; 2) Conduct booster vaccination and L-15 injection in vaccinated and unvaccinated pompano broodfish, respectively; 3) Conduct induce spawning of sexually matured vaccinated and unvaccinated pompano broodfish; 4) Detect NNV</p>	<p>Jan – Dec</p> <p>Jan – Dec</p>	

Activity/inputs	Duration	Remarks
<p>in milt and eggs collected from both vaccinated and unvaccinated pompano broodfish by RT-PCR and cell culture isolation; 5) Detect NNV in spawned eggs of vaccinated and unvaccinated pompano broodfish by RT-PCR and cell culture isolation; and, 6) Quantify the levels of NNV-neutralizing antibodies in spawned eggs of vaccinated and unvaccinated pompano broodfish.</p>		
<p>Sub-activity 2.3 Establishment of novel prophylactic and therapeutic methods for the prevention of viral infections in commercially important cultured fish</p> <p>1) Determine the <i>in vitro</i> susceptibility of newly acquired fish pathogens such as <i>Vibrio alginolyticus</i>, <i>V. parahaemolyticus</i>, <i>Edwardsiella tarda</i>, and <i>Streptococcus</i> spp. to <i>Ulva pertusa</i> aqueous extract; 2) Determine the minimum inhibitory concentration (MIC) and minimum bacteriicidal concentration (MBC) of the <i>U. pertusa</i> aqueous extract against the above fish pathogens; 3) Examine the prophylactic and therapeutic efficacy of <i>U. pertusa</i> aqueous extract against the above fish pathogenic bacteria <i>in vivo</i> through experimental infection; 4) Determine the anti-nervous necrosis virus activity of <i>U. pertusa</i> aqueous extract <i>in vitro</i>; and 5) Test the prophylactic and therapeutic efficacy of <i>U. pertusa</i> aqueous extract against nervous necrosis virus <i>in vivo</i> through experimental infection.</p>	Jan – Dec	
<p>Sub-activity 2.4 Evaluation of carriers for practical delivery of vaccines to shrimp and other crustaceans</p> <p>Challenge trials with different vaccine-carrier ratios and dosages will be conducted in shrimp/ crustacean species other than <i>P. monodon</i>.</p>	Jan – Dec	
<p>Sub-activity 2.5 Parasitic and shell diseases of abalone (<i>Haliotis asinina</i>) in Philippines</p> <p>1) Reproductive characteristics of shell-boring polychaetes using scanning electron microscope (SEM) will be done; 2) Continued parasitological screening of hatchery-reared abalone from different sites; 3) Confirmatory runs on the mode of infestation (cohabitation) will be continued; and 4) Guideline of prevention and control method for shell-boring polychaetes infections will be formulated.</p>	Jan – Dec	
<p>Activity 3: Dissemination of Output of the Project</p>		
<p>Sub-activity 3.1 Publication of new information into popular materials (No activity scheduled in 2014)</p>		
<p>Sub-activity 3.2 Maintenance and updating of website contents (No activity scheduled in 2014)</p>		
<p>Activity 4: Annual progress meeting and international workshop</p>		
<p>Sub-activity 4.1 Annual progress meeting Annual meeting will be held to review the project achievements. Evaluators will be invited to join the meeting to review/evaluate the project achievements.</p>	December	
<p>Sub-activity 4.2 International workshop (No activity scheduled in 2014)</p>	March	
<p>Activity 5: Coordination by the project leader</p>		
<p>The project leader will coordinate and encourage the research, training and dissemination, and also facilitate information exchange not only between activities but also among Member Countries so that awareness and capacity-building in fish health management will be effectively promoted in Southeast Asia. Semi-annual meeting will be held in July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.</p>	Jan – Dec	

4.2 Expected Outcomes/Outputs of the Year 2014

The envisaged outcomes for the fifth year are : 1) increased awareness on primary aquatic animal health care in small-scale aquaculture; 2) prophylactic and control methods of zoonotic parasite of freshwater fishes formulated; 3) plasmid positive controls for IHHNV, TSV, IMNV and VNN developed, 4) level of neutralizing antibodies in the sera of booster vaccinated and unvaccinated sea bass broodstocks determined; 5) antibacterial activity in vitro and in vivo evaluated; 6) practical delivery system examined and the administration method optimized; 7) reproductive characteristics and infection mechanisms of shell-boring polychaetes clarified; and 8) guidelines on prevention methods for parasite infections formulated.

PROJECT DOCUMENT

				Project id: 021004
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism			
Project Title:	Food Safety of Aquaculture Products in Southeast Asia			
Program Thrust:	II	Total Duration:	5 years (2010-2014)	
Lead Department:	Aquaculture Department	Lead Country:	Philippines	
Project Sponsor:	Japanese Trust Fund	Project Partner:		
Proposed Budget:		This year budget:		
Prepared by:	Teruo Azuma, Deputy Chief	Project Leader:	Teruo Azuma, Deputy Chief	

1. INTRODUCTION/BACKGROUND

The use of antibiotics and other chemicals in aquaculture is widely practiced to help meet the increasing demand for aquaculture food. These antibiotics and chemicals detected in aquaculture products appear to derive from material inputs during rearing, mostly from contaminated feed ingredients and therapeutants for prevention or treatment of diseases. On the other hand, with the ever-growing and worldwide concern for food safety, fish farmers are faced with the challenge of producing safe food from farm to fork. Uncontrolled use of chemicals should be prevented to secure human health and wholesome aquatic ecosystem and to keep from loading of harmful chemicals. Certificates guaranteeing safety as foods would be increasingly important, particularly for trading.

The mechanisms of accumulation and withdrawal of some antibiotics and chemicals have already been studied in developed countries. However, these data were generated using their species and under environmental conditions that are different from the conditions prevalent in the Southeast Asian region. There are still very limited data available on the withdrawal period of antibiotics and the presence of chemical residues in aquaculture products from the region. Considering the growing-awareness on issues of food safety of aquaculture products, it is an urgent matter that SEAFDEC should take the lead in establishing regional guidelines on the right usage of antibiotics and other chemical inputs.

At almost the same time when this project started, ASEAN also initiated preparation of guidelines for the use of chemicals in aquaculture and measures to eliminate the use of harmful chemicals, with the Department of Fisheries Malaysia as the lead country. This is based on the declaration on the ASEAN Economic Community Blueprint to realize the ASEAN Economic Community (AEC) during the 13th ASEAN Summit held in Singapore in November 2007. Since the purposes are common between the activities under the present project funded by Government of Japan and the guidelines led by ASEAN, SEAFDEC/AQD and ASEAN agreed to collaborate to make a better guideline so that more practical, detailed information could be disseminated and utilized effectively in the Southeast Asian region.

The results of this project will also be useful for the formulation of policy recommendations for a concerted action by governments of the ASEAN Member Countries.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The project goal is to attain food safety of aquaculture products in Southeast Asia. The project objectives are to:

- 1) Contribute in the establishment of guidelines on the production of safe aquaculture products from Southeast Asia;
- 2) Determine the presence and levels of commonly used chemicals in aquaculture in aquaculture products such as fish and shrimps;
- 3) Compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture

to the ASEAN region; and

- 4) Implement training course/workshop to promote food safety awareness in the ASEAN region.

The performance indicators are as follows.

- 1) Detection of withdrawal period of antibiotics in important cultured fishes;
- 2) Surveillance and monitoring of the chemical contaminants in aquaculture products and feeds especially in developing ASEAN Member Countries;
- 3) Compiling guidelines on appropriate administration and regulation of antibiotics/other chemicals; and
- 4) Implementation of training course/workshop

2.2 Expected Outcomes and Outputs:

Expected outcomes are:

- 1) Determination of the withdrawal periods of antibiotics in a high value fin fish;
- 2) Screening the present status of the usage of chemical contaminants in aquaculture products and feeds;
- 3) Establishment of a new method of determining antibiotics in aquaculture product samples;
- 4) Publishing guidelines for the SEAFDEC Member Countries; and
- 5) Implementation of International Workshop on “Food Safety of Aquaculture Products in Southeast Asia”.

Expected outputs are:

- 1) Information on withdrawal period of antibiotics in important culture species;
- 2) Baseline data on chemical contaminants in aquaculture products and feeds;
- 3) New techniques for detection of antibiotics in aquaculture products and feeds;
- 4) Guidelines on appropriate administration and regulation of antibiotics/other chemicals; and
- 5) Practical information to promote food safety in the Southeast Asian region.

2.3 Project Description/Framework

Activity 1: Withdrawal period of antibiotics in important species cultured in the tropics

Developments in aquaculture discouraged the use of antibiotics because of the risk of developing antibiotic resistance to human pathogens, effect on non-target organisms, safety of workers, and effect on the environment, among others. However, the use of these drugs is sometimes inevitable, especially in an outbreak of a disease.

Milkfish is the most common cultured species in the Philippines and is now becoming a fast export aquaculture commodity. Most often, monoculture technique is employed. However, polyculture system is also being practiced and the milkfish-shrimp polyculture is quite common. Although outbreaks of bacterial infection during milkfish culture have seldom occurred, risk of exposure to antibiotics in a polyculture system increases if its co-culture species is at risk of bacterial infection. Likewise, freshwater fish species like tilapia could be at risk to exposure to antibiotics during culture.

Withdrawal periods, bioavailability and pharmacokinetic studies of some antibiotics, have been conducted in temperate countries in several species. However, data are very limited, if there is any, for fishes raised in the tropics.

In the present activity, therefore, withdrawal periods of antibiotics from marine fish such as milkfish and freshwater fish such as tilapia are revealed to contribute in the establishment of guidelines on the production of safe aquaculture products from Southeast Asia.

Activity 2: Surveillance of chemical contaminants in aquaculture products and feeds: Levels and classification of contaminants in aquaculture products, aqua feeds and aqua feed ingredients in the Philippines and other Asian countries

A wide range of chemicals are used in the culture of popular aquaculture species. There are also chemicals applied or used in the processing of feed ingredients and in the manufacture of aquafeeds. The indiscriminate use of these chemicals; however, poses dangers to human health since some of these chemicals have been detected in aquaculture products. The increased usage and the number of these drugs and other chemicals throughout the years are predictable since world aquaculture production and the numbers of species for culture have been increasing. The trend towards high density culture systems is also a contributing factor in the increased use of chemicals in aquaculture. For health reasons of consumers and the safety regulations imposed by importing countries on aquaculture products, there is a pressing need to survey at this time the chemicals used in aquaculture.

The fast growing aquaculture sector exerted a great demand for aqua feed and feed ingredients. This has translated into adulteration and indiscriminate use of chemicals in these commodities. A survey of these chemicals is important in the sustainability of the aquaculture industry which is much related to the environment.

This Activity 2 will determine the presence and levels of commonly used chemicals such as antibiotics, fungicides, feed additives, toxin binders *etc.* in aqua feed and feed ingredients as well as aquaculture products through the conventional method using HPLC. In addition, the Activity 2 also tries to develop a new method to detect antibiotics, which is reliable, inexpensive, mass-determination-possible, and simple so that the Member Countries can easily adopt the method for screening of chemicals.

Activity 3: Establishment of guidelines on appropriate administration and regulation of antibiotics/other chemicals

Comprehensive information on the use of chemicals in aquaculture in Asia with emphasis on the various aquaculture systems and species to which chemicals are applied as well as the various country regulations regarding their distribution and use was presented during the Expert Meeting on the Use of Chemicals in Aquaculture in Asia at the SEAFDEC AQD in 1996. Concerns for the safe, effective and minimal use of chemicals to protect human health and the environment are also reflected in the FAO Code of Conduct for Responsible Fisheries. A wide range of chemicals are being used in aquaculture worldwide in different aquaculture systems and for various reasons. Sustained efforts are needed to update the general information base on chemical usage in aquaculture in Asia and understand the realities and uncertainties in the regulatory frameworks governing the use of chemicals to ensure food safety and minimal impacts on public health and the environment. Many countries are now imposing strict food safety requirements (maximum residue levels and monitoring banned chemicals) on imported aquaculture products, which will likely pose significant difficulties to countries exporting aquaculture products in the future. Therefore, the Activity 3 will establish guidelines on appropriate administration and regulation of antibiotics and other chemicals used in aquaculture in Southeast Asian countries.

Activity 4: Dissemination of food safety awareness and manual publication

Dissemination of information on food safety is inevitable to responsible approach to aquaculture. Manuals, posters, pamphlets and fliers describing information on food safety will be published and distributed.

Activity 5: Annual Progress Meeting and International Workshop

Annual progress meeting and International Workshop will be organized to review the progresses and check the appropriateness of the project, and to disseminate new information to each member country.

Sub-activity 5.1: Annual progress meeting

Annual progress meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.

Sub-activity 5.2: International Workshop

New information on food safety will be presented and discussed by participants from ASEAN Member Countries, resource persons as well as study leaders in this project. Emerging problems that require urgent

solutions will also be discussed to pave the way to promote and to assure the food safety practices in the Southeast Asian region.

Activity 6: Coordination by the Project Leader

The project leader will coordinate and assist the research, training and dissemination, and also facilitate information exchange not only domestically but also among Member Countries so that food safety will be effectively promoted in Southeast Asia. Semi-annual meeting will be held on July or August to confirm the progress of respective activities and sub-activities. Project achievements will be summarized at the end of year. Annual progress report will be prepared.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
1. Withdrawal period of antibiotics in important species cultured in the tropics - Determine the withdrawal periods of commonly used and generally approved antibacterial agents, specifically oxytetracycline (OTC) and oxolinic acid (OXA)	Jan – Aug	
2. Surveillance of chemical contaminants in aquaculture products and feeds: Levels and classification of contaminants in aquaculture products, aqua feeds and aqua feed ingredients in the Philippines and other Asian countries - Preparation of micro-organism method for the detection of OXA and OTC in fish and shrimp muscle	Jan – Aug	
3. Establishment of guidelines on appropriate administration and regulation of antibiotics/other chemicals - Support the efforts of the ASEAN to develop guidelines on the use of chemicals in aquaculture in the ASEAN	May – Aug	
4. Dissemination of food safety awareness and manual publication (No activity scheduled in 2013)		
5. Annual progress meeting and international workshop 5.1 Annual progress meeting 5.2 International workshop - Posting the prospectus, call for papers, and registration in the homepage of SEAFDEC Aquaculture Department.	Feb 2014 Mar 2014 August	
6. Coordination by the project leader - Semi-annual progress meeting	August	

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Food safety of aquaculture products in Southeast Asia / II. Enhancing capacity and competitiveness to facilitate international and intra-regional trade
(2) Issues in the region at the beginning of the study: The use of antibiotics and other chemicals in aquaculture is widely practiced to help meet the increasing demand for aquaculture food. These antibiotics and chemicals detected in aquaculture products appear to derive from material inputs during rearing, mostly from contaminated feed ingredients and therapeutants for prevention or treatment of diseases. Thus, cultured shrimps and fish in various stages from hatcheries to grow-out ponds are exposed to chemical contamination. On the other hand, with the ever-growing and worldwide concern for food safety, fish farmers are faced with the challenge of producing safe food from farm to fork. There are very limited

data available on the withdrawal period of antibiotics and the presence of chemical residues in aquaculture products from the region. Considering the growing-awareness on issues of food safety of aquaculture products, it is an urgent matter that SEAFDEC should take the lead in establishing regional guidelines on the right usage of antibiotics and other chemical inputs in collaboration with ASEAN that will allow farmers to increase production of safe food using the environment-friendly technologies.

3.2.2 Expected Final Goal of the Project:

- To contribute in the establishment of guidelines on the production of safe aquaculture products from Southeast Asia
- To determine the presence and levels of commonly used chemicals in aquaculture in aquaculture products such as fish and shrimps
- To compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture to the ASEAN region
- To implement training course/workshop to promote food safety awareness in the ASEAN region

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1:

- Literature survey & method validation
- Acquisition of reagents, sample collection in Philippines and analysis of samples
- Surveillance of antibiotics/chemicals usage
- Preparation of training course/international seminar

Step 2:

- Administration trial & analysis
- Sample collection in other countries and analysis of samples
- Continued surveillance of antibiotics/chemicals usage
- Training course

Step 3:

- Evaluation of the mechanism of accumulation and withdrawal of antibiotics and formulation of guidelines on drug administration for responsible aquaculture
- Continued sample analyses and preparation/submission of reports
- Update of baseline data and guideline preparation
- International workshop/publication

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 3

(2) Program duration: 2010 - 2014

(3) Main activities:

- Withdrawal period of antibiotics in important cultured fishes in the Southeast Asian region
- Surveillance of chemical contaminants in aquaculture products and feeds
- Guidelines on appropriate administration and regulation of antibiotics/other chemicals
- Training course/workshop

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project

- To detect withdrawal period of antibiotics in important cultured fishes
- To survey and monitor the chemical contaminants in aquaculture products and feeds especially in developing ASEAN Member Countries
- To compile guidelines on appropriate administration and regulation of antibiotics/other chemicals
- To implement of training course/workshop

(2) Main achievements till the end of 2013 (tentative)

1. Withdrawal period of antibiotics in some fish species cultured in the tropics

Withdrawal period of antibiotics in Grouper, *Epinephelus coioides*

- The withdrawal periods of Oxytetracycline (OTC) from muscle and blood of grouper were experimentally proven to be 21 days and 13 days, respectively.
- Determination of oxolinic acid (OXA) from muscles and blood of grouper during accumulation and

withdrawal periods are on-going.

2. Surveillance of chemical contaminants in aquaculture products and feeds
Establishment of micro-organism method to detect antibiotics
 - Protocols for the detection of OXA and OTC in fish and shrimp muscles are in the process of establishment.

3. Establishment of guidelines on appropriate administration and regulation of antibiotics/other chemicals
Guideline preparation for antibiotics/chemicals usage and regulations
 - The semi-annual progress meeting discussed on this and suggested that the guideline should include the detailed recommendation for antibiotics/chemicals usage, which were not included in the ASEAN guideline draft. In addition, emerging chemicals concerned recently among the Southeast Asian region such as ethoxyquin should be included as well as information on withdrawal periods for antibiotics.

4. Training course/workshop
International Workshop on Food Safety of Aquaculture Products in Southeast Asia
 - The workshop was held at Hotel del Rio on 8-9 May 2013, gathering 150 aquaculture and food safety experts, scientists, representatives and observers from 11 countries. The general objective of the workshop was to promote and influence regional initiatives in securing wholesome and safe aquaculture commodities in the ASEAN region. The details of the workshop discussion were described in the workshop report together with the book of abstracts, which are available from the SEAFDEC/AQD homepage.

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)

Expected outcomes/outputs	Achievement rate (%)
- To contribute in the establishment of guidelines on the production of safe aquaculture products from Southeast Asia	80%
- To determine the presence and levels of commonly used chemicals in aquaculture in aquaculture products such as fish and shrimps	70%
- To compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture to the ASEAN region	60%
- To implement training course/workshop to promote food safety awareness in the ASEAN region	100%

3.2.6 Evaluation of Project Activities in 2013

Implementation in some activities is behind the schedules. This is due to delay of materials, which are needed in the activities.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Withdrawal periods of antibiotics in some aquatic species cultured in the tropics Withdrawal periods of oxytetracycline (OTC) and oxolinic acid (OXA) on aquatic species cultured in the tropics will be continuously determined. Among high-valued species such as sea bass, giant freshwater prawn, pompano, one species will be selected after the availability is confirmed as the target species. A general review on the withdrawal period of antibiotics including the species done by other researchers as well as those analyzed in the previous years in this project will be done.</p>	Jan – Dec	
<p>Activity 2: Surveillance of chemical contaminants in aquaculture products and feeds Continue activities in 2013 on the establishment of protocols for OXA and OTC detection using micro-organisms. Surveillance of the presence of OXA and OTC in shrimp and fish using micro-organisms will be done in the Philippines and selected Southeast Asian countries, if budget permits.</p>	Jan – Dec	
<p>Activity 3: Establishment of guidelines on appropriate administration and regulation of antibiotics/other chemicals Guidelines for antibiotics/chemicals usage and regulations will be finalized for the SEAFDEC Member Countries by filling the gaps of the ASEAN</p>	Jan – Dec	

Activity/inputs	Duration	Remarks
<p>guidelines.</p> <p>Activity 4: Dissemination of food safety awareness and manual publication (No activity scheduled in 2014)</p> <p>Activity 5: Annual progress meeting and international workshop <i>Sub-activity 5.1:</i> Annual progress meeting Annual meeting will be held to review the project achievement. Evaluators will be invited to join the meeting to review/evaluate the project achievements.</p> <p><i>Sub-activity 5.2:</i> International workshop (No activity scheduled in 2014)</p> <p>Activity 6: Coordination by the project leader The project leader will coordinate and encourage the research activities and also facilitate information exchange not only domestically but also among Member Countries so that the present project under TF-5 will promote food safety of aquaculture products in Southeast Asia.</p>	<p>December</p> <p>Jan – Dec</p>	

4.2 Expected Outcomes/Outputs of the Year 2014

The envisaged outcomes for the fifth year are: 1) withdrawal period studies in a high value culture fish determined; 2) microorganism method of determining antibiotics in aquaculture product samples applied; and 3) guidelines for the SEAFDEC Member Countries finalized.

PROJECT DOCUMENT

			Project id: 011204
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)		
Program Thrust:	II	Total Duration:	4 years (2012 to 2015)
Lead Department:	Training Department	Lead Country:	
Project Sponsor:	Global Environmental Facility (GEF)	Project Partner:	FAO, GEF
Proposed Budget:	USD 199,500	This year budget:	USD 199,500
Prepared by	Isara Chanrachkij, Project Technical Advisor	Project Leader	Dr. Chumnarn Pongsri

1. INTRODUCTION/BACKGROUND

The Coral Triangle region of Southeast Asia is one of the world's most biologically diverse, economically productive and potentially vulnerable marine zones. As a result of increasing population and exploitation pressures, growing threats from pollution and major ecosystem change there is particular concern in the region, as in the global context more widely, of the untargeted capture of fish species and non fish species, commonly termed by-catch and discards. Problems associated with by-catch include the capture of juveniles of ecologically-important and economically-valuable species, non reporting of retained catches and discarded catches. In some fisheries and regions, there is an increasing trend towards retention of by-catch for use as food for human consumption or for utilization as aquafeed and fertilizer. This is therefore a complex issue, requiring resource and biodiversity issues to be tackled alongside human needs, involving a mix of policy, technical and community support measures.

Building on the successes of the REBYC first phase during year 2002-2008, FAO/UNEP/GEF project “*Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management (REBYC)*”, it had a relatively strong focus on technology and the development of selective gear. While the project generated significant results, the experience showed that more was needed to successfully address the complex issues related to by-catch reduction. Gear modifications are important but they are not always the most appropriate tool or they may need to be combined with other management measures. This is particularly the case in multi-species trawl fisheries of the type found in Southeast Asia and the Pacific region where overall management is weak and by-catch is largely utilized and considered part of the total catch. Gear modification solutions also need to be supported by appropriate legal and incentive frameworks to become effective. Moreover, the socioeconomic drivers behind by-catch and livelihoods and poverty context need to be understood and considered. While initially this holistic approach may be more costly and require more efforts, it is cost-effective in the longer-term because of the sustainability of the results.

The follow up project “*Strategies for trawl fisheries by-catch management (REBYC-II CTI)*” is proposed to mitigate problems associated with by-catch in fisheries located within in the Coral Triangle region of Southeast Asia. This project will be based around multispecies trawling, where by-catch issues are amongst the most serious, with potentially significant effects on ecosystems and livelihoods. The project aims to address these challenges by promoting sustainable fishing, encouraging adoption of best fishing practices, and providing a rational approach to delivering benefit from landed by-catch. Specific technological practices will be identified and management plans developed in partnership with the private sector at both national and regional levels, including the preparation of "best practice guidelines for fishing operations".

Project is executed by the governments in the participating countries, *i.e.*, Indonesia, Papua New Guinea, Philippines, Thailand, Vietnam and the Southeast Asian Fisheries Development Center (SEAFDEC), based in Bangkok, Thailand will assume the role as Regional Project Facilitator, in partnership with the private sectors and relevant national, regional and international organizations. The Food and Agriculture

Organization of the United Nations (FAO) is the Global Environment Facility (GEF) agency for the project that will be funded jointly by GEF and the implementing and executing partners.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

- 1) Responsible trawl fisheries that result in sustainable fisheries resources and healthy marine ecosystems in the Coral Triangle and Southeast Asian waters by reduced by-catch, discards and fishing impact on biodiversity and the environment; and
- 2) Effective public and private sector partnership for improved trawl and by-catch management and practices that support fishery dependent incomes and sustainable livelihoods

2.2 Expected Outcomes and Outputs:

- 1) Agreed regional by-catch policy/strategy – that is in line with the forthcoming International Guidelines on By-catch Management and Reduction of Discards – is adopted by at least one relevant organization in the project region, and national or area specific trawl fisheries by-catch management plans are adopted covering at a third of all trawlers in the project countries.
- 2) Measures that manage by-catch and reduce discards, and thereby improve fisheries resources, are implemented for 25% of all trawlers in the project countries. In these fisheries (covered by improved by-catch management measures), by-catch has been reduced by 20% compared to baseline data in year 1 of the project.
- 3) Standardized data on at least 3 key by-catch and habitat indicators are available in all project countries and inform trawl fisheries and by-catch management planning and implementation at national and regional levels.
- 4) Enhanced understanding of responsible fishing by private sector/fishers, fisheries managers and decision-makers are supporting participatory management arrangements in all project countries.
- 5) Institutional arrangements and processes for public and private sector partnerships are in place and supporting trawl fisheries by-catch management in all project countries.
- 6) The role of by-catch in trawl profitability is understood and measures for how to ensure long-term economic sustainability of trawl fisheries are identified and incorporated into trawl fisheries by-catch management plans in all project countries.
- 7) Incentives for trawl operators to reduce by-catch are defined and implemented in all project countries and best practices communicated within relevant regional frameworks.

2.3 Project Description/Framework

The follow-up project “*Strategies for trawl fisheries by-catch management (REBYC-II CTI)*” is initiated to mitigate problems associated with by-catch in fisheries located within in the Coral Triangle region of Southeast Asia. This project will be based around multispecies trawling, where by-catch issues are amongst the most serious, with potentially substantial effects on ecosystems and livelihoods. The project aims to address these challenges by promoting sustainable fishing, encouraging adoption of best fishing practices, and providing a rational approach to delivering benefit from landed by-catch. Specific technological practices will be identified and management plans developed in partnership with the private sector at both national and regional levels, including the preparation of “best practice guidelines for fishing operations”.

The project is executed by the governments in the participating countries *i.e.*, Indonesia, Papua New Guinea, Philippines, Thailand and Vietnam, in partnership with the private sector and relevant national, regional and international organizations. The Food and Agriculture Organization of the United Nations (FAO) is the Global Environment Facility (GEF) agency for the project, which is funded jointly by GEF and the implementing and executing partners. Financial supports are major allocated by GEF and the governments of the five project countries have confirmed co-financing. The contributions mainly refer to in-kind co-financing from the central fisheries authorities but also include inputs from provincial and local governments and state universities and research institutes. An important part of the government contributions consist of staff time, at central, provincial and local levels. Other items covered include project management costs, some material and equipment for field trials, meetings and surveys. Project co-financing partners including supported by Swedish International Development Cooperation Agency

(SIDA), World Wild Fund for Nature (WWF) Coral Triangle Programme, Sustainable Fisheries Partnership (SFP), International Fishmeal and Fish Oil Organization (IFFO) and Regional Fisheries Livelihoods Programme for South and Southeast Asia (RFLP). SEAFDEC will host and staff the Regional Facilitation Unit (RFU) and provide, in collaboration with the FAO Lead Technical Officer (LTO), the FAO Lead Technical Unit (LTU) located at FAO-Headquarter (FAO-HQ), and FAO Regional Office for Asia and the Pacific (FAO-RAP), administrative and technical support to the national fisheries authorities with regard to project implementation.

Project is structured through the inter-related components:

- 1) The policy, legal and institutional frameworks component will work towards the establishment of national or area specific trawl fisheries by-catch management plans and building institutional capacity for their implementation;
- 2) The resource management and fishing operations component will lead to the adoption of more selective fishing gear and practices, provide a basis for implementing zoning of fishing areas and developing spatial-temporal closure management measures, and generate better data on number of vessels and recommendations for fishing effort and capacity management;
- 3) The Information management and communication component will include by-catch data collection, mapping of fishing grounds, establishment of socio-economic monitoring procedures, and means for communicating by-catch data and information. Standardized methods for by-catch data collection will be promoted across project countries;
- 4) The awareness and knowledge component will address the awareness of and knowledge on trawl fisheries by-catch management issues and how they relate to sustainability, and what measures that are available to make fishing more responsible. Private sector/fishers, policy makers, fisheries managers, officials, extension officers and NGOs will be offered activities to enhance their knowledge on best management practices and responsible fisheries.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1: Support REBYC-II CTI to participate the Mini Symposium of ICES-FAO Working Group on Fishing Technology and Fish Behavior (WGFTFB)	6-9 November 2012	Improve the knowledge international's trawl fisheries in particular technical issues <i>i.e.</i> Research and Experiment on shrimp trawl technologies and their modification. Selective issues on shrimp trawls will be obtained from the Mini Symposium
Activity 2: Regional technical workshop	8-11 May 2013	Improved knowledge of the region's trawl fisheries and its catch composition enabling the formulation of regional guidelines, advice and tools for improved trawl fisheries governance and policy processes. Set of data and data collection methodologies appropriate for implementation in project countries
Activity 3: Steering Committee Meeting	13 May 2013	To provided policy guidance and be responsible for approving the annual project work plans
Activity 4: Support REBYC-II CTI to participate the APFIC Regional Expert Workshop on Tropical Trawl Fishery Management	30 September - 4 October 2013	An <i>ad hoc</i> activity aim to developing guidance for the management of trawl fisheries in the Asia Pacific Region under collaboration with FAO-APFIC
Activity 5: Regional Training-cum-Workshop on Co-Management and	7-11 October 2013	Improved knowledge and skill on the trawl fisheries management of co-management, Ecosystem Approach to Fisheries including the technical issues of trawl selectivity

Selective Fishing Gears and Other Practices		
---	--	--

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Strategies for Trawl Fisheries By-catch Management</p>
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> - Existing national and regional policies and strategies for trawl fisheries by-catch management need to be adapted to the current situation of the fisheries resources. - There is limited data on by-catch composition, volumes and the potential impact of trawl fishing on bottom habitats. - There is inadequate knowledge and awareness of responsible approaches to trawl fishing, and the measures available for improving management and sustainability.

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> - An agreed Regional by-catch policy/strategy, in line with the International Guidelines on By-catch Management and Reduction of Discards, is adopted by at least one relevant organization in the project region and national or area specific trawl fisheries by-catch management plans are adopted covering at least a third of all trawlers in the project countries. - Measures to manage by-catch and reduce discards, and thereby improve fisheries resources, are implemented for 25% of trawl fisheries in all project areas. - In the fisheries covered by improved by-catch management measures, by-catch has been reduced by 20% compared to baseline data to be gathered in year 1. - Incentives for trawl operators to reduce by-catch are defined and implemented in the project areas and best practices communicated within relevant regional frameworks. - Institutional arrangements and processes for public and private sector partnerships are in place and supporting trawl fisheries by-catch management in all project areas - Standardized data on at least 3 key by-catch (species/sizes) and habitat indicators are available from all project areas and inform trawl fisheries and by-catch management planning and implementation at national and regional levels. - The role of by-catch in trawl profitability is understood and measures for how to ensure long-term economic sustainability of trawl fisheries are identified and incorporated into trawl fisheries by-catch management plans in all project countries. - Enhanced understanding of responsible fishing by private sector/fishers, fisheries managers and decision-makers are supporting participatory management arrangements in all project countries
--

3.2.3 “Steps” Toward Achieving Final Goal:

<p>Step 1: The initial step is strengthened project work plans and standardization of data and information collection and analysis.</p> <ul style="list-style-type: none"> - Preparation of detailed work plan-budget and review of indicators and development of project/activities monitoring tools. - Recruitment/designation of Project Staffs, establishment of Project Steering Committee, National Working Groups, Consultative Groups, management councils as the national level and partnership coordination arrangements are established. - Review/assessment of existing gears and their modifications as well as identification of priorities and methods for surveys and mapping are standardized. - Review/assessment of existing systems, guidelines and related initiatives of existing management of fishing capacity, including study of potential incentives will be conducted. The existing data collection systems and identified key indicators for monitoring and evaluation system are reviewed. - Appropriate monitoring and evaluation system (combined with Project Management M&E system) will be designed. - Assessment of training needs and capacity building for policy and decision-makers to understand fisheries management, responsible trawl fishing technology and practices is conducted. - Project website is set up including the preparation and distribution of relevant Information Education and

<p>Communication (IEC) materials</p> <p>Step 2: Intermediate step is strengthened implementation of trawl fisheries management concepts/plans in the areas covered by the project.</p> <ul style="list-style-type: none"> - Assessment on the level of similarity among countries regarding regional by-catch policy/strategy contents and priorities. - Provide more opportunities for experience sharing/learning/discussions among participating countries as required. - Assess need for improved policy, legal and institutional frameworks to support trawl fisheries by-catch management plans including related activities. - Draft regional by-catch policy/strategy and by-catch management plans for trawl fisheries in project areas will be available. - Evaluate the possibilities of fishing and market-based incentives for more responsible fishing and make plans for incentive package implementation. Assess progress towards recommended management measures and finalized incentive packages and ensure their inclusion in trawl fisheries by-catch management implementation. - Assess progress on data collection, verify suitability and cost-effectiveness of methods and choice of indicators and, if needed, adjust the scope and processes for future data collection. - The awareness and capacity building activities carried out and results compared with expectations and future activities adjusted accordingly as required. <p>Step 3: Finalization and evaluation on the result, experiences and lessons learnt from the intermediate step activities provides the knowledge to develop appropriate trawl fisheries management at national and regional levels.</p> <ul style="list-style-type: none"> - Finalize and agree on a regional policy/strategy - Support to adoption and implementation of national fisheries by-catch management plans. - Introduction of incentive packages to Consultative Groups/Management Councils. - Appropriate fishing gears and/or practices are individually introduced to participating countries. - Preparation of final recommendations on the implementation of trawl fisheries management, including fishing capacity, spatial and temporal management measures. - Recommendations on appropriate data collection methodologies are provided. - Project website is functional and arrangements are made to continue production and distribution of relevant IEC materials

3.2.4 Activities in the Current Project:

<p>(1) Current position of the project: Step 1</p> <p>(2) Program duration: 2013 to 2015</p> <p>(3) Main activities:</p> <ul style="list-style-type: none"> - Organizing regional technical workshop on data collection trawl fisheries management information and data requirements - Adopting the National/Regional Plan year 1st - Develop human resources and institutional capacity of the REBYC-II CTI Member Countries for Trawl fisheries management - Supporting the technical and management details for FAO/APFIC in formulating of Guidance for the Management of Tropical Trawl Fisheries in the Asian Region
--

3.2.5 Progress and Achievements of the Current Project:

<p>(1) Main activities conducted in the current project</p> <ol style="list-style-type: none"> 1. Regional technical workshop on data collection Trawl fisheries management information and data requirements 2. Steering Committee Meeting 3. Support REBYC-II CTI to participate the APFIC Regional Expert Workshop on Tropical Trawl Fishery Management 4. Regional Training-cum-Workshop on Co-Management and Selective Fishing Gears and Other Practices <p>(2) Main achievements till the end of 2013 (tentative)</p> <ol style="list-style-type: none"> 1. National and regional plan of the project activities for the year 1st project implementation 2. Regional technical workshop on data collection Trawl fisheries management information and data requirements 3. Steering Committee Meeting

4. Support REBYC-II CTI to participate the APFIC Regional Expert Workshop on Tropical Trawl Fishery Management	
5. Regional Training-cum-Workshop on Co-Management and Selective Fishing Gears and Other Practices	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
1. Regional technical workshop on data collection Trawl fisheries management information and data requirements	100
2. Steering Committee Meeting	100
3. Support REBYC-II CTI to participate the APFIC Regional Expert Workshop on Tropical Trawl Fishery Management	100
4. Regional Training-cum-Workshop on Co-Management and Selective Fishing Gears and Other Practices	100

3.2.6 Evaluation of Project Activities in 2013

1. Improved knowledge of the region's trawl fisheries and its catch composition enabling the formulation of regional guidelines, advice and tools for improved trawl fisheries governance and policy processes. Set of data and data collection methodologies appropriate for implementation in project countries
2. Adoption of project work plan year 1 st and budget
3. Human resources development on project officers is strengthened on various management approaches for trawl fisheries, <i>i.e.</i> Co- Management, Ecosystem to Fisheries Approach Management, and Coastal Based Fisheries Management, Trawl Gear Based Management included Selectivity Aspect.
4. Co-Drafting the Guidance for the Management of Tropical Trawl Fisheries in the Asian Region

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

Activity 1 Facilitation of national level activities/outputs and consolidation at the regional level

This will continue to be the core function of the RFU, and will involve coordination of agreed activities and outputs at the country level. The RFU will support the participating countries in the implementation of national activities through facilitating the exchange of experiences and the provision of advice to address technical as well as institutional issues. The lessons from the national level activities will be consolidated and packaged for Project use and for dissemination to third parties. Where necessary, RFU staff will carry out visits to the various national project sites.

Activity 2 Regional Workshops/Trainings

The regional workshop on the following topics is under International Guidelines on By-catch International Guidelines on By-catch Management and Reduction of Discards. These workshops may be combined with other regional meetings to reduce participant travel costs.

These will include: 1) Training of Trainers in the Ecosystem Approach to Fisheries management; Trawl Fisheries Economic Incentives Workshop; 3) Year 2015 Work plan Development Workshop; and 4) An unspecified workshop.

Activity 3 Training and capacity building

Under this LOA, SEAFDEC will provide training on the following topics, identified through the Training Need Assessment conducted during the 1st LOA. These trainings may be combined with other regional meetings/workshops to reduce participant travel costs.

These will include: 1) Training in Ecosystem Approach to Fisheries Management; 2) Mapping Fisheries Resources through the use of GIS; 3) Socio-economic surveys and trawl by-catch information collection; and 4) Project Monitoring and Evaluation.

Activity 4 Drafting of Working Papers

Desk study on 3 topics will be carried out by consultant include: 1) A regional overview of policy and legal framework for trawl fisheries; 2) A draft regional by-catch policy/strategy; and 3) A study of economic incentives used in Asian trawl fisheries.

Activity 5 The Second Project Steering Committee Meeting

SEAFDEC RFU will work with partner organizations in the host country, (currently planned as Vietnam) to facilitate the Second Steering Committee Meeting. The RFU will be responsible for all documentation relating to the event. This event may be combined with a regional workshop to save participant travel costs.

Activity 6 Support to the organization of the Mid-term Evaluation

SEAFDEC RFU will not be responsible for this event but will play an important supporting role, particularly in terms of arranging logistics, etc.

Activity 7 Upgrading of Project website and development of communication materials SEAFDEC will continue to develop and maintain the project website where relevant information will be published, including project documents, reports, tool kits/methodologies and news items.

Activity 8 Engagement with Government, NGOs and private sector organizations

Engagement with trawl stakeholder through participation in the fishmeal round table discussions and other public/private. SEAFDEC staff promotes the work of the project and actively look for opportunities to cooperate with government organizations, the private sector and NGO's. This could including liaison between pilot projects and Fishery Improvement projects being implemented by other organizations, in areas of geographic overlap. Through these fora, SEAFDEC will also engage with private sector and government initiatives over the establishment of trawl fishery improvement plans and by-catch certification.

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Facilitation of national level activities/outputs and consolidation at the regional level	Oct 2013 – Oct 2014	The training to trainer course will promote the EAFM approach being championed by FAO/BOBLME to key trainers and technical staff in SEAFDEC.
Activity 2 Regional Workshops/ Trainings	Nov 2013-Oct 2014	<p>2.1 Training of Trainers in the Ecosystem Approach to Fisheries Management. This course will promote the EAFM approach being championed by FAO/BOBLME to key trainers and technical staff in SEAFDEC's regional centers.</p> <p>2.2 Trawl Fisheries Economic Incentives Workshop This workshop will explore the issue of incentives, (both constructive and perverse), in the partner countries' trawl fisheries, with a view to developing recommendations for their use or otherwise. The findings from this workshop will contribute to 3.c. below.</p> <p>2.3 Year 2015 Work Plan Development Workshop This workshop will develop and agree work plans for 2015, in the five countries, drawing on experiences and lessons learned through current implementation.</p> <p>2.4 An unspecified workshop Planning for this is thought necessary to allow the SEAFDEC RFU some flexibility in its workshop program.</p>
Activity 3 Training and capacity building	Jan-Oct 2014	<p>3.1 Training in Ecosystem Approach to Fisheries Management. This course, based on the Essential EAFM Handbook will be delivered by SEAFDEC to key trainers in 2 of the participating countries under REBYC II. Countries shared with BOBLME, (<i>i.e.</i> Indonesia and Thailand) will be prioritized.</p> <p>3.2 Mapping Fisheries Resources through the use of GIS The spatial representation of data is of considerable interest to several of the partner organizations who, currently lack capacity</p>

Activity/inputs	Duration	Remarks
		<p>to use GIS for planning purposes. Indonesia and Philippines have all indicated an interest in receiving training in this topic.</p> <p>3.3 Socio-economic surveys and trawl by-catch information collection. This course will combine requests from Thailand (Socio-economics), and Vietnam, (by-catch information collection).</p> <p>3.4 Project Monitoring and Evaluation. Thailand Vietnam and Philippines requested support on Project M&E as a medium level priority. However, this training would provide an opportunity for all countries to look at how they are monitoring and evaluating their respective programs.</p>
<p>Activity 4 Drafting of Working Papers</p>		<p>4.1 A regional overview of policy and legal framework for trawl fisheries; 4.2 A draft regional by-catch policy/strategy; and 4.3 A study of economic incentives used in Asian Trawl fisheries.</p>
<p>Activity 5 The Second Project Steering Committee Meeting</p>	<p>May 2014</p>	<p>Discussion on the project work plan and budget as well as to agree on related important issues in order to ensure the effective implementation of the project both nation and regional level.</p>
<p>Activity 6 Support to the organization of the Mid-term Evaluation</p>	<p>Feb 2014</p>	<p>To facilitate the project evaluation and provide information to evaluators.</p>
<p>Activity 7 Upgrading of Project website and development of communication materials</p>	<p>Oct 2013 – Oct 2014</p>	<p>Project website where relevant information will be published, including project documents, reports, tool kits/methodologies and news items.</p>
<p>Activity 8 Engagement with Government, NGOs and private sector organizations Engagement with trawl stakeholder through participation in the fishmeal round table discussions and other public/private</p>	<p>Oct 2013 – Oct 2014</p>	<p>SEAFDEC staffs promote the work of the project and actively look for opportunities to cooperate with government organizations, the private sector and NGO's. This could include liaison between pilot projects and Fishery Improvement projects being implemented by other organizations, in areas of geographic overlap. Through these fora, SEAFDEC staffs will also engage with private sector and government initiatives over the establishment of trawl fishery improvement plans and by-catch certification.</p>

4.2 Expected Outcomes/Outputs of the Year 2014

1. Progress report of Participating Countries activities in year 2013-2014
2. Countries work-plans year 2015 of Participating Countries, are agreed and adopted.
3. New Letter of Agreement composed with Term of Agreement and Consultant Term of Reference in national and regional level is agreed and approved.
4. SEAFDEC trainers/researchers will be developed their capacity in trawl fisheries management concept of Ecosystem Approach to Fisheries Management.
5. Technical and local staffs of Participating Countries will develop their capacity in Resources mapping; Socio-economic and by-catch data collection; and Project Monitoring and Evaluation.
6. Materials and reports as result of workshops and training courses are produced. They are published and disseminated through website.
7. Three working papers: *i.e.* 1) Regional overview of policy and legal framework for trawl fisheries; 2) Regional by-catch policy/strategy; and 3) Study of economic incentives used in Asian Trawl fisheries, are drafted and disseminate to Participating Countries for consideration and comments.
8. Prospectus & progress report of 2nd Project Steering Committee Meeting.



9. Records of liaison between SEAFDEC RFU and FAO MTW team.
10. Project website operational.
11. Minutes of roundtable meetings and other public and private meetings.

PROJECT DOCUMENT

				Project id: 011305
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism			
Project Title:	Promotion of Countermeasures to Reduce IUU Fishing Activities			
Program Thrust:	III	Total Duration:	5 years (2013-2017)	
Lead Department:	Training Department	Lead Country:	Malaysia	
Project Sponsor:	Japanese Trust Fund	Project Partner:		
Proposed Budget:	USD 192,600	This year budget:	[2013] USD 45,000	
Prepared by	Kongpathai (ICTSH)	Project Leader	Bundit (ITRDH)	

1. INTRODUCTION/BACKGROUND

Illegal, Unreported and Unregulated (IUU) fishing can take place in all capture fisheries. Efforts to conserve and manage fish stocks are undermined by IUU fishing, which can lead to the collapse of fisheries or can seriously impair efforts to rebuild fish stocks that have already been depleted. This may result in the loss of both short- and long-term social and economic opportunities and could have negative impacts on food security.

In every country in the Southeast Asian Region, efforts are now focusing on the promotion of sustainable fisheries management and countermeasures against IUU fishing. She recognizes fishing management schemes such as fishing license, boats registration, etc., as effective measures to promote the sustainable use and the long-term conservation of marine living resources.

The Plan of Action on Sustainable Fisheries for Food Security Towards 2020 which was adopted at the ASEAN-SEAFDEC Conference Fish for the People 2020 “Adaptation to a Changing Environment” in Bangkok, Thailand during 13-17 June 2011 emphasizes: 1) strengthening regional and national policy and legislation to implement measures and activities to combat IUU fishing, including the development and implementation of national plans of action to combat IUU fishing, and promoting the awareness and understanding of international and regional instruments and agreements through information dissemination campaigns; 2) establishing and strengthening regional and sub-regional coordination on fisheries management and efforts to combat IUU fishing including the development of regional/sub-regional Monitoring, Control and Surveillance (MCS) networks; 3) facilitating consultative dialogue among fisheries legal officers to share, at the sub-regional/regional level, perspectives of the respective legal and regulatory framework in terms of developing MCS-networks and to take action to combat IUU fishing; and 4) building up capacity among Member Countries, including functions for regional and sub-regional cooperation, to effectively meet the requirements of port state measures and flag state responsibilities.

Following the direction of Resolution and Plan of Action, the SEAFDEC Training Department (TD) has been implemented the project of “Promotion of Countermeasures to reduce IUU Fishing” in coordination and cooperation with SEAFDEC Member Countries to reduce IUU fishing activities in the region.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The project goal is reduction of IUU fishing activities in Southeast Asia for sustainable fisheries. Countermeasures will be improved, developed and promoted as tools to reduce IUU fishing activities in coordination and cooperation among Member Countries.

2.2 Expected Outcomes and Outputs:

Expected outcomes: coordination, cooperation and application of countermeasure to reduce IUU fishing activities by Member Countries

Expected outputs:

- 1) Regional Fishing Vessel Record database in the region
- 2) Member Countries awareness building and common understanding of Port State Measure activities as a tool to reduce IUU fishing

2.3 Project Description/Framework

Activity 1: Promotion and development of Regional Fishing Vessel Record (RFVR)

The database of regional fishing vessels of 24 meters in length and over will be designed and developed in collaboration with SEAFDEC Member Countries. An on-site workshop on development and management of RFVR will be organized in concerned Member Countries to find out obstacles of RFVR implementation. A regional workshop on development and management RFVR will be organized to adjust and share obstacle from concerned Member Countries and integrate items of basic requirement information for RFVR. Moreover, the regional fishing record for vessels less than 24 meters in length will be initiated as next step.

Activity 2: Strengthening of Port State Measures and other surveillance measures in the region

The technical assistance to improve PSMs and existing mechanism in SEAFDEC Member Countries will be provided. The outputs information will be used to prepare and organize an on-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing in collaboration with SEAFDEC Member Countries.

Activity 3: Production of information materials

Production on information and promotional materials such as VDOs, posters, reports, etc., related to countermeasures to IUU fisheries activities will be carried out during the implementation of the project activities and disseminated to the SEAFDEC Member Countries and worldwide.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1: Promotion and development of Regional Fishing Vessel Record (RFVR) - A questionnaire on RFVR was designed and sent to concerned Member Countries. Aims of this questionnaire are as follows: 1) reviewing the situation in each SEAFDEC Member Country to identify the possibility of data sharing, especially of the agreed basic information requirement; and 2) updating the existing information on the number of national fishing vessels, 24 meters and over in length. The results of this questionnaire are used as information to organize on-site workshop on RFVR with concerned Member Countries to find out obstacles of RFVR implementation	Jul - Sep	
- An on-site workshop on development and management RFVR was started in Thailand in collaboration with Department of Fisheries and Department of Marine, Thailand. The result from questionnaire was discussed to find out obstacle of RFVR implementation. The conclusion from the workshop will be used as information and topic at the regional workshop in next year. Moreover, the on-site workshop was also planned in other Member Countries concerned.	Oct -Mar 14	
Activity 2: Strengthening of PSMs and other surveillance measures in the region		
- Discussion with DOF Thailand and FAO was held to collaborate on Port State Measures pilot project activity in Phuket, Thailand through survey and participation in pilot project workshops. The results from PSM pilot project implementation will be as lesson learned to plan and promote PSM activities in collaboration with Thailand	Apr-Dec	

Achievements based on Activities	Duration	Remarks
- The technical assistance on PSMs facilities and existing mechanism with Indonesia was planned. The output information will be used to prepare and organize an on-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing in collaboration with Indonesia.	Nov-Dec	

3.2 Evaluation of the Project Outcomes till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Promotion of countermeasures to reduce IUU fishing activities / Improving Management Concepts and Approaches for Sustainable Fisheries
(2) Issues in the region at the beginning of the study:
- IUU fishing situation is important issues emerging in the region
- Follow-up of the Plan of Action on Sustainable Fisheries for Food Security Towards 2020

3.2.2 Expected Final Goal of the Project:

Reduction of IUU fishing activities in Southeast Asian region for sustainable fisheries

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: Consultation, gathering and sharing information concerned
Step 2: Coordination and cooperation with Member Countries
Step 3: Promotion, awareness building and implementation in Member Countries

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 1 and 2
(2) Program duration: (2013-2017)
(3) Main activities:
- Promotion and development of Regional Fishing Vessel Record (RFVR)
- Strengthening of PSMs and other surveillance measures in the region
- Production of information materials

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project	
- Promotion and development of the Regional Fishing Vessel Record (RFVR)	
- Strengthening of PSMs and other surveillance measures in the region	
(2) Main achievements till the end of 2013 (tentative)	
- Information on situation in some Member Countries concerned to identify the possibility of data sharing and updating the existing information on the number of national fishing vessels of 24 meters in length and over that will be used to prepare a regional workshop on development and management RFVR next year.	
- Information needs of outcomes and expected outputs from some Member Countries concerned for preparing an on-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing in the next year.	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
Coordination, cooperation and application of countermeasure to reduce IUU fishing activities by Member Countries	10%
Regional Fishing Vessel Record database in the region	20%
Member Countries awareness building and common understanding of Port State Measure activities as a tool to reduce IUU fishing	10%

3.2.6 Evaluation of Project Activities in 2013

- The collection of information on situation and updating of the exiting information on the number of national fishing vessel with Member Countries concerned are not completed. The project is waiting for the questionnaire answer from Brunei Darussalam, Indonesia, Malaysia, Myanmar and Vietnam (update information September 2013)
- The on-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing is preparing for contents and subjects following information and expected output from Member Countries and then will be organized as requirement.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Promotion and development of RFVR Sub-activity 1.1: Regional workshop on RFVR database development and management Aims of the regional workshop are discussion on RFVR information sharing and integration on items of basic requirement information with Member Countries concerned.</p>	Jul	
<p>Sub-activity 1.2: Development and management of database for RFVR The outputs from the regional workshop will be used to create and design RFVR database. The technical support and assistance on introduction and implementation of database will also be imparted to Member Countries concerned. Moreover, discussion on RFVR less than 24 meters in length will be conducted and initiated as next step following recommendation from councils.</p>	Aug-Dec	
<p>Activity 2: Strengthening of Port State Measures and other surveillance measures in the region Sub-activity 2.1: Providing technical assistant to improve PSM and existing mechanism in SEAFDEC Member Countries The technical assistance to improve PSMs and existing mechanism in Member Countries concerned will be provided. The outputs information will be used to prepare and organize an on-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing in collaboration with Member Countries.</p>	Mar, Aug	
<p>Sub-activity 2.2: On-site training and workshop on strengthening of PSMs and other surveillance measures to reduce IUU fishing in the region The on-site training and workshop on strengthen of PSMs activities and other surveillance measures to reduce IUU fishing will be organized in collaboration with Member Countries. Government agencies, stakeholders and other sectors concerned will be invited to attend this activity. The course subject will provide its participants with understanding of PSM agreement and how to implement/improvement PSM and related activities.</p>	Apr, Sep	
<p>Activity 3: Production of information materials Production on information and promotional materials such as VDO, posters, reports, etc., related to countermeasures against IUU fisheries activities will be carried out during the implementation of the project activities and disseminated to the SEAFDEC Member Countries and worldwide.</p>	Jan-Dec	

4.2 Expected Outcomes/Outputs of the Year 2014

- Development of Regional Fishing Vessel Record database
- Member Countries awareness building and common understanding of Port State Measure and other surveillance measures activities as a tool to reduce IUU fishing

PROJECT DOCUMENT

				Project id: 041301
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism			
Project Title:	Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for International Trade in Fish and Fishery Products			
Program Thrust:	III	Total Duration:	5 years (2013-2017)	
Lead Department:	MFRDMD	Lead Country:	Singapore	
Project Sponsor:	Japanese Trust Fund	Project Partner:		
Proposed Budget:	USD 18,000	This year budget:	[2013] USD 33,000	
Prepared by	Masaya Katoh, Deputy Chief	Project Leader	Mr. Abdul Razak Latun	

1. INTRODUCTION/BACKGROUND

Illegal, unreported and unregulated (IUU) fishing was identified as the biggest threat to the sustainable development of fisheries and aquaculture in the Asia-Pacific region (29th Session of APFIC). To combat IUU fishing, countries are asked to take actions among others to adopt on sub-regional cooperation in preventing, deterring and eliminating IUU fishing in the region. In response to this, the issue on management of fishing capacity and combating IUU fishing has been seriously addressed by ASEAN, SEAFDEC and the RPOA initiative to combat IUU fishing, as well as in the “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” adopted by the Ministers and Senior Officials during the ASEAN-SEAFDEC Conference in 2011. In addition to the aforementioned regional initiatives, there have been emerging trade-related measures and requirements aiming to combat IUU Fishing and enhance responsible fishing practices, among which is the European Council Regulation (EC) No. 1005/2008. Most countries in the Southeast Asian region which are directly affected by the EC Regulation have developed their respective regulations. Therefore it is also important for the countries in the region to support the efforts to use trade measures to combat IUU fishing within the region. In line with EU initiatives, this project will seek possible way to combat IUU fishing in the capture fisheries by seeking a new catch documentation system for international trade in fish and fishery products within the Southeast Asian region.

This project corresponds to #8 of the Resolution at the ASEAN-SEAFDEC conference in 2011: Foster cooperation among ASEAN Member Countries and with international and regional organizations in combating IUU fishing. This project also corresponds to #67 of the Plan of Action at the conference: Strengthen cooperation among Member Countries to implement international standards with regards to trading on fish and fishery products within the ASEAN region.

The performance indicators will be the number of summary tables for related subjects and the number of publications.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The objectives of this project are:

- 1) To provide suggestions for Member Countries to strengthen cooperation in combating IUU fishing;
- 2) To study existing fishing and trading practices in small-scale fishery in the region;
- 3) To analyze associated problems in compliance with the EC Regulation No. 1005/2008 in the region; and
- 4) To suggest a possible catch documentation system for capture fisheries to ensure only non-IUU/legal fish and fishery products traded in the region.



2.2 Expected Outcomes and Outputs:

The expected outputs for the project include summarized information about (1) existing fishing and trading practices in small-scale fisheries and (2) impact of implementation of EC Regulation 1005/2008, and (3) problems that related to cooperation among Member Countries in combating IUU fishing. The outputs also include the Regional Guideline to Prevent Landing, Import and Export of IUU Fish and Fishery Products and possible solutions to the problems that associate with EU catch certificates.

Through those outputs, Member Countries will be able to develop the ASEAN catch documentation system and combat IUU fishing. Eventually Member Countries can reduce IUU fishing activities in the region through the catch documentation system. Reduction of IUU fishing activities in the region will be an expected outcome.

2.3 Project Description/Framework

Activity 1: Meetings for Effective Program Implementation

Sub-activity 1.1: Core Expert Meetings

SEAFDEC/MFRDMD will invite experts on trading of fish and fishery products from SEAFDEC Member Countries and SEAFDEC Secretariat, and resource persons to participate in the Core Expert Meeting on EU catch certification in 2013. The meeting participants will identify problems associated with EU catch certificates in the Southeast Asian region (Sub-activity 2.1). MFRDMD will organize another meeting in 2015.

Sub-activity 1.2: Terminal Core Expert Meeting

SEAFDEC/MFRDMD will organize the Terminal Core Expert Meeting in 2017.

Activity 2: To study existing fishing and trading practices in small-scale fishery & problems in compliance with the EC Regulation 1005/2008 in large-scale fishery

Sub-activity 2.1: Identification of existing practices/mechanisms and associated problems

Existing practices in small-scale fishery and problems associate with the EC Regulation 1005/2008 in the Southeast Asian region were identified during the Core Expert Meeting in October 2013 and will be compiled by SEAFDEC/MFRDMD. Those results will be published.

Sub-activity 2.2: Possible solutions to the problems

SEAFDEC/MFRDMD will study solutions to the identified problems that associate with EU catch certificates in the Southeast Asian region. MFRDMD will invite resource persons from Member Countries for further information and advice.

Activity 3: Strengthened cooperation among Member Countries and suggest a possible catch certification system for large- and small-scale capture fisheries

Sub-activity 3.1: Identify problems and strengthen cooperation among Member Countries in combating IUU fishing

Problems that related to cooperation among Member Countries will be identified during the second Core Expert Meeting in 2015.

Sub-activities 3.2: To suggest a possible catch certification system for large- and small-scale capture fisheries to ensure only non-IUU/legal fish and fishery products traded in the region

SEAFDEC/MFRDMD will develop ideas to solve or ease the problems that will be identified in Sub-activity 3.1. Through a series of meetings MFRDMD will suggest a possible catch certification system for large- and small-scale capture fisheries to ensure only non-IUU/legal fish and fishery products traded in the region. Member Countries will strength cooperation to combat IUU fishing activities in the region.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>Activity 1: Meetings for Effective Program Implementation Sub-activity 1.1: Core Expert Meetings SEAFDEC/MFRDMD organized the meeting in June with Malaysian Officials for preparation of the Core Expert Meeting and questionnaires related to Activity 2. MFRDMD invited experts on trading of fish and fishery products from SEAFDEC Member Countries and SEAFDEC Secretariat to participate in the Core Expert Meeting on catch certification in October 2013. The meeting participants identified problems associated with EU catch certificates in the Southeast Asian region (Activity 2.1).</p>	Apr.–Oct.	
<p>Activity 2: To study existing fishing and trading practices in small-scale fishery & problems in compliance with the EC Regulation 1005/2008 in large-scale fishery Sub-activity 2.1: Identification of existing practices/mechanisms and associated problems The questionnaires were distributed to Member Countries to obtain information about (1) existing fishing and trading practices in small-scale fisheries and (2) impact of implementation of EC Regulation 1005/2008 (in small scale and large scale fisheries). Problems associated with EU catch certificates in the Southeast Asian region were identified during the Core Expert Meeting in October 2013 and will be compiled by SEAFDEC/MFRDMD.</p>	Jan.-Dec.	

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Application of Catch Certification for International Trade in Fish and Fishery Products in Southeast Asian Region/ Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries</p>
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> - The impact of illegal, unreported and unregulated (IUU) fishing on fishery resources and stocks in the region - Most countries in the Southeast Asian region which are directly affected by the EC Regulation have developed their respective regulations. Therefore it is possible for the countries to support the efforts to use trade measures to combat IUU fishing within the region. - Countries should ensure the primary responsibility of flag States and countermeasures to combat IUU fishing

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> - Suggestions to Member Countries a possible catch documentation system for capture fisheries to ensure only non-IUU/legal fish and fishery products traded in the region; - Improved cooperation among Member Countries to combat IUU fishing.
--

3.2.3 “Steps” Toward Achieving Final Goal:

<p>Step 1: Identification of existing mechanisms and associated problems with EU catch certificates in the regions</p> <ul style="list-style-type: none"> - Organization of the Core Expert Meeting - Compilation of those problems by SEAFDEC/MFRDMD
<p>Step 2: Suggestion of possible solutions to those problems associated with EU catch certificates</p> <ul style="list-style-type: none"> - Possible solutions to those problems associate with EU catch certificates - Identification of problems associate with cooperation among Member Countries

Step 3: Development of improved cooperation among MCs in combating IUU fishing

- Suggestions to Member Countries a possible catch documentation system for capture fisheries to ensure only non-IUU/legal fish and fishery products traded in the region

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 1
(2) Program duration: 2013-2017
(3) Main activities:
<ul style="list-style-type: none"> - Core Expert Meetings - Identification of existing practices/mechanisms and associated problems with EU catch certificates and development of those solutions - Strengthened cooperation among Member Countries in combating IUU fishing

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> - Meetings for Effective Program Implementation; - To study existing fishing and trading practices in small-scale fishery & problems in compliance with the EC Regulation 1005/2008 in large-scale fishery by questionnaires. 	
(2) Main achievements till the end of 2013 (tentative)	
<ul style="list-style-type: none"> - One preparatory meeting and one Core Expert Meeting - Preparation and distribution of the questionnaires to Member Countries - Preliminary analysis of existing fishing and trading practices in small-scale fisheries - Preliminary analysis of problems in compliance with the EC Regulation 1005/2008 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
Core Expert Meetings	33%
Identification of existing mechanisms and associated problems with EU catch certificates in the region	66%
Suggestion of possible solutions to those problems associate with EU catch certificates	0%
Development of improved cooperation among MCs in combating IUU fishing	0%

3.2.6 Evaluation of Project Activities in 2013

Continuing from the activity of the previous IUU project in 2012, SEAFDEC/MFRDMD is developing the Regional Guidelines for Preventing Landing, Import and Export of IUU Fish and Fishery Products. The questionnaires were distributed to Member Countries to obtain information about (1) existing fishing and trading practices in small-scale fisheries and (2) impact of implementation of EC Regulation 1005/2008 (in small scale and large scale fisheries). Received results were summarized and reviewed at the Regional Core Expert Meeting in October 2013. Issues in ASEAN catch documentation system were discussed at the meeting. Several types of IUU fishing activities were highlighted during the meeting.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 2: To study existing fishing and trading practices in small-scale fishery & problems in compliance with the EC Regulation 1005/2008 in large-scale fishery</p> <p><i>Sub-activity 2.1:</i> Identification of existing practices/mechanisms and associated problems</p> <p>Existing practices in small-scale fishery and problems associate with the EC Regulation 1005/2008 in the Southeast Asian region were identified during the</p>	Jan.-June	

<p>Core Expert Meeting in October 2013 and will be compiled by SEAFDEC/MFRDMD. Those results will be published.</p>		
<p>Sub-activity 2.2: Possible solutions to the problems MFRDMD will study solutions to the identified problems that associate with EU catch certificates in the Southeast Asian region. MFRDMD will invite resource persons from Member Countries for further information and advice.</p>	<p>Apr.-Dec.</p>	

4.2 Expected Outcomes/Outputs of the Year 2014

SEAFDEC/MFRDMD will compile identified existing practices in small-scale fishery and problems associate with the EC Regulation 1005/2008 in the Southeast Asian region during the Core Expert Meeting in October 2013. Those results will be published. Moreover, MFRDMD will study solution to the identified problems. Member Countries will use the publication to improve their practices and measures to combat IUU fishing. Those activities will contribute to sustainable fisheries in the region. The compiled information of existing practices in small-scale fishery will be an expected output and reduction of IUU fishing activity will be an expected outcome.

PROJECT DOCUMENT

			Project id: 010406
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Fisheries Resources Survey and Operational Plan for M.V. SEAFDEC 2		
Program Thrust:	IV	Total Duration:	2004 ~
Lead Department:	Training Department	Lead Country:	All Member Countries
Project Sponsor:	Requesting country/agencies	Project Partner:	
Proposed Budget:		This year budget:	
Prepared by	Worawit Wanchana	Project Leader	Worawit Wanchana

1. INTRODUCTION/BACKGROUND

In 2002, the Government of Japan approved the construction of a fishery research and training vessel – M.V. SEAFDEC 2 for conducting fishery resource and oceanographic surveys and training in coastal ASEAN waters, along with procurement of the requisite fishing gear, fishing machinery, and survey equipment. Subsequently, the construction of a research vessel, M.V. SEAFDEC 2, was completed in 2003. Since 2004, research survey on fisheries stock, exploration of fisheries resources, testing of sampling gears, fishery oceanography, and other activities related to marine capture fisheries were conducted by M.V. SEAFDEC 2 in collaboration with the Member Countries. In a broader sense, the achievement of M.V. SEAFDEC 2 includes strengthen technical cooperation for effective fisheries and environmental management in the ASEAN region through the enhancement of research capability.

Due to increased operational cost for using M.V. SEAFDEC 2 that mainly caused by increased fuel price, the 40th Meeting of SEAFDEC Council (2009) agreed that the country that request to use M.V. SEAFDEC 2 should be responsible for the cost incurred by the vessel. Since 2010, the modified cost-sharing policy was therefore applied that fuel consumption of the vessel for the entire duration of the research/survey including cursing to and back to the requesting country will be responsible by the requested country (s).

At the 45th Meeting of the Council of SEAFDEC (2013) SEAFDEC/TD proposed some revisions of the Guidelines on the cost sharing policy for operation of the M.V. SEAFDEC 2. The results was that sharing of data collected from the cruise survey using M.V. SEAFDEC 2 should be finalized at the planning meeting before the cruise survey between the requesting country and SEAFDEC. Such basic data will be kept confidential and to be used only for the SEAFDEC regional database and for future regional analysis. (appears as a new *para 4* of the Part IV in Attachment 1).

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

- 1) Assist Member Countries to conduct fisheries resources survey (*i.e.* fishing trial and demonstration, oceanographic and hydro-acoustic surveys); and
- 2) Assist Member Countries to build human resources capacity during the surveys on-board M.V. SEAFDEC 2 (fish preservation techniques, fish sampling and species identification, etc.) based upon the request.

2.2 Expected Outcomes and Outputs

To fulfill the needs of the Member Countries, region, sub-regional initiatives on research survey for fisheries resources stock status in their specific areas, the outputs from the survey include cruise report of the survey, technical documents related to fisheries resource stock status, and other specific requirements. It is expect that the results from the survey would facilitate the establishment and implementation of comprehensive policy for such envisaged outputs.

2.3 Project description/Framework

To accomplish key activities as mentioned above, TD works in close collaboration with the Member Countries and other key partners at national, sub-regional, and regional levels. M.V. SEAFDEC 2 focuses on three major specific areas: (i) fisheries research and training; (ii) oceanographic survey; and (iii) onboard navigation and marine engineering training. Over the years, the M.V. SEAFDEC 2 has been used for the survey of the fisheries resources in EEZ of the Member Countries. The vessel will also be used to implement the training programs.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Activity Title	Duration	Remarks
1. Training on Benthic Habitat Mapping	18 – 22 Feb.	With the financial support from the Japanese Trust Fund 2012, this program was implemented with the aim to: <ul style="list-style-type: none"> - Enhance human resources capacity on techniques and procedures for benthic habitat mapping; and - Encourage SEAFDEC Member Countries on deep-sea fisheries resources exploration.
2. Environmental survey in the Gulf of Thailand	10 – 31 Aug.	Based upon the request from Department of Marine and Coastal Resources – Phuket Center, TD arranged the cruise survey for collecting environmental data. The survey items included physical and chemical parameters using oceanographic survey equipment – CTD and Niskin bottles. After the cruise survey, preliminary analysis for that of oceanographic parameters was carried out. Summary report of the data collected during the cruise survey was prepared and submitted.
3. Shipboard training for DOF Officials on navigation and seamanship	26 Sept.	The training area was the entrance of Chao-praya river, 24 participants of the training course were onboard M.V. SEAFDEC 2 as well as instructors from SEAFDEC/TD.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme and Issues:

(1) Theme: Fisheries resources survey; human resources capacity building on fishing gear (sampling gear), navigation and seamanship, marine engineering, oceanographic survey.

(2) Issues in the region at the beginning of the study:

- Human resource capacity of the Member Countries in the field of fisheries resources exploration is significantly needed.
- Fisheries resources in offshore and/or some areas of the region are still under-exploited.
- Facility for conducting research cruise survey in most of the Member Countries is limited.

3.2.2 Expected Final Goals of the Project:

- Information on potential/status fisheries resources in the Southeast Asian waters available.
- Human resources capacity of the Member Countries on fishery resources survey is enhanced

3.2.3 “Steps” Toward Achieving Final Goals:

Step 1: Meeting with the requested country/agency (s) for formulation and finalize the cruise survey plan/arrangement for M.V. SEAFDEC 2

- Meeting between SEAFDEC/TD and country requested for using M.V. SEAFDEC2 to finalize the plan of activity of the cruise survey.
- Summarize report of the meeting and the tentative cruise plan.

<p>Step 2: Collaborative arrangement of SEAFDEC/TD and the requested country for the cruise survey</p> <ul style="list-style-type: none"> - SEAFDEC/TD and the country proceed with all arrangement for the cruise survey. - The activities of the cruise survey have been implemented as planned.
<p>Step 3: Result reporting</p> <ul style="list-style-type: none"> - Results from the fisheries resources survey will be jointly drafted and released.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 1~3
(2) Program duration: 2004~
<p>(3) Main activities:</p> <ul style="list-style-type: none"> - Supporting fisheries resources survey (equipment and facilities in terms of fish sampling gear, oceanographic survey equipment, hydro-acoustic equipment, etc.). - Carry out on-the-job training and/or requested based program of activity with the country/agency.

3.2.5 Progress and Achievements of the Current Project:

<p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> - Supporting fisheries resources survey (equipment and facilities in terms of fish sampling gear, oceanographic survey equipment, hydro-acoustic equipment, etc.). - Carry out on-the-job training and/or request-based program of activity with the country/agency. 								
<p>(2) Main achievements till the end of 2013</p> <ul style="list-style-type: none"> - Training on habitat mapping for researchers and scientist of the Member Countries - Environmental survey in the Gulf of Thailand - Training for fisheries officials on navigation and seamanship 								
<p>(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">Expected outcome</th> <th style="text-align: center;">Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td>Training on habitat mapping</td> <td style="text-align: center;">100</td> </tr> <tr> <td>Environmental survey in the Gulf of Thailand</td> <td style="text-align: center;">100</td> </tr> <tr> <td>Training for fisheries officials on navigation and seamanship</td> <td style="text-align: center;">100</td> </tr> </tbody> </table>	Expected outcome	Achievement rate (%)	Training on habitat mapping	100	Environmental survey in the Gulf of Thailand	100	Training for fisheries officials on navigation and seamanship	100
Expected outcome	Achievement rate (%)							
Training on habitat mapping	100							
Environmental survey in the Gulf of Thailand	100							
Training for fisheries officials on navigation and seamanship	100							

3.2.6 Evaluation of Project activities in 2013

<p>Over the years, technical cooperation between SEAFDEC and Department of Marine and Coastal Resources – Ministry of Natural Resources and Environment in the area of environmental survey has been well established. Environmental data collected through the cruise survey can be used as the technical reference for the pollution management in the Gulf of Thailand.</p> <p>Training courses conducted in 2013, it can be recognized that not only fisheries/environmental survey can be conducted but other general/specific subjects can also be trained onboard M.V. SEAFDEC 2. This provides a wide range of utilization of the vessel in fulfilling the specific requirements of the Member Countries as well as other governmental agencies.</p>
--

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Fisheries resource survey in Vietnam waters	Pre- or post-monsoon period	<p>The 3rd fisheries resources survey in Vietnam will be carried out in 2014. The main activities of the survey by M.V. SEAFDEC2 in Vietnam waters each year are as follows:</p> <p>Activity 1: Hydro-acoustic surveys using multi-frequencies Simrad EK-60 (at 38 kHz, 120 kHz, and 200 kHz).</p> <p>Activity 2: Species composition and biological study. During the surveys, bottom otter-board trawl, and mid-water trawl will be used to take samples for species composition and biological study of small pelagic resources.</p> <p>Activity 3: Oceanographic and plankton surveys: ICTD, IKMT, plankton nets, Temperature and Depth Sensor, Current Indicator, and other weather information.</p>
Fisheries resource survey in Sulu-Sulawesi Seas	Oct ~	<p>The overall goal of the program is to provide updated scientific findings on the status and trends of yellow-fin, big-eye, and skipjack tunas in the Sulu-Sulawesi Seas.</p> <p>Specific objectives of this program are to:</p> <ul style="list-style-type: none"> • Strengthen collaborative research among the three countries surrounding the Sulu-Sulawesi Seas, through the conduct of: <ul style="list-style-type: none"> - Study on the use of FADs in the SSS areas; - Assessment of the status and trends of tuna stocks and the estimated maximum sustainable yield; and • Increase awareness of stakeholders on sustainable exploitation and management of tuna. <p>The M.V. SEAFDEC 2 is proposed to be utilized for the conduct of the collaborative tuna resources and oceanographic surveys within the jurisdiction of Malaysia, Philippines and Indonesia in the Sulu-Sulawesi Seas. The scope of the survey activities shall include the following:</p> <ul style="list-style-type: none"> • Research on tuna early life history using fish larvae sampling net and Bongo net in the near shore and off shore of the SSS, in order to determine the relative abundance and species composition of the fish larvae; • Oceanographic survey using the Integrated Conductivity-Temperature and Depth (ICTD) attached with other sensors, namely: pH, DO, Fluorescence, among others; • Use of scientific hydro-acoustic during the track survey; and • Scanning sonar survey on the FADs, and fish sampling by specific sampling gears for echo verification (if appropriate, e.g. data collection by hook and line/hand lines and longlines).

4.2 Expected Outcomes in the year 2014

- | |
|--|
| <ol style="list-style-type: none"> 1. Results from the 1st and 2nd cruise survey conducted in Vietnam waters can be summarized. 2. Technical arrangement of the survey by using M.V. SEAFDEC 2 in Sulu-Sulawesi Seas made. |
|--|

Revised Guidelines on the Cost Sharing Policy for the Operation of the M.V. SEAFDEC 2¹

I. Introduction

With favorable understanding of the Government of Japan about the function of SEAFDEC to assist in the sustainable development of fisheries of the Member Countries, the Government of Japan agreed to provide a new research vessel, the M.V. SEAFDEC 2 under the Japanese Grant Aid Program to SEAFDEC.

Through a series of consultations with the Government of Japan, SEAFDEC and Japan reached to the agreement that the utilization of the M.V. SEAFDEC 2 should be secured for the benefit of the countries which are eligible to the Japanese Grant Aid Program. On the other hand, it was also agreed among the SEAFDEC Member Countries that the operation of the M.V. SEAFDEC 2 should be based on cost-sharing policy taking into account both aspects, such as the benefits of the operation of the vessel to the Member Countries and the expected budgetary constraints of SEAFDEC in the future. The cost-sharing policy regarding the operation of the M.V. SEAFDEC 2 has also been recognized as an important element to establish the ownership of research activities by the Member Countries and to promote sustainable research activities using the M.V. SEAFDEC 2 in the region.

In exploring the research needs of the Member Countries, SEAFDEC established two mechanisms, namely: the Eligible Countries Committee where the eligible countries could provide or propose their own research needs or plans for the use of the M.V. SEAFDEC 2; and the Operations Committee where the annual plan of operation of the M.V. SEAFDEC 2 would be developed taking into account of needs of the SEAFDEC Member Countries other than the eligible countries as well.

During the 26th Meeting of the SEAFDEC Program Committee held in Manila in 2004, three categories of the expected operation using the M.V. SEAFDEC 2 were presented. It was also recommended that all categories of collaborative operations that are related to the needs of the Member Countries and operation in the national waters would be under the cost-sharing policy except the operation by SEAFDEC to verify the application of standardized research methods using the M.V. SEAFDEC 2, which have been considered through the Technical Consultative Meeting in October 2003 and November 2004.

At the 45th Meeting of the Council of SEAFDEC held in CEBU, the Philippines in 2013, SEAFDEC/TD proposed revision of the Guidelines on the cost sharing policy for operation of the M.V. SEAFDEC 2 particularly on the proposed modification of the cost-sharing policy for countries requesting for the use of the M.V. SEAFDEC 2, the Council expressed apprehension that the Member Countries might not be able to shoulder the increased costs as proposed by SEAFDEC considering the difficulties in the internal negotiations with the respective national budget agencies of the countries. However, With regards to data sharing, the Council agreed that some basic data collected onboard during the survey should be shared with SEAFDEC/TD. The data to be shared should be finalized at the planning meeting of the cruise survey between the requesting country and SEAFDEC. Such basic data will be kept confidential and to be used only for the SEAFDEC regional database and for future regional analysis. (appears as a new *para 4* of the Part IV of this document).

II. Objectives

This Guideline will provide the outline of the expected cost-sharing policy to be considered by the Member Countries, for the operation of the M.V. SEAFDEC 2 based on the policy arrived at SEAFDEC in early March 2004.

¹ The revised **Guidelines on the Cost Sharing Policy for the Operation of the M.V. SEAFDEC 2** was endorsed by the 45th Meeting of the Council of SEAFDEC held at CEBU, the Philippines from 1-4 April 2013 (refer to para 111-113 of the Report of 45th Council Meeting).

III. Outline of the Proposed Cost-Sharing Policy

Regardless of whether it is in cash or in kind, the following financial items related to the operations cost should be borne as a matter of principle, by the Member Country requesting for the collaborative operation of the M.V. SEAFDEC 2 in her national waters in response to her needs and interests.

- 1) **Supply of fuel** for the entire duration of the research including cruising to and back to the requesting country;
- 2) **Supply of fresh water** that would be consumed by the vessel during the operation of research in the national waters;
- 3) **Salary and necessary DSA of the local or national participants** onboard, who are involved in the research activities should be borne by the Member Country based on its own national standard; and
- 4) **Agency fee and port clearance fee** should be borne by the Member Country when the vessel visits and stays at the port for implementation of the collaborative research program.

IV. Working Scheme for the Collaborative Research with the Member Countries

- 1) Each Member Country is requested to prepare her research proposal, if any, taking into account of the short or medium-term activities. The proposal should be presented to the Eligible Countries Committee and/or Operations Committee to consider the cruise plans for the M.V. SEAFDEC 2. As a matter of principle, the staying period for the operation of the M.V. SEAFDEC 2 in the national waters could be limited to a maximum period of one month, taking into account of the availability also of the M.V. SEAFDEC 2 for the other Member Countries.
- 2) Through consultation with the Operations Committee, each proposal from the Member Countries and Departments should be reviewed and finalized based on priority, practicability, readiness and financial background of the proposed research programs. The schedule of the research program of the country finalized by the Operations Committee could be adjusted to cater to the next priority country's needs or could be postponed until financial arrangements become ready by the requesting country.
- 3) Two months prior to the implementation of the individual research program, TD staff in charge of the operation will communicate through E-mail/or visit each beneficiary Member Country to discuss with the concerned staff on the detailed arrangements of the cruise and research program. The concerned members of the Regional Fisheries Policy Network (RFPN) could be mobilized for effective communication with their respective countries, as the case may be.
- 4) With regards to data sharing, Member Country agreed that some basic data collected onboard during the survey should be shared with SEAFDEC/TD. The data to be shared should be finalized at the planning meeting of the cruise survey between the requesting country and SEAFDEC. Such basic data will be kept confidential and to be used only for the SEAFDEC regional database and for future regional analysis.
- 5) Preliminary cruise report including comments on the immediate impacts of the utilization of the M.V. SEAFDEC 2 as well as the results of the national research program should be submitted to SEAFDEC/TD within six months after the cruise.

PROJECT DOCUMENT

			Project id: 011307
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Offshore Fisheries Resources Exploration in Southeast Asia		
Program Thrust:	IV	Total Duration:	5 years (2013 to 2017)
Lead Department:	Training Department	Lead Country:	Vietnam
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	USD 52,500
Prepared by	Worawit Wanchana, Head of Capture Fisheries Technology Division	Project Leader	Mr. Sayan Promjinda, Fishing Gear Technologist

1. INTRODUCTION/BACKGROUND

Over the past few years, a number of countries in the region have increased their interest to promote the exploration of offshore fisheries resources to reduce the pressure of over-exploited fisheries resources in nearshore areas in their EEZ, at the same time to find alternative source of fisheries resources. This is in line with the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Regional Towards 2020 as mentioned in the Plan of Action # 18 “Investigate the potential of under-utilized fisheries resources and promote their exploitation in a precautionary manner based upon analysis of the best available scientific information”. In this connection, this project will provide technical support to the Member Countries in exploring the under-utilized fisheries resources including offshore areas in their respective EEZ waters.

Therefore, SEAFDEC in close collaboration with the Member Countries has supported exploration of fishery/living resources in the EEZ of the countries in SEA. The overall aims of this project are to encourage Member Countries to collect the information on the offshore fishery resources in terms of research and training facilities using M.V. SEAFDEC2, and to build human resources capacity for offshore fishery resources exploration.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

Ultimate goal of this project is to facilitate sustainable development of new/existing source of fisheries resources offshore waters in the EEZ of the Member Countries through human resources and institutional capacity enhancement for offshore fisheries resources exploration. In the process of project implementation, national/sub-regional plan(s) of offshore fisheries resources exploration will be developed.

The overall objective of the project is to enhance knowledge and skill of fisheries officials of the Member Countries on exploration of offshore fisheries resources. It includes:

- 1) To enhance human resources capacity on offshore fisheries resources exploration in Southeast Asian countries;
- 2) To provide technical supports¹ to the Member Countries on offshore fisheries resources exploration; and
- 3) To train fisheries officials of the Member Countries on the post-harvest fish handling techniques².

¹ Knowledge, guidelines, technical advice, survey equipments and facilities, etc.

² Based on the facilities onboard M.V. SEAFDEC2

2.2 Expected Outcomes and Outputs:

It is envisaged that the result from the project implementation, such as the national/sub-regional plan of research/study on offshore fisheries resources exploration will be published and shared among the relevant governmental agencies for appropriate management establishment.

2.3 Project Description/Framework

Currently, attempts of some countries in the Southeast Asia have been made to expand the fishing more towards the offshore in their EEZ areas where fisheries resources are still under-utilized as for the alternative fisheries resources. Over the years, SEAFDEC/TD has also initiated and supported technically to the Member Countries on the exploration of fishery resources in their EEZ waters through various programs of activities. However, the development of such under-utilized fishery resources should be carried out with the view of international concerns on the ecosystem approach to fisheries (EAF). In this connection, SEAFDEC/TD had initiated a series of activities aiming at building human resources and institutional capacities of the Member Countries on exploration of fishery resources with the basis of EAF. During the past few years, TD organized a number of technical meetings, workshops and trainings related to fisheries resource exploration. The outputs from such activities could be referred to as technical references to facilitate development of the offshore fishery resources in the EEZ of the Member Countries.

Main activities under this project include training activities and technical supports from TD on offshore fisheries resources exploration in EEZ of the Member Countries through human resources capacity building programs including sea trial, and cruise survey of the Member Countries using M.V. SEAFDEC2 and other research vessels if necessary. The project will also facilitate a joint collaboration research survey in the area where fisheries resources are sharing among the countries in Southeast Asia.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1: Organization of the regional training course on offshore fisheries resources exploration	Jan ~	<i>1.1 Design of the training course</i> Project staff designed the program activities in 2013 (including regional offshore workshop, and regional training course on improvement of tuna handling) based upon the recommendations and current situation of the countries in the region.
	Nov	<i>1.2 Training course for researchers</i> <i>1.2.1 Training course or regional workshop on offshore fisheries resource survey</i> The regional workshop on offshore fisheries resources survey in Southeast Asia was organized in Bangkok in November 2013. Research works and initiatives on offshore fisheries resources exploration currently conducting in the Southeast Asian waters were updated/ reviewed. Member Countries were encouraged to formulate cruise plan of offshore fisheries resource survey through utilization of M.V. SEAFDEC 2.
	Dec	<i>1.2.2 Training course on improvement of post-harvest fish handling at sea</i> The regional training course on improvement of tuna handling was organized in General Santos – the Philippines from 11 to 13 December 2013. The training was designed for fisheries officials who involve in promoting the reduction of post-harvest loss in tuna catch landing, in particular for hand-line fishing gear which is commonly used in Philippines, Malaysia, and Indonesia (for example in Sulu and Sulawesi Seas). Main resource person of the

Achievements based on Activities	Duration	Remarks
		training course was tuna fish handling expert from Fisheries Research Agency of Japan.
Activity 2: Modification of the offshore sampling gears and their handbook	Nov	<p><i>2.1 Review of the current handbook and publication</i> <i>2.2 Modification/revision of the handbook</i></p> <p>The existing handbook and publications produced by SEAFDEC, countries, other relevant agencies were reviewed during the workshop in November 2013. Revision or re-packaging such materials will be made based on the recommendation as discussed during the workshop.</p>
Activity 3: Technical support of TD to the cruise survey	<p>Aug</p> <p>Aug</p> <p>Aug ~</p> <p>Aug ~</p>	<p><i>3.1 Support for developing the survey plan and to monitor the progress of the survey</i></p> <p>Project facilitated the development of cruise plan for joint research on tuna in Sulu Sulawesi seas by organizing the “Sub-regional Technical Meeting for Development of Joint Research Program for Tuna Research Survey in Sulu-Sulawesi Seas” held in KL – Malaysia from 20 to 21 August. The meeting could come up with the draft plan of the research cruise survey in Sulu-Sulawesi Sea using M.V. SEAFDEC2 under the cost-sharing scheme with the target tuna species including yellow-fin, big-eye, and skipjack tunas. In addition, the meeting also agreed to establish sub-regional working groups for data collection and analysis including the representative from each participating countries (Indonesia, Malaysia, and Philippine), to jointly work on the following topics in the Sulu-Sulawesi Seas: (i) tuna stock assessment; (ii) study on FADs; and (iii) larvae and spawning grounds of tunas (3 species as mentioned above).</p> <p><i>3.2 Technical staff of TD join the cruise survey</i></p> <p>No activity in 2013 due to the postponement of Vietnam on the cruise survey using M.V. SEAFDEC2.</p> <p><i>3.3 Establishment of mechanism for sharing data of the results from the survey</i></p> <p>The establishment of mechanism for sharing data of the results from the survey in Sulu-Sulawesi Seas was discussed at the workshop in KL in August.</p> <p><i>3.4 Publications of the meeting and survey reports</i></p> <p>The report of the meeting held by the project in August was published and disseminated to the participants (Indonesia, Malaysia, and Philippines) and other Member Countries.</p>

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Exploration of alternative/under-utilized fisheries resources in offshore waters in the Southeast Asian countries.</p>
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> - Significant depletion of coastal fisheries resources in the Southeast Asian Countries - Effort of many countries in the region have been made in reducing the pressure to coastal resources through development of fisheries in offshore areas - Lack of technical information on the potential fisheries resources in the offshore areas in Southeast Asian waters

3.2.2 Expected Final Goal of the Project:

- | |
|--|
| <ul style="list-style-type: none"> - Information available for potential fishery resources in offshore areas in the Southeast Asian region; and - A set of recommendations for the medium- and long-term development and management plan for exploration of offshore fishery resources in the Southeast Asian region |
|--|

3.2.3 “Steps” Toward Achieving Final Goal:

- | |
|--|
| Step 1: Review and gather information on the national, regional, and international initiatives related to offshore fisheries in Southeast Asian waters for regional analysis on potential offshore fisheries development in Southeast Asian region. |
| Step 2: Enhance knowledge and skill of fisheries technicians of the Member Countries on offshore fisheries resources exploration. |
| Step 3: Support sea-trial, survey, data collection of the selected countries/area for offshore fisheries resources exploration. |

3.2.4 Activities in the Current Project:

- | |
|--|
| (1) Current position of the project: Step 1 |
| (2) Program duration: 2013 to 2017 |
| (3) Main activities: <ul style="list-style-type: none"> - Organizing regional workshop for reviewing the existing project/initiatives on offshore fisheries development/exploration in the Southeast Asian countries - Identify the needs on technical assistance for the Member Countries in developing/exploring the offshore fisheries resources - Build human resources and institutional capacity of the Member Countries for offshore fisheries resources exploration. |

3.2.5 Progress and Achievements of the Current Project:

- | | |
|--|-----------------------------|
| (1) Main activities conducted in the current project | |
| <ol style="list-style-type: none"> 1. Regional workshop on offshore fisheries resources survey in Southeast Asia, November 2013. 2. Regional training course on improvement of tuna handling, December 2013. 3. Sub-regional technical meeting for development of joint research program for tuna research survey in Sulu-Sulawesi Seas, August 2013. | |
| (2) Main achievements till the end of 2013 (tentative) | |
| <ol style="list-style-type: none"> 1. Draft framework for the joint research program on tuna resources in Sulu-Sulawesi Seas 2. Current information of the national initiatives on tuna fisheries in Sulu-Sulawesi Seas 3. Tentative cruise plan of M.V. SEAFDEC2 for joint research survey in Sulu-Sulawesi Seas, including estimated budget for the participating countries 4. Establishment of sub-regional working groups, including: (i) tuna stock assessment of yellow-fin, big-eye, and skipjack tunas in Sulu-Sulawesi Seas; (ii) study on larvae abundance and spawning area of tunas in Sulu-Sulawesi Seas; and (iii) study on FADs in Sulu-Sulawesi Seas. 5. Organization of regional training course on improvement of tuna handling | |
| (3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative) | |
| Expected outcomes/outputs | Achievement rate (%) |
| 1 st cruise survey plan with the budget of using M.V. SEAFDEC2 in Sulu-Sulawesi Seas (post-monsoon season) | 100 |
| 3-years research plan of the sub-regional working groups on joint research program on oceanic tuna fisheries in Sulu-Sulawesi Seas | 100 |
| Official communication with the focal point of the participating countries on the required national budget arrangement for the joint research program on tuna fisheries in Sulu-Sulawesi Seas | 100 |

3.2.6 Evaluation of Project Activities in 2013

Sub-regional joint research plan and its draft framework with activities to be implemented for sustainable utilization of the tuna fisheries resources in Sulu-Sulawesi Seas were developed. The national counterparts are requested to secure the budget for implementation of the plan of activities from 2014 and onwards.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

Activity 1 Organization of the regional training course on offshore fisheries resources exploration

Two (2) training courses will be organized under this activity, including: (i) offshore fisheries resources survey; and (ii) improvement of post-harvest fish handling at sea. Designing of the contents of the training courses will be based on the recommendations made at the workshop held in 2013. In 2014, support of the project on offshore fisheries resources exploration by M.V. SEAFDEC2 and other national cruise will be main activities of the project. The regional training course on post-harvest fish handling will be organized onboard M.V. SEAFDEC2 back-to-back with the cruise survey of M.V. SEAFDEC2 in the EEZ of the Member Countries (Vietnam in 2014). The activity will also include information gathering on offshore fisheries resources exploration in the Member Countries based on sub-regional offshore fisheries resources survey.

Activity 2 Modification/revision of the offshore sampling gears and their handbook

Handbook of sampling gears compiled by the project in cooperation with the Member Countries and other relevant agencies will be disseminated through appropriate events of SEAFDEC and other relevant initiatives. Its revision will also be made.

Activity 3 Technical supports of TD to the cruise survey

The activity includes support of the project to the joint research plan on tuna stock assessment in Sulu-Sulawesi Seas that was developed in 2013, including technical meeting and staff onboard M.V. SEAFDEC2. Major outputs from the activity implementation will be disseminated and shared among participating countries and other relevant initiatives, and to be used as the references.

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Organization of the regional training course on offshore fisheries resources exploration		<i>1.1 Design of the training course</i> To follow-up the recommendations made at the first project meeting held in 2013, the training courses in 2014 and onwards will be designed and adjusted concurrently with other national initiatives.
		<i>1.2 Training course for researchers</i> <i>1.2.1 Training course or regional workshop on offshore fisheries resource survey</i> The recommendations made at the first meeting of the project held in 2013 will be used as a basis for development of the training course or technical workshop on offshore fisheries resources exploration. Beneficiaries include researchers and fishing gear technologist who are involving with regional/national activities related to offshore fisheries resources survey. <i>1.2.2 Training course on improvement of post-harvest fish handling at sea</i> The regional training courses on improvement of post-harvest fish handling at sea will be organized back-to-back with the cruise survey in Vietnam (or in the area of Sulu-Sulawesi Sea as planned in 2013 where appropriate).

Activity/inputs	Duration	Remarks
<p>Activity 2 Modification of the offshore sampling gears and their handbook</p>		<p><i>2.1 Review of the current handbook and publication</i></p> <p><i>2.2 Modification/revision of the handbook</i> Regional initiatives on compilation and revision of the technical handbook and guideline on sampling gears and survey methodology for offshore fisheries resources exploration will be continued.</p>
<p>Activity 3 Technical support of TD to the cruise survey</p>		<p><i>3.1 Support for developing the survey plan and to monitor the progress of the survey</i> Project will continue to provide technical support the process of implementation on the joint research activity on tuna stock assessment in Sulu-Sulawesi Seas based on the sequence of the activities planned/adjusted by the sub-regional working groups that were established and agreed at the Sulu-Sulawesi Sea meeting in 2013.</p> <p><i>3.2 Technical staff of TD join the cruise survey</i> Project will support technical staff of TD to join the cruise survey in Vietnam and Sulu-Sulawesi seas, based on the survey planning and arrangement of the cruise in their respective countries.</p> <p><i>3.3 Establishment of mechanism for sharing data of the results from the survey</i> Project will maintain the mechanism for sharing data and support information sharing of the research survey in offshore areas of the Member Countries.</p> <p><i>3.4 Publications of the meeting and survey reports</i> Progress report of the joint research on tuna stock assessment in Sulu-Sulawesi seas, and summary report of the cruise survey in Vietnam waters will be published and disseminated to the participating countries and others.</p>

4.2 Expected Outcomes/Outputs of the Year 2014

Based on the outputs from the training courses conducted in 2014, it is expected that knowledge and skill on offshore fisheries resource exploration (sampling gears, stock assessment for offshore fisheries resources, post-harvest technologies, etc.) of the fisheries officials of the Member Countries will be enhanced. At that time, M.V. SEAFDEC 2 can also be utilized for the trainings. Regarding the outputs from the project based on the research survey planned for using M.V. SEAFDEC 2, it is envisaged that the results from the survey will provide policy recommendation for future planning and management of fisheries resources in the offshore waters of the participating Member Countries.

PROJECT DOCUMENT

Project id: 041002			
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters.		
Program Thrust:	IV	Total Duration:	5 yrs (2010-2014)
Lead Department:	MFRDMD	Lead Country:	Malaysia
Project Sponsor:	Japanese Trust Fund	Project Partner:	TD & TUMEC, DoF Malaysia
Proposed Budget:	USD 11,500	This year budget:	[2013] USD 30,466
Prepared by	Masaya Katoh, Deputy Chief	Project Leader	Mr. Syed Abdullah & Ms. Wahidah

1. INTRODUCTION/BACKGROUND

Southeast Asian countries have been recognized as one of major nesting sites for sea turtles in the world. These reptiles are highly migratory and share several certain foraging habitats in the Southeast Asian region. Thus, regional cooperation among Member Countries in conserving sea turtles is vital to ensure their survival. In addition, regional effort should be undertaken to reduce the mortality especially due to accidental catch by fishing gears. This project is aimed to conduct several research activities to collect information about sea turtles in the foraging habitats, to reduce sea turtle mortality by fisheries, and to formulate the management plans of fisheries to protect sea turtles in this region.

Sea turtle activities correspond to #5 of Resolution at the ASEAN-SEAFDEC conference in 2011 (Further develop regional initiatives to promote a responsible fisheries management mechanism, taking into account the specific social, economic, cultural, ecological and institutional contexts and diversity of ASEAN and ASEAN fisheries in the spirit of the development of the ASEAN Economic Community and the ASEAN Socio-Cultural Community) and #29 of Plan of Action (Recognizing the different management approaches that are required, sustainably manage major critical coastal habitats, such as mangroves, coral reefs and seagrass; and develop and disseminate information and guidance on appropriate tools and interventions).

The performance indicators will be numbers of tagged sea turtles and studied individuals for DNA analysis in the research activities and publication of the plan of action for managing foraging habitats of sea turtles in the region.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The objectives of this project are:

- 1) To collect ecological parameters of several pilot foraging habitats of sea turtles to study the key factors to manage these areas for sea turtle conservation;
- 2) To collect, compile, and review information of sea turtles migration corridors, nesting/foraging habitats, and their population structures in the region by genetic, satellite tracking, and conventional tagging studies for conservation and enhancement of the sea turtle populations in the ASEAN region;
- 3) To review fishing activities in the region which are possibly interacting with sea turtle populations in their foraging/nesting habitats and migration routes in space and time;
- 4) To promote responsible fishing gears and practices by conducting commercial demonstrations and experimental trials of modified specific fishing gears to protect sea turtle populations in the region; and
- 5) To formulate and propose management plans on fishing activities and other activities to conserve and enhance sea turtle populations in the region based on the scientific information.

2.2 Expected Outcomes and Outputs:

The expected outputs of the project include the biological and ecological information of sea turtles and their foraging habitats, which can be used for development of the management and conservation plans of sea turtles, and promotion of mitigation measures for fisheries suitable for the ASEAN region to reduce the incidental capture of sea turtles.

The regional plan of action on sea turtle foraging habitats will be formulated by the end of the project. Through implementation of the plan of action, incentives for conservation among fishers and ordinary people will be established in the future. The incentives for conservation will be expected outcomes.

2.3 Project Description/Framework

Activity 1: Meeting/Workshop

SEAFDEC/MFRDMD organized two workshops and one regional meeting and three preparatory meetings to implement the project. The meeting participants discussed an action plan for managing foraging habitats of sea turtles in the region.

Activity 2: Research on Sea Turtle Foraging Populations

SEAFDEC/MFRDMD and other partner organizations with participants from selected Member Countries conducted two scientific surveys for ecological parameters in pilot foraging habitats (Lawas and Mabul and Sipadan islands). During the surveys, tissue samples of sea turtles were obtained for genetic study. Probable natal origins were defined through Mixed Stock Analysis (MSA) of mtDNA sequencing data employing Bayes software. Inconel tagging activities were continued in Member Countries. MFRDMD conducted the satellite telemetry study. Information about sea turtle poaching will be discussed at the regional meeting. All available scientific data have been used to prepare an action plan for managing foraging habitats of sea turtles in the region.

Activity 3: Interaction between Sea Turtles and Fishing (TD)

TD conducted the study for modification of responsible fishing gears and their practices to reduce the sea turtles by-catch. The use of c-hook in hook-and-line fishing was promoted in SEAFDEC Member Countries.

Activity 4: Action Plan for Managing Foraging Habitats of Sea Turtles

An action plan for managing foraging habitats of sea turtles in the region has been formulated based on the scientific information. The action plan includes management on fishing activities that threaten adult sea turtles and abatement of egg poaching. The purpose of the action plan is to conserve and enhance sea turtle populations in the region.

Activity 5: Publication

Two reports (i) Regional Plan of Action; and (ii) Information on Sea Turtle Populations and Migration of Sea Turtles will be published. The report (ii) intends to summarize sea turtle activities conducted by SEAFDEC/MFRDMD since the first workshop on marine turtle research and conservation in 1996.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 2: Research on Sea Turtle Foraging Populations Sub-Activity 2.2: Genetic study During the scientific survey for ecological parameters in a pilot foraging habitat (Mabul and Sipadan islands) in 2011, more than 80 green sea turtles inhabiting there were captured. Tissue samples collected from these sea turtles were preserved appropriately and analyzed for genetic study of sea turtle subpopulation structures in the region. The mtDNA markers were used for the genetic analysis. Probable natal origins were defined through Mixed Stock Analysis (MSA) of mtDNA sequencing data employing Bayes software.	Jan. -Dec.	

<p>Sub-Activity 2.3: Tagging study Inconel tagging activities were continued in Member Countries.</p>	Jan.-Dec.	
<p>Sub-Activity 2.5: Information collection of sea turtle poaching Information about sea turtle poaching will be discussed at the regional meeting in October 2013.</p>	October	
<p>Activity 4: Action Plan for Managing Foraging Habitats of Sea Turtles Sub-Activity 4.1: Formulation of Action Plan for managing foraging habitats of sea turtles The regional plan of action on sea turtle foraging habitats has been formulated based on the scientific information. The plan of action includes management on fishing activities that threaten adult sea turtles and abatement of egg poaching. The purpose of the plan of action is to conserve and enhance sea turtle populations in the region.</p>	Jan.-Dec.	

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Research and management of sea turtles in foraging habitats in the Southeast Asian waters/ Thrust IV: Providing Policy & Advisory Services for Planning & Executing Management of Fisheries</p>
<p>(2) Issues in the region at the beginning of the study: Conservation of endangered marine animals in relation to fisheries is now matters of global concern. In the Southeast Asian region, six of the seven species of sea turtles in the world are distributed. They are highly migratory and recognized as the endangered species. Successful conservation and enhancement of sea turtle resources requires the scientific evidences on their ecological aspects such as migratory routes, reproductive and feeding behaviors and genetic structure, and on the status of incidental catch and habitat reduction related to their mortality.</p>

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> - To contribute to the formulation of a management/action plan of sea turtles inhabited in the ASEAN region with reference to the biological and ecological information; - To contribute to the formulation of management plans of fisheries that are suspected to have relationship with sea turtle habitats in space and time; - To develop and distribute mitigation measures for fisheries suitable for the ASEAN region to reduce the incidental capture of sea turtles.

3.2.3 “Steps” Toward Achieving Final Goal:

<p>Step 1: Conservation and management of sea turtles</p> <ul style="list-style-type: none"> - To study management of sea turtle hatchery; - To conduct sea turtle tagging survey in major nesting beaches in the region; - To collect and compile information on the current status of sea turtle nesting and conservation effort in the Southeast Asia; - To study and distribute the turtle excluder devices (TEDs) for the shrimp trawl fishery as a mitigation measure to reduce sea turtle by-catch.
<p>Step 2: Research for stock enhancement of sea turtles</p> <ul style="list-style-type: none"> - To conduct sea turtle tagging and satellite tracking studies for nesting females in major nesting beaches to obtain ecological information about sea turtles such as migration route, foraging habitats, etc.; - To conduct the genetic analysis of nesting sea turtles to reveal the subpopulation structure of sea turtles in the region; - To study and distribute the usage of responsible fishing gear and practices, including C-hook instead of J-hook in several longline fisheries, etc. to reduce sea turtle by-catch.
<p>Step 3: Research and management of sea turtles in foraging habitats in the Southeast Asian Waters.</p> <ul style="list-style-type: none"> - To conduct sea turtle genetic, tagging, and satellite tracking studies in their foraging habitats;

- To compile ecological and biological information about sea turtles in the foraging habitats;
- To conduct information collection of ecological parameters in pilot foraging habitats in the region;
- To collect information on sea turtle poaching in the region;
- To recognize fisheries which supposed to be closely related to sea turtle habitats in space and time;
- To study and distribute effective mitigation measures to reduce sea turtle unintentional capture by artisanal fisheries in their foraging habitats;
- To formulate the regional plan of action on sea turtle foraging habitats.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 3
(2) Program duration: 2010-2014
(3) Main activities: <ul style="list-style-type: none"> - Regional Meetings/Workshops to discuss on the implementation plans, progress, and outcomes of this program. - Field survey to collect ecological information on selected pilot foraging habitats of sea turtles. - Genetic study of foraging sea turtles to reveal sea turtle population structures in the region. - Conventional tagging and satellite tracking studies of sea turtles to reveal sea turtle migration patterns and their nesting/foraging habitats in the region. - Information collection of sea turtle poaching in the region. - Research on interaction between sea turtles and fishing, including sound and hook-and-lines. - Dissemination of the outcomes from research on interaction between sea turtles and fishing, including sound stimuli and hook-and-lines. - Formulation of the regional plan of action on sea turtle foraging habitats.

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> - The Regional Planning Workshop, Regional Progress Workshop and two preparatory meetings for the management/action plan. - Field survey to collect ecological information on selected pilot foraging habitats of sea turtles. - Genetic study of foraging sea turtles to reveal sea turtle population structures in the region. - Conventional tagging and satellite tracking studies of sea turtles to reveal sea turtle migration patterns and their nesting/foraging habitats in the region. - Information collection of sea turtle poaching in the region. - Research on interaction between sea turtles and fishing, including sound stimuli and hook-and-lines. - Dissemination of the outcomes from research on interaction between sea turtles and fishing, including hook-and-lines. 	
(2) Main achievements till the end of 2013 (tentative)	
<ul style="list-style-type: none"> - The Regional Planning Workshop, Regional Progress Workshop and two preparatory meetings for the management plan. - Ecological information of selected pilot foraging habitats of sea turtles was collected at Lawas and Mabul and Sipadan islands. - Genetic data on foraging sea turtles. - Inconel tagging at the focused nesting sites of sea turtles in participating Member Countries and tag recovery. - Satellite telemetry studies for one juvenile green turtle in Malaysia. - Research on interaction between sea turtles and fishing, including sound stimuli and hook-and-line. - Draft of the regional plan of action on sea turtle foraging habitats. 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
- Meeting/Workshop	100%
- Field surveys to collect ecological information on selected pilot foraging habitats of sea turtles	100%
- Genetic study of foraging sea turtles to reveal sea turtle population structures in the region	100%

- Conventional tagging and satellite tracking studies of sea turtles to reveal sea turtle migration patterns and their nesting/foraging habitats in the region	100%
- Information collection of sea turtle poaching	100%
- Research on interaction between sea turtles and fishing, including sound stimuli and hook-and-lines.	100%
- Dissemination of the outcomes from research on interaction between sea turtles and fishing, including sound stimuli and hook-and-lines	100%
- Formulation of the regional plan of action on sea turtle foraging habitats	100%
- Publication of two reports (i) Regional Plan of Action and (ii) Information on Sea Turtle Populations and Migration of Sea Turtles	0%

3.2.6 Evaluation of Project Activities in 2013

More than one hundred specimens of sea turtles have been sequenced for the DNA study. They were captured at foraging habitats. The result of the genetic data will elucidate stock structure of green turtles. Two reports (i) Regional Plan of Action and (ii) Information on Sea Turtle Populations and Migration of Sea Turtles will be prepared by the end of 2013. These publications will be key references for management planning of sea turtles in the region.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 6: Publication Two reports (i) Regional Plan of Action and (ii) Information on Sea Turtle Populations and Migration of Sea Turtles will be published. The report (ii) intends to summarize sea turtle activities conducted by SEAFDEC/MFRDMD since the first workshop on marine turtle research and conservation in 1996.	Jan.-Dec.	

4.2 Expected Outcomes/Outputs of the Year 2014

The two reports will be distributed to Member Countries. The Member Countries can endorse the regional plan of action and will utilize those reports to strength their activities for managing foraging habitats of sea turtles in the region. Outputs will be the two reports and an outcome will be improvement of management of sea turtle foraging habitats.

PROJECT DOCUMENT

			Project id: 011308
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region: <i>Improving the data collection of the commercially-exploited aquatic species and threaten species</i>		
Program Thrust:	IV	Total Duration:	5 years (2013 to 2017)
Lead Department:	Training Department	Lead Country:	Vietnam
Project Sponsor:	Japanese Trust Fund	Project Partner:	MFRDMD
Proposed Budget:		This year budget:	USD 32,800
Prepared by	Mr. Woarawit Wanchana, Head of Capture Fisheries Technology Division	Project Leader	Mrs. Penchan Laongmanee, Head of Fishing Ground and Oceanography Section

1. INTRODUCTION/BACKGROUND

During the past decade, the issues and the need to enhance conservation and sustainable utilization of commercially-exploited aquatic species and threaten species were raised in the international arena. Various aquatic species, *e.g.* sharks, was proposed for listing under the Appendices of the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES). FAO also developed an International Plan of Action on Conservation and Management of Sharks (IPOA-Sharks) and urged countries to develop and implement their respective NPOAs accordingly.

In the Southeast Asian region, the statistics on sharks was however insufficient to serve as a basis for sustainable management of the species. During the past years, there have been initiatives of SEAFDEC in improving better understanding on status of sharks through the conduct of regional technical meetings, and enhancing the capacity of Member Countries in the identification of shark species through training in order to support future data collection. Nevertheless, it is still necessary for SEAFDEC to continue undertaking initiatives to further develop more appropriate data collection methodologies in order to come up with better statistics and information on sharks in the future.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The overall objective of this project is to build capacity of researchers/fisheries officers of the SEAFDEC Member Countries for improvement of fisheries statistical data collection and compilation for the commercially-exploited aquatic species of sharks. After establishment of the better quality national/regional sharks' data, the countries and relevant national agencies can make use of it to strengthen in-country coordination for effective conservation and management of sharks in their waters. This could, in long-term period, help the countries in the region to sustain utilization of the sharks.

2.2 Expected Outcomes and Outputs:

It is envisaged that capacity of human resources and institute of the SEAFDEC Member Countries for sharks data and information collection will be improved. However, it was found most of the countries in the region have yet started activity/program related to shark information collection. Under this project, there are two groups of the countries having different development level in data collection, including: (i) advanced countries in collecting shark data (*e.g.* Indonesia, Malaysia, Philippines, and Thailand); and (ii) less advanced countries in collecting shark data (CLMV countries).

In this connection, different set of support from the project will be designed in specific to the current status of the data collection. For those advanced countries in the region, it is expected that more complete set of data/information on sharks' utilization will be made available. Regarding the less advanced countries, it is planned that national initiatives for collecting sharks data will be established. In the later phase, the data from these two groups will be used towards sustainable conservation and management of sharks in their respective countries.

2.3 Project Description/Framework

In order to address international fisheries related issues, this program is aimed to enhance capability of fishery sectors in compiling and utilizing fishery statistics and information. The focus of the project is given to improve data collection for the commercially-exploited aquatic and threaten species: sharks.

Generally, primary goals of collecting fishery statistic are to obtain the information to manage fisheries. Trend and status of commercially aquatic species provides useful and important information for fishery management. This information can come from various sources, including the monitoring of the fishing activities (*e.g.* landing, catch and effort data), biological surveys, and information from resource users. Poor capture fishery statistics in Southeast Asian Countries has led to difficulty in managing sustainably their coastal and marine fisheries resources. In particular to the species listed by CITES that will impact to the fisheries sectors of the countries in the region.

The project activities will focus on improvement of data and information collection for commercially-exploited aquatic species of sharks. This was to follow-up the outputs from the series of events, including the technical meetings in Thailand in 2011 and 2012 organized by TD, and the regional training course on sharks species identification organized by MFRDMD in early 2012. The outputs from these showed that information on sharks stock status in Southeast Asian Countries has yet reliable. The dearth of information on stock structure, abundance, life history, and reproductive capacity of major marine and freshwater sharks' species treat sharks as a separate statistical data. Moreover, insufficient policy and financial support on research and management of sharks is commonly the key issues in the region¹. This project aims at continuing the support the Member Countries to improve quality and timeliness of data/information on sharks.

Currently, there is certainly a vast difference of capacity of shark data collection in the ASEAN Member Countries in terms of technical skills, manpower, and financial resources. In following-up to the regional workshop on data collection methodology for the assessment of sharks stock status conducted in 2013, the project will assist the countries to implement data collection in according to their needs under the current condition of their data collection system for sharks. Some of the Member Countries who have more progress in implementing shark information collection, such as Malaysia, Philippines, and Thailand will be invited to join the activities of the project as the resource persons.

The activities of this project include:

Activity 1: Human resource development programs

A series of technical consultation meeting for planning of the project activities will be conducted considering the current development of their sharks' data collection. The project will also monitor the progress of improvement of sharks' data collection in the Member Countries in order to provide appropriate technical assistance in terms of knowledge and skill. The sub-activities also include the support from project for participation of the project staff and focal points of the project activities to participate to the meeting related to sharks.

Activity 2: Data collection

Due to the limited budget of the project, it is planned that the project will support sharks' data collection (at the landing site, and onboard selected fishing vessels) in some of the Member Countries in order to be able for the less advanced countries to start up the process for their data collection.

¹ SEAFDEC. 2011. Report of the Special Meeting on Sharks Information Collection in Southeast Asia, Bangkok, 15-17 September 2011. TD/RP/156

Activity 3: Information dissemination

Technical promotional materials for supporting sharks' data collection will be disseminated to the project participating Member Countries.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Explain briefly the major achievements of the projects and activities conducted in the year 2013.

Achievements based on Activities	Duration	Remarks
Activity 1: Human Resources Development Program	Oct	<i>1.1 Regional Workshop</i> TD organized, in collaboration with MFRDMD, the regional workshop on methodology of shark data collection and assessment of stock status in October 2013 in Bangkok, Thailand. Major outputs from the training included: (i) regional review of the existing shark landing data collection in the Member Countries; (ii) planning for the support of SEAFDEC/JTF on pilot activities in collecting shark landing data in IMPT countries; and (iii) a practical guidebook for shark data collection at the landing site.
	Nov ~	<i>1.2 Onsite Training</i> Based on the activities planned for collecting shark landing data in IMPT countries, the onsite or pilot program in these countries were conducted, which are scheduled in the 4 th quarter of 2013 to 1 st quarter of 2014.
Activity 2 Data collection	Oct	<i>2.1 Publication and dissemination of the practical guidebook; and 2.2 Project website</i> The practical guidebook developed during the regional training under Activity 1 will be published and disseminated to the Member Countries and other relevant organizations. Information of the project activities and other materials produced through the activities will be disseminated through project website.
Activity 3 Information dissemination	Oct	The Field Guide for Sharks' identification published by SEAFDEC/MFRDMD was disseminated to the participants of the regional workshop on data collection methodology for the assessment of shark stock status.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust:

Utilization, conservation, and management of sharks in Southeast Asian waters.

(2) Issues in the region at the beginning of the study:

The paucity of information on the status of shark fishery in Southeast Asia has been noted despite its recognition as the region blessed with the richest elasmobranchs biodiversity in the world. The catch, landing, trade as well as biological and taxonomic data have yet to be compiled for many meaningful interpretation and utility.

Since the adoption of the International Plan of Action for the Conservation and Management of Sharks (IPOA-Sharks) by the 23rd session of the FAO-COFI in 1999, all of the ASEAN countries have been encouraged to develop their national plan of action on sharks (NPOA-Sharks). A number of projects/programs that aims to improve data collection on shark fisheries have been implemented by SEAFDEC (TD and MFRDMD). In addition, the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership, at its 13th Meeting in 2010, took it as a SEAFDEC priority activity to strengthen the national capacity of its Member Countries for shark fisheries data collection to the species level. The Member Countries realize

importance of the data collection and analysis of shark's stock for appropriate fisheries management for their utilization and conservation, taking into account significant adverse impacts that can be possibly caused on the economy of the community of the Southeast Asian region in case of inclusion of sharks species in CITES appendices.

Currently, it was reported that Indonesia, Malaysia, Philippines, and Thailand have developed their NPOA-Sharks, while other Member Countries are still in the process of developing/finalizing it. The following subjects are considered as the priority areas of the ASEAN countries for implementation of NPOA-Sharks: (i) research in fishery biology, physiology, fishing ground and habitats of sharks; (ii) fishing effort and stock assessment that involve data compilation from various sources (*e.g.* catch landing, fishing boat enumeration, fishing technology, CPUE); (iii) monitoring, collecting, and compiling information on sharks utilization, trades, import and export statistics; (iv) effective methodologies in information collection at the national, regional and international levels to make it more reliable; and (v) sharing information through the establishment of sharks network and database.

3.2.2 Expected Final Goal of the Project:

- Strengthen capacity of the Member Countries for improving shark fisheries data collection;
- Compilation of shark fisheries data collected by the Member Countries for regional analysis; and
- Regional analysis of implementation of NPOA-Shark in the Member Countries.

3.2.3 "Steps" Toward Achieving Final Goal:

- | |
|--|
| Step 1: Regionally review the current status of implementation of the NPOA-Sharks in the Member Countries |
| Step 2: Build national capacity on shark fisheries data collection |
| Step 3: Sharing, updating, and exchanging information on shark fisheries among the Member Countries and other relevant organizations/initiatives. |

3.2.4 Activities in the Current Project:

- | |
|---|
| (1) Current position of the project: Step 1 and 2 |
| (2) Program duration: 2013 to 2017 |
| (3) Main activities: |
| - Compilation of shark fisheries data collection, and update the progress of implementation of the NPOA-Sharks in the Member Countries; and |
| - Organization of regional/national program to strengthen capacity of the Member Countries for improving shark fisheries data collection |

3.2.5 Progress and Achievements of the Current Project:

- | | |
|--|-----------------------------|
| (1) Main activities conducted in the current project | |
| - The regional workshop on sharks for planning of the onsite training in IMPT and/or other Member Countries | |
| - Onsite training on shark stock assessment in IMPT countries | |
| - Information dissemination of the information materials related to sharks produced by TD and MFRDMD | |
| (2) Main achievements till the end of 2013 (tentative) | |
| - Improved national capacity of the Member Countries on data collection for shark stock assessment; and | |
| - Drafted plan of onsite training course on data collection in IMPT countries. | |
| (3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative) | |
| Expected outcomes/outputs | Achievement rate (%) |
| Strengthen capacity of the Member Countries for improving shark fisheries data collection | 25 |
| Compile shark fisheries data collected by the Member Countries | 5 |

3.2.6 Evaluation of Project Activities in 2013

In 2013, tentative annual plan for the training programs to be organized during 2014 to 2017 was discussed with the Member Countries. The priority will be given to 2 levels, including (i) the countries who has already started to collect sharks' data (IMPT countries); and (ii) the other Member Countries. The pilot activity to be supported by the project was also discussed during the planning meeting organized in 2013.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Human Resources Development Program	Feb/Mar ~	<i>1.1 Planning meeting with the participating countries</i> Based on recommendations made at the national training course conducted in 2013, the project will provide support the process for development of the planning for national activity/program on shark information collection.
	Mar ~	<i>1.2 Monitoring of data collection</i> Monitoring and evaluation on the achievement of the implementation of the national activities on shark information collection will be conducted in the project participating countries. Details of monitoring and evaluation will be discussed based upon the recommendations by resource person (s) and other relevant agency (s).
	Jan ~	<i>1.3 Participation of project staff and focal point in related meeting/workshop</i> To ensure that the project implementation will benefit not only to participating countries but also to the other Member Countries and relevant organizations, project will provide financial support for participation of project staff to relevant international, regional, national meetings.
Activity 2 Data collection	Jan ~	The project will follow-up and communicate with the national coordinator to ensure implementation of such activities planned under the Activity 1.1 (2014)
Activity 3 Information dissemination		Reports from national project activities implemented will be published and disseminated to other Member Countries and relevant organizations.

4.2 Expected Outcomes/Outputs of the Year 2014

In collaboration with resource persons and staff of MFRDMD, it is envisaged that the specific training program as planned during the planning meeting in 2013 will be successfully organized. Some necessary training materials for improving knowledge and skill of the participating countries will be developed in consultation with regional/national experts. It is also envisaged that some country (s) can start to systematically collect sharks' data at the landing site for assessing the stock status of some major sharks' species.

PROJECT DOCUMENT

			Project id: 011308
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region: <i>Facilitating fisheries activity information gathering through introduction of community-based management</i>		
Program Thrust:	IV	Total Duration:	5 years (2013-2017)
Lead Department:	Training Department (TD)	Lead Country:	Vietnam
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:	USD 350,000	This year budget:	[2013] USD 70,000
Prepared by	Ms. Sumitra (SESH)	Project Leader	Dr. Yuttana (CSFDH)

1. INTRODUCTION/BACKGROUND

Inland and coastal fisheries are other areas where the available fishery statistics are recognized to be under-reported due to the nature of fisheries as being multi-species and involving large number of small-scale fishers. It is therefore also necessary to improve data and information collection methodologies, *e.g.* by involving local communities, local officers, etc. in data collection, in order that the data could better reflect the importance of inland and coastal fisheries, and could be used as a basis for planning and management of fisheries.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

- 1) Improve compilation of fisheries information and socio-economic aspect on coastal small-scale and inland fisheries in the Southeast Asia;
- 2) Improve the tool and methodology of fisheries data collection in coastal small-scale and inland fisheries at national for setting up fisheries census in future;
- 3) Support Member Countries to promote the applicable practice of autonomous community based resources management with establishing support officer system towards institutional building of stakeholders for coastal and inland fisheries management; and
- 4) Facilitate better presentation and knowledge on status and condition of coastal small-scale and inland fisheries at national and regional level.

2.2 Expected Outcomes and Outputs:

The targets participants are fisheries officers of SEAFDEC's Member Countries, who are normally providing information to decision maker for policy formulation and transforming policy into management planning, to practice in collecting and analyzing information from fisheries community for policy formulation, also to design coastal and inland fishery management plans by selected the appropriate participatory mechanism of co-management approach, that suit the local condition.

2.3 Project Description/Framework

Activity 1: Regional Workshop on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region, the result from workshop will be identified the key issues in fisheries data collection that should be addressed by the countries.

Activity 2: Strengthening training on site to introduce the appropriate participatory mechanism of autonomous community based resources management including the methodology on gathering fisheries activity information with establishing support officer system. Training To Trainers (TOT) courses aimed at

providing more clear and detailed concept and methodology on autonomous community based resources management, required tools of data and information collection in coastal fishing communities for better development and management of coastal resources to ensure sustainable livelihood of coastal communities, and skills of establishment and development of community fisheries development organizations are very extremely needed for Southeast Asian Region.

Activity 3: Monitoring and additional support for Member Countries activities of facilitating autonomous community based co-resource management and gathering fisheries activity information. SEAFDEC should be assisted fisheries officers of SEAFDEC's Member Countries to practice in collecting and analyzing information from fisheries community for policy formulation, also to design coastal and inland fishery management plans by selected the appropriate participatory mechanism of co-management approach, that suit the local condition.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>There have been many attempts in SEAFDEC's Member Countries to cope with the problems by implementing pilot projects to deal with their particular situation. SEAFDEC try to assist Member Countries by provide three activities in 2013.</p>		
<p>Activity 1: Regional Workshop on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region., Bangkok, Thailand. Based on the comment and recommendation grain from the workshop to review the problems and constraints in fisheries data collection in coastal small-scale and inland fisheries at national level, and identify the key issues in fisheries data collection that should be addressed by the countries.</p>	<p>28-30 January 2013</p>	
<p>Activity 2: Training on site at Cambodia, Lao PDR, the Philippines, Thailand and Vietnam, to introduce the appropriate participatory mechanism of autonomous community based resources management including the methodology on gathering fisheries activity information with establishing support officer system. The targets participants are fisheries officers, who are normally providing information to decision maker for policy formulation and transforming policy into management planning. The training course in each SEAFDEC Member Countries are shown as the following;</p>		
<p>1. Training on Practical Approach to Co-management in Inland Fisheries of Cambodia on 20-23 May 2013 at Siem Reap, Cambodia.</p>	<p>20–23 May 2013</p>	
<p>2. Training on Practical Approach to Co-management in Coastal Fisheries of Cambodia on 23-26 September 2013 at Sihanoukville, Cambodia.</p>	<p>23–26 Sep. 2013</p>	
<p>3. On-site Training on Facilitating Fisheries Information Gathering Through Introduction of Community-based Fisheries Management on 17-20 June 2013 at Luang Prabang, Lao PDR.</p>	<p>17-20 June 2013</p>	
<p>4. Training Course on Practical Approach to Community-based Fisheries Management in Coastal Areas of the Philippines on 15-19 July 2013 at Quezon Province, The Philippines.</p>	<p>15-19 July 2013</p>	
<p>5. On-site Training Course on Practical Approach for Enhancing Community Based Fisheries Co-Management in Inland Fisheries of Thailand on 13-18 January 2013 at Lamtakong, Thailand.</p>	<p>13 -18 January 2013</p>	
<p>6. On-site Training on Facilitating Fisheries Information Gathering Through Introduction of Community-based Fisheries Management on 13-16 May 2013 at Thanh Hoa, Vietnam.</p>	<p>13-16 May 2013</p>	
<p>7. On-site Training on Facilitating Fisheries Information Gathering through Introduction of Community-based Fisheries Management on 1-5 July 2013 at Can Tho city, Vietnam.</p>	<p>1-5 July 2013</p>	

Achievements based on Activities	Duration	Remarks
<p>Activity 3: Monitoring and additional support for Member Countries activities of facilitating autonomous community based resources management and gathering fisheries activity information. These activities have assisted fisheries officers of SEAFDEC’s Member Countries to practice in collecting and analyzing information from fisheries community for policy formulation, also to design coastal and inland fishery management plans by selected the appropriate participatory mechanism of co-management approach, that suit the local condition. The training course are show as the following;</p> <p>1. Mobile On-site Training Program on Applicable Fisheries Management Approaches for Sustainable Fisheries in Inland Fisheries of Cambodia on 3-7 June 2013 at Siem Reap, Cambodia.</p>	3-7 June 2013	

3.2 Evaluation of the Project Outcomes Till the Year 2013 <in general>

3.2.1 Theme/Program Thrust and Issues:

<p>(1) Theme/Program Thrust: Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region</p>
<p>(2) Issues in the region at the beginning of the study: In the Southeast Asian Region, Coastal and Inland Fisheries is the main fisheries production and more socially and economically important. People rely on the coastal area, river, reservoir, lake, etc., system to provide them with their primary source of nutrition, as well as their livelihood. Sustainable development of the fisheries resources need to enhance various national capacities to collect national information for proper management of the fisheries resources and to obtain qualitative data. From catch data information and socio-demographic characteristics and trends of coastal fishing communities have identified needs, and this calls for a need to strengthen community fisheries organization and capacity building for better development and management of coastal resources to ensure sustainable livelihood of coastal communities.</p> <ul style="list-style-type: none"> - Inadequate fisheries information to support fishery management, particular for management of fishing socio economic aspect. - Lack of effective fisheries information gathering included socio-economic aspect for setting up fisheries census - Need to improve knowledge of fisheries officers and fisheries communities on implementing the autonomous community based co-resource management.

3.2.2 Expected Final Goal of the Project:

<ul style="list-style-type: none"> - Appropriate effective way of fisheries activities information gathering including socio economic aspect for SEA was established; - Enhancing national capacity to strengthen effective way of fisheries information gathering included socio-economic aspect for setting up fisheries census in future; - Fisheries officers of SEAFDEC’s Member Countries improved knowledge on fisheries activities information gathering included socio-economic aspect for setting up fisheries census in future; - Fisheries officers of SEAFDEC’s Member Countries improved knowledge on implementing the autonomous community based co-resource management in their countries; and - Sufficient information on fisheries communities in SEA region, through better implement necessary actions towards enabling the communities and local organizations were increasing.

3.2.3 “Steps” Toward Achieving Final Goal:

<p>Step 1: Seeking the problems and constraints in fisheries data collection in coastal small-scale and inland fisheries at national level by organizing the Regional Workshop on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region</p>
<p>Step 2: Assist regional initiative on appropriate cost effective way of fisheries activities information gathering included socio-economic aspect for setting up fisheries census in future for Southeast Asian region</p>
<p>Step 3: Assist national initiative on appropriate participatory mechanism of autonomous community based co-resource management including the methodology on gathering fisheries activity information</p>

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 2
(2) Program duration: 2013-2017
(3) Main activities: <ul style="list-style-type: none"> - Strengthening training on site to introduce the appropriate participatory mechanism of autonomous community based resources management including the methodology on gathering fisheries activity information with establishing support officer system. - Monitoring and additional support for Member Countries activities of facilitating autonomous community based co-resource management and gathering fisheries activity information.

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project <ul style="list-style-type: none"> - Training To Trainers (TOT) courses aimed at providing clearer and detailed concept and methodology on autonomous community based resources management, required tools of data and information collection in coastal fishing communities for better development and management of coastal resources to ensure sustainable livelihood of coastal communities, and skills of establishment and development of community fisheries development organizations are very extremely needed for Southeast Asian Region. - Support national workshop for Member Countries activities to facilitating autonomous community based resource management and gathering fisheries activity information. 	
(2) Main achievements till the end of 2013 (tentative) Fisheries officers of SEAFDEC Member Countries expertise clear and detailed concept and methodology on autonomous community based resource management, required tools to facilitating on autonomous community based resource management such as tools of data and information collection in coastal fishing communities for better development and management of coastal resources to ensure sustainable livelihood of coastal communities, and skills of establishment and development of community fisheries development organizations are very extremely.	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
- SEAFDEC Member Countries have discussed and exchanged information/opinions and adopts on the way forward for promoting the effective way of fisheries information gathering in coastal small-scale and inland fisheries.	60%
- Increase number of fisheries officials and fishers to recognize autonomous community based resource management.	60%
- Increase skills of establishment and development of community fisheries development for fisheries officials and fishers.	60%

3.2.6 Evaluation of Project Activities in 2013

During "the Regional Workshop on Improvement of Fisheries Information Collection in Coastal Small-scale and Inland Fisheries of the Southeast Asian Region", the SEAFDEC Member Countries have discussed and exchanged information/opinions and adopts on the way forward for promoting the effective way of fisheries information gathering in coastal small-scale and inland fisheries. This could be achieved by fostering the lessons learned in terms of the methodologies and exchanging experiences in effective fisheries data collection. It is also envisaged that such effort could be adapted in the setting up of fisheries census with a future goal of improving fisheries data collection.

Moreover, the fisheries officials and fishers, who were participated in the Training Course, have increased their skills and knowledge on establishment and development of community-based resource management. SEAFDEC conducted the training evaluation by providing evaluation form, which focus on personal information and course evaluation to participants to recommend in each training course. The evaluation result of each training site of each country, almost of fisheries officers got more skill and knowledge on design coastal and inland fishery management plans by selected the appropriate participatory mechanism of co-management approach, that suit the local condition.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

Activity 1: Strengthening training on site to introduce the appropriate participatory mechanism of autonomous community based resources management including the methodology on gathering fisheries activity information with establishing support officer system.

This training course will be addressed the concept of autonomous community based resource management for provincial officers of SEAFDEC Member Countries, Cambodia, Lao PDR, Myanmar and Vietnam. Training to Trainers (TOT) courses aimed at providing more clearly and detailed concept and methodology on autonomous community based resource management, such as tools of data and information collection in coastal fishing communities for better development and management of coastal resources to ensure sustainable livelihood of coastal communities, and skills of establishment and development of community fisheries development organizations.

Activity 2: Monitoring and additional support for Member Countries activities of facilitating autonomous community based co-resource management and gathering fisheries activity information.

This training will be organized in the Philippines, Thailand and Cambodia, to order that the fisheries officers and community fisheries would clearly understand these concept as the fisheries officers are responsible for encouraging the fishers to apply the concept of inland fisheries management into practice. Meanwhile, the community fisheries can better participate in resources management.

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<u>Activity 1:</u> Strengthening training on site to introduce the appropriate participatory mechanism of autonomous community based co-resource management for SEAFDEC Member Countries, Cambodia, Lao PDR, Myanmar, the Philippines, Thailand and Vietnam	Jan.-Dec.	SEAFDEC will be supported 2 countries in activity 2 and 3 countries in activity 3 respectively, which proposed by Member Countries.
<u>Activity 2:</u> Monitoring and additional support for Member Countries activities of facilitating autonomous community based co-resource management and gathering fisheries activity information for SEAFDEC Member Countries, Cambodia, Lao PDR, Myanmar, the Philippines, Thailand and Vietnam	Jan. – Dec.	

4.2 Expected Outcomes/Outputs of the Year 2014

The targets participants are fisheries officers of SEAFDEC's Member Countries, who are normally providing information to decision maker for policy formulation and transforming policy into management planning, to practice in collecting and analyzing information from fisheries community for policy formulation, also to design coastal and inland fishery management plans by selected the appropriate participatory mechanism of co-management approach, that suit the local condition.

PROJECT DOCUMENT

			Project id: 011308
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in Southeast Asian Region: <i>Harmonization of fishery statistics in the Southeast Asian region</i>		
Program Thrust:	IV	Total Duration:	5 years (2013 to 2017)
Lead Department:	Training Department	Lead Country:	Vietnam
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:		This year budget:	USD 7,000 (2013)
Prepared by	Ms. Nualanong Tongdee	Project Leader	Ms. Nualanong Tongdee/ Ms. Saivason Klinsukhon, SEAFDEC Secretariat

1. INTRODUCTION/BACKGROUND

The primary goals of collecting fishery statistic are to obtain the information that could serve as a basis for policy planning and management for sustainable fisheries. SEAFDEC has been undertaking initiatives in collating fishery statistics from countries bordering the South China Sea Areas since 1978, and starting from 2008 onwards, the framework for compilation of statistics data was changed to cover countries in the Southeast Asian region. The new regional statistics framework was endorsed by the SEAFDEC Council during its 40th Meeting, and subsequently at the 16th Meeting of the ASEAN Sectoral Working Group on Fisheries in 2008.

While recognizing that the regional compilation of fishery statistics is dependent on the availability and quality of statistics collected and provided by responsible agency of the respective countries, activities would be carried out under this sub-project to support Member Countries in enhancing understanding of Member Countries, in order to support reporting of their respective national statistics in accordance with the regional statistics framework.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The overall objective of this sub-project is to improve the reporting of statistics by the ASEAN Member Countries in line with the harmonized framework for fishery statistics of Southeast Asia.

2.2 Expected Outcomes and Outputs:

Target group of this sub-project is officers of Member Countries that are designated to coordinate with SEAFDEC in providing their respective national fishery statistics. Through coordination and production/provision of relevant information and reference materials, it is expected that countries would be clarified and could provide better statistics to SEAFDEC based on the statistics frameworks.

2.3 Project Description/Framework

SEAFDEC has developed a Regional Framework for Fishery Statistics of Southeast Asia, which has been used as a skeleton for countries in reporting of their fishery statistics for compilation in the Fishery Statistical Bulletin of Southeast Asia by SEAFDEC (starting from statistics of 2008). This sub-project is therefore undertaken to continue supporting the collection and reporting of statistics by the ASEAN Member Countries in line with the new fishery statistics framework.

Due to the scale of budget, the activities of this sub-project is limited only to communication/coordination and production of relevant materials for reference/usage by the Member Countries in provision of statistics for regional compilation; while other aspects in improving data collection would be undertaken by SEAFDEC technical departments under their respective programs/projects, and the compilation of statistics bulletin is considered routine activities of SEAFDEC.

The activities of this sub-project include:

- Activity 1: Coordination of work and participation in the Consultations/Meetings of relevant projects
- Activity 2: Preparation of materials to support the collection/reporting of statistics
- Activity 3: Production/dissemination of the materials

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
Activity 1 Coordination of work and participation in the Consultations/Meetings of relevant projects	Jan-Dec	Continued coordination/communication with Member Countries, and officer in charge in FAO for compilation of statistics, to clarify the submission of statistics based on the regional statistics framework.
Activity 2 Preparation of materials to support the collection/reporting of statistics	Jan-Sep	Compilation of list of aquatic species in Southeast Asia, based on the updated statistics data by species that could be provided by countries. As during the years, some Member Countries has improved the collection of statistics at species/species group levels, therefore, the list need to be regularly updated and shared with concerned countries. The list has also been harmonized with the FAO ASFIS list.
Activity 3 Production/dissemination of the materials	Oct-Dec	Production/dissemination of the updated list of aquatic species in Southeast Asia.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Enhancing the compilation of statistics to serve as a basis for planning and executing management of fisheries
(2) Issues in the region at the beginning of the study: Fishery Statistics collected by different countries in the region are at the different levels, depending on the capacity, resources allocation and policy in data collection. Although effort has been exerted to harmonize the compilation of statistics at the regional level based on the regional statistics framework, there are still disparities of data from different countries. SEAFDEC Departments have been undertaking several programs/projects to enhance data collection from countries, which is envisaged to result in better statistics and data collection. The eventual goal is still to obtain better official statistics in order to come up with long-term data that could provide better pictures on status and trends of fisheries for the region as a whole.

3.2.2 Expected Final Goal of the Project:

- Enhanced countries understanding and capacity in reporting of fishery statistics in line with the regional statistics framework

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: Capacity building for countries to enhance capacity in collection of fishery statistics
Step 2: Harmonization of fishery statistics through development of regional statistics framework
Step 3: Supporting countries in submitting data under the regional statistics framework

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 3
(2) Program duration: 2013 to 2017
(3) Main activities: <ul style="list-style-type: none"> - Coordination of statistics related work and participation in the relevant meetings - Updating information that support harmonization of statistics in the region - Preparation/dissemination of materials to support the collection/reporting of statistics

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project <ul style="list-style-type: none"> - Coordination of statistics related work and participation in the relevant meetings - Updating information that support harmonization of statistics in the region - Preparation/dissemination of materials to support the collection/reporting of statistics 	
(2) Main achievements till the end of 2013 (tentative) <ul style="list-style-type: none"> - Clarification with countries on the submission of national statistics - Clarification with FAO on harmonization process of compilation/sharing of statistics from countries to SEAFDEC and FAO through set of harmonized questionnaires - Updated List of Aquatic Species in Southeast Asia, based on updated statistics that could be provided by countries in the region (the list has been updated, and expected to be published by the end of 2013). 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
- Coordination of statistics related work and participation in the relevant meetings	On-going based on arising inquiry
- Compilation of the list of aquatic species that statistics could be collected and reported in Southeast Asia	90
- Publishing and dissemination of Updated List of Aquatic Species in Southeast Asia	0 (to be published by 2013)

3.2.6 Evaluation of Project Activities in 2013

The nature of activities under this sub-project focuses on coordination and providing clarification/reference materials. While this sub-project could help clarifying the provision of statistics to be in line with the statistics framework; the availability and quality of data is subject to the respective countries; in which SEAFDEC Departments also undertakes projects to improve fishery data collection in various aspects. This sub-project could complement the routine activities of the SEAFDEC Secretariat in compilation of regional fishery statistics.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Coordination of work and participation in the Consultations/ Meetings of relevant projects		SEAFDEC will continue to coordinate with countries that inquire assistance for harmonization of their respective statistics systems with the regional statistics framework. Linkages with other activities: <ul style="list-style-type: none"> - Projects undertaken by SEAFDEC Departments that support better data collection by Member Countries, which could at the end contribute to better statistics of the respective countries - Compilation of fishery statistics bulletin – routine activities of SEAFDEC Secretariat
Activity 2 Preparation of materials to support the collection/reporting of statistics		To be determined when the need arise

Activity 3 Production/dissemination of the materials		To be determined when the need arise
---	--	--------------------------------------

4.2 Expected Outcomes/Outputs of the Year 2014

It is expected that through coordination/ provision of clarification and suggestions towards harmonization of national statistics and regional statistics frameworks, and production/provision of relevant information and reference materials, countries would be clarified and could provide statistics to SEAFDEC based on the statistics frameworks. However, this is also subject to the availability of data of the respective countries.

PROJECT DOCUMENT

Project id: 041302			
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region.		
Program Thrust:	IV	Total Duration:	5 years (2013-2017)
Lead Department:	MFRDMD	Lead Country:	The Philippines
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:	USD 58,260	This year budget:	[2013] USD 60,000
Prepared by	Masaya Katoh, Deputy Chief	Project Leader	Mr. Raja Bidin Raja Hassan

1. INTRODUCTION/BACKGROUND

Small pelagic fishes such as Indian mackerels, scads and sardinellas are very important in the Southeast Asian region. In 2010, more than 800,000 tons of *Rastrelliger* spp., 700,000 tons of *Decapterus* spp. and 800,000 tons of *Sardinella* spp. were captured in the region. Purse seine is one of the major fishing gears to catch those small pelagic fishes. So far in the region, licensing for purse seine is the only measures of fishery management. However, no scientific stock assessment has been conducted for those small pelagic fishes. The project involves compilation and comparison of annual and/or monthly catch per unit effort (CPUE) where data are available for the last three decades in the region, comparison of TAC systems in the world, the genetic study of a commercially important pelagic species, and construction of management strategies for sustainable purse seine fisheries in the Southeast Asian region. Since catch-effort statistics are available in Malaysia and Thailand and CPUE is an indirect measurement of the abundance of a target species in fisheries, SEAFDEC/MFRDMD will make its first attempt to examine the trend of resources using CPUE for the last three decades. At the same time, SEAFDEC/MFRDMD will review and compare TAC systems in the world to examine which TAC system is applicable for management of small pelagic fishery in the region.

This program corresponds to #10 of Resolution at the ASEAN-SEAFDEC conference in 2011 (Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information) and #22 of Plan of Action (Establish and strengthen regional and sub-regional coordination on fisheries management and efforts to combat IUU fishing including the development of regional/sub-regional Monitoring, Control and Surveillance (MCS) networks).

The performance indicators will be the amount of data typed in the excel format for CPUE, the number of CPUE comparisons/figures produced and the number of meetings/workshops/ seminars for the CPUE comparisons and study of TAC systems in the world.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The objectives of this project are:

- 1) To compile and compare annual and/or monthly catch per unit effort (CPUE) data for the last three decades in Malaysia and Thailand where historical catch-effort statistics had been collected by SEAFDEC and to interpret the trend of resources in the region (additional CPUE data in the past will be analyzed by MFRDMD when they are voluntarily provided by Member Countries);
- 2) To assess which unit of effort is most appropriate for Malaysia, Thailand and other Member Countries and to examine other indicators for stock assessment;
- 3) To compare total allowable catch (TAC) systems in the world to examine which TAC system is applicable for management of small pelagic fishery in the region;

- 4) To estimate the genetic structure of a targeted small pelagic species in the region; and
- 5) To propose management strategies for sustainable purse seine fisheries in the Southeast Asian region based on available data.

2.2 Expected Outcomes and Outputs:

The expected outputs of the project include analysis of CPUE data in Malaysia and Thailand, and comparisons of TAC systems in the world.

Through those outputs, Member Countries will be able to collect CPUE data. Eventually Member Countries can monitor the trend of resources for sustainable fisheries. The sustainable utilization of fishery resources will be an expected outcome.

2.3 Project Description/Framework (for total duration of the project)

Activity 1: Comparative Studies for CPUE and TAC

Sub-Activity 1.1: Case studies for CPUE in the Southeast Asian region

SEAFDEC first published catch-effort statistics for 1978 in 1981 and those statistics between 1981 and 2000 for limited Member Countries had been published first by SEAFDEC Secretariat and later by MFRDMD. However, those data have never been analyzed or compared by SEAFDEC/MFRDMD. In Sub-activity 1.1, MFRDMD will compile and compare CPUE data for the last 30 years in selected Member Countries where historical CPUE data are available to examine the trend of stock status for purse seine fisheries. A suitable unit of effort will be chosen from those statistics.

Sub-activity 1.2: Suitable CPUE and other indicators for fish stock status in Member Countries

SEAFDEC/MFRDMD will develop suitable CPUE and/or other indicators for stock assessment for purse seine fisheries. Member Countries will learn how to use suitable CPUE and other indicators for fish stock status in Member Countries using available/limited data in the region.

Sub-activity 1.3: Comparison of TAC systems in the world

SEAFDEC/MFRDMD will continue to compare different TAC systems in the world to examine which TAC system is applicable for management of fishery resources in the region. TAC comparisons will include systems in Japan, Norway and other countries. MFRDMD intends to clarify the pros and cons of each system with/without individual catch quotas and to choose the best system in the region with its requirements for Member Countries if applicable. MFRDMD will invite a resource person from Japan for comparisons of TAC systems.

Activity 2: Genetic Data Collection and Analysis

Sub-activity 2.1: Equipment preparation for genetic study

To handle large number of specimens, one thermal cycler and other genetic equipments will be purchased by SEAFDEC/MFRDMD.

Sub-activity 2.2: Sample collection

There are distinctive spots, making spotted sardinella (*Amblygaster sirm*) easy to identify. Because of the collaborative study, it is not suitable to choose a species that requires counting of gill rakers, fin rays or scales for species identification. *Amblygaster sirm* will be chosen for the genetic study of a pelagic species in the South China Sea and Andaman Sea. Reasonable number of specimens will be collected by supporting Member Countries. Each specimen will be photographed, dissected and preserved individually. Tissue samples for the DNA study will be shipped to SEAFDEC/MFRDMD. Detailed sampling procedures will be discussed at the workshop in 2014.

Sub-activity 2.3: Genetic study

Dissection of fish and DNA extraction will follow the standard operating procedures by SEAFDEC/MFRDMD. DNA will be extracted the collected tissue samples and analyzed for population structure. DNA markers will be determined at the workshop in 2014.

Activity 3: Meetings for Effective Program Implementation

Sub-activity 3.1: Core Expert Meeting/Workshop

The workshop will be held in the second quarter of 2014. The main purposes of the workshop are to study how to analyze CPUE data, to share the information about CPUE of purse seine fisheries in Malaysia and Thailand and TAC systems in the world, and to determine sampling procedures for the genetic study.

Activity 4: Recommendation for Purse Seine Fisheries Management in the Southeast Asian Region

Sub-activity 4.1: Recommendation for fisheries Management

For sustainable utilization of fishery resources, recommendation for purse seine fisheries management will be formulated during the final year of the project.

Sub-activity 4.2: Preparation and publishing of terminal report

The terminal report including the recommendation for purse seine fisheries management will be published at the end of the project.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>Activity 1: Comparative Studies for CPUE and TAC <i>Sub-Activity 1.1:</i> Case studies for CPUE in the Southeast Asian region SEAFDED/MFRDMD started to compile landings and compare CPUE data for the last 30 years in Malaysia and Thailand where historical CPUE data are available to examine the trend of stock status for purse seine fisheries in the region. The second meeting was organized in July to discuss about the suitable format of data and construction of database for CPUE. The old database under JTF2 will be used as guideline during development of a new database for JTFVI. Preliminary data analysis indicated that there were no decreasing trends in Malaysia and Thailand for landings of pelagic fishes between 1978 and 1999.</p> <p><i>Sub-activity 1.3:</i> Comparison of TAC systems in the world The first meeting for the Japanese Trust Fund VI on TAC was held on 20th May 2013. Local experts from the Fisheries Research Institute and local university were invited to discuss on the project proposal and expected outputs of the project. Available data in Malaysia were listed during the meeting. Suggestions have been given to the presented future plan including determination of TAC figure. TAC systems in Norway, Portugal and Commission for the Conservation of Southern Bluefin Tuna were reviewed at the meeting. After understanding the landings and CPUE trends of pelagic in the region, MFRDMD will continue to study about TAC systems from developed countries.</p> <p>Activity 2: Genetic Data Collection and Analysis <i>Sub-activity 2.1:</i> Equipment preparation for genetic study To handle large number of specimens, one thermal cycler and other genetic equipments were purchased by SEAFDEC/MFRDMD.</p>	<p>Jan. -Dec.</p> <p>Jan.-Dec.</p> <p>Jan.-June</p>	

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust:

Research and management of sharks and rays in the Southeast Asian waters/

Thrust IV: Providing Policy & Advisory Services for Planning & Executing Management of Fisheries

(2) Issues in the region at the beginning of the study:

Small pelagic fishes such as Indian mackerels, scads and sardinellas are very important in the Southeast Asian region. In 2010, more than 800,000 tons of *Rastrelliger* spp., 700,000 tons of *Decapterus* spp. and 800,000 tons of *Sardinella* spp. were captured in the region. Besides food resources, capture fisheries targeting these fishes are of fundamental importance to this region in terms of employment and livelihood of fishers. Purse seine is one of the major fishing gears to catch those small pelagic fishes. However, management of purse seine fisheries is still neglected because information about stocks is lacking. For sustainable use of these resources, formulation of a management plan is required. Therefore, we need to develop the best way to assess the size and state of the stocks for accurate TAC allocation and to find the most applicable TAC system for the purse seine fisheries in the region. Considering the likeliness of these stocks shared by countries bordering with the same ecosystems both in the Andaman Sea and the South China Sea, effective management of shared stocks requires management measures to be taken for the whole coverage area that is beyond national waters.

3.2.2 Expected Final Goal of the Project:

- To contribute to the formulation of management strategies for small pelagic fisheries in the region;
- To provide monitoring tools for small pelagic fishery resources in the region.

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: Information compilation and analysis for sustainable pelagic fisheries in the South China Sea and Andaman Sea

- To compile and compare CPUE data for selected Member Countries where historical CPUE data are available for last 30 years;
- To choose a suitable unit of efforts for comparisons;
- To estimate the genetic structure of a small pelagic fish in the region.

Step 2: Comparison of existing systems for management of pelagic fishery resources

- To choose suitable CPUE and other indicators for resource levels in Member Countries;
- To choose the best TAC system in the region with its requirements for Member Countries if applicable.

Step 3: Formulation of recommendation for management of small pelagic fish resources in the Southeast Asian region.

- To provide management strategies for sustainable small pelagic fisheries in the region.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 1

(2) Program duration: 2013-2017

(3) Main activities:

- Comparison of CPUE data in selected Member Countries
- Comparison of TAC systems in the world
- Genetic study of a small fish species for management of purse seine fisheries in the Southeast Asian region

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project

- To compile and compare CPUE data for the last 30 years in Malaysia and Thailand;
- To study an example of the different TAC systems in the world.

(2) Main achievements till the end of 2013 (tentative)

- Two preparatory meetings
- Preliminary CPUE analysis
- Preliminary study of TAC systems
- Preparation of genetic equipments

(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)

Expected outcomes/outputs	Achievement rate (%)
- Compilation and comparison of historical CPUE data for selected Member Countries	50%
- Comparison of selected TAC systems in the world	25%

- Understanding of the subpopulation structure for fishery management by genetic study of a small pelagic fish species	20%
- Core Expert Meeting/Workshop	0%
- Management strategies for sustainable purse seine fisheries in the region	0%

3.2.6 Evaluation of Project Activities in 2013

About 20 year data of landings and effort have been typed in for CPUE analysis. Preliminary analysis started for stock levels of small pelagic fishes. Preliminary information collection of TAC systems in the world started. Equipments were purchased for the genetic study.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Meeting/Workshop</p> <p>Sub-activity 1.1: Case studies for CPUE in the Southeast Asian region SEAFDEC/MFRDMD will continue to compile and compare CPUE data for the last 30 years in Malaysia and Thailand where historical CPUE data are available to examine the trend of stock status for purse seine fisheries. A suitable unit of effort will be chosen from those statistics for comparisons.</p> <p>Sub-activity 1.3: Comparison of TAC systems in the world SEAFDEC/MFRDMD will continue to compare different TAC systems in the world to examine which TAC system is applicable for management of fishery resources in the region. TAC comparisons will include systems in Japan, Norway and other countries.</p> <p>MFRDMD intends to clarify the pros and cons of each system with/without individual catch quotas and to choose the best system in the region with its requirements for Member Countries if applicable. MFRDMD will invite a resource person from Japan for comparisons of TAC systems.</p>	<p>Jan.-Dec.</p> <p>Jan.-Dec.</p>	
<p>Activity 2: Genetic Data Collection and Analysis</p> <p>Sub-activity 2.2: Sample collection <i>Amblygaster sirm</i> will be chosen for the genetic study of a pelagic species in the South China Sea and Andaman Sea. Reasonable number of specimens will be collected by supporting Member Countries. Detailed sampling procedures will be discussed at the Core Expert Meeting in the second quarter of the year.</p> <p>Sub-activity 2.3: Genetic study Dissection of fish and DNA extraction will follow the standard operating procedures by SEAFDEC/MFRDMD. DNA will be extracted the collected tissue samples and analyzed for population structure. DNA markers will be determined at the Core Expert Meeting in the second quarter of the year.</p>	<p>Jan.-Dec.</p> <p>Jan.-Dec.</p>	
<p>Activity 3: Meetings for Effective Program Implementation</p> <p>Sub-activity 3.1: Core Expert Meeting/Workshop The workshop will be held in the second quarter of the year. The main purposes of the workshop are to study how to analyze CPUE data, to share the information about CPUE of purse seine fisheries in Malaysia and Thailand and TAC systems in the world, and to determine sampling procedures for the genetic study.</p>	<p>Apr.-June</p>	



4.2 Expected Outcomes/Outputs of the Year 2014

During the workshop, the results of CPUE data analysis and comparisons of TAC systems in the world will be presented by officers of SEAFDEC/MFRDMD. The participants will study how to analyze the CPUE data. The participants can start to collect/compile fishery data in Member Countries to assess fish stock status in the region. Those activities will contribute to fishery management. An output will be information delivered at the workshop and an expected outcome will be improved fishery management in the region.

PROJECT DOCUMENT

			Project id: 041303
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Research and Management of Sharks and Rays in the Southeast Asian Waters.		
Program Thrust:	IV	Total Duration:	2 years (2013-2014)
Lead Department:	MFRDMD	Lead Country:	Indonesia
Project Sponsor:	Japanese Trust Fund	Project Partner:	
Proposed Budget:	USD 33,646	This year budget:	[2013] USD 24,590
Prepared by	Masaya Katoh, Deputy Chief	Project Leader	Mr. Ahmad Ali

1. INTRODUCTION/BACKGROUND

Recently, on a regional level the pressure to list commercially important and valuable marine species on CITES is growing. Therefore, governments need to collect data on these species and to prepare management plans when needed. Identification of elasmobranch (sharks and rays) species is fundamental of biological data collection. Expertise in identification and biological data collection on sharks and rays in the region need to be strengthened. This project is aimed to train technical officers in the participating Member Countries to be able to collect taxonomic and biological data on sharks and rays in their countries and to publish field guide books on sharks and rays in the region with key features and biology.

These activities correspond to #10 of Resolution (Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information) and #4 of Plan of Action (Enhance regional fishery information systems and mechanisms to facilitate sharing, exchange and compilation of statistics and information that are required at the sub-regional and regional level and apply, where appropriate, regionally standardized definitions and classifications for statistical data to facilitate regional compilation, analysis and data exchange).

The performance indicators will be the number of publications such as field guidebooks and the number of individuals collected for the DNA bar-coding study.

2. PROJECT**2.1 Goal/Overall Objectives and Performance Indicators:**

The objectives of this project are:

- 1) To facilitate biological studies of sharks and rays in Southeast Asian waters in participating Member Countries through the workshop on taxonomy and identification of sharks and rays in 2012;
- 2) To study biology of major elasmobranch (sharks and rays) species, which will provide basic knowledge for conservation and enhancement of shark and ray populations in the region; and
- 3) To publish field guide books on sharks and rays in the region with key features and biology.

2.2 Expected Outcomes and Outputs:

The expected outputs for the project include the biological information of sharks and rays in the region, publication of field guidebooks on sharks and rays and a workshop on taxonomy and identification of sharks and rays.

Through those outputs, Member Countries will be able to collect biological and taxonomic data on sharks and rays in the region. Strengthened data collection of sharks and rays in the region will be established for sustainable utilization. The sustainable utilization will be an expected outcome.

2.3 Project Description/Framework

Activity 1: Meeting/Workshop

Sub-activity 1.1: Workshop on taxonomy and identification of sharks and rays
SEAFDEC/MFRDMD organized the workshop on taxonomy and identification of sharks and rays in 2012, which was conducted under the different project.

Sub-activity 1.2: Regional Core Expert Meeting
SEAFDEC/MFRDMD will invite selected experts on sharks and rays from participating SEAFDEC Member Countries and SEAFDEC/SEC, and resource persons to participate in the Core Expert Meeting on Sharks and Rays in the third/fourth quarter of 2014. The meeting participants will review current available biological data on sharks and rays in the region, NPOA-sharks and a new Japanese Trust Fund project on sharks and rays for sustainable fishery from 2015.

Activity 2: Research on Biology of Sharks and Rays

Sub-activity 2.1: Data collection at landing sites
Shark and ray specimens were collected at landing sites in Pahang and Perak. Their biological data were recorded including sex and number of embryos/eggs if any.

Sub-activity 2.2: Genetic study and information compilation
SEAFDEC/MFRDMD will continue to compile genetic information on sharks and rays as an alternative identification method. Currently, DNA bar-coding research on sharks is progressing in the world. MFRDMD will conduct genetic research on some of the un-sequenced shark and ray species. Because of time and budget constraints, the new JTF project from 2015 will continue this sub-activity for elasmobranch species identification.

Sub-activity 2.3: Publication of biological information on sharks and rays in the region
SEAFDEC/MFRDMD will prepare and publish a book about biological information on sharks and rays in the Southeast Asian region in 2014.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration	Remarks
<p>Activity 2: Research on Biology of Sharks and Rays</p> <p>Sub-activity 2.1: Data collection at landing sites Shark and ray specimens were collected at landing sites in Pahang and Perak. Their biological data were recorded including sex and number of embryos/eggs if any. The poster entitled "Species composition of sharks in Southeast Asian region: Reanalysis of the study on sharks in 2003 and 2004 by SEAFDEC and ASEAN-SEAFDEC Member Countries" was presented at the 9th Indo-Pacific Fish Conference in Okinawa, Japan. Two species of stingrays collected at Kuala Terengganu and Dungun confirmed to be new records for Malaysia. Study on mobula ray species will be conducted in Sabah. All shark and ray specimens are now preserved in the refrigerator at SEAFDEC/MFRDMD for the DNA study. A book entitled 'Field Guide to Rays, Skates and Chimaeras of the Southeast Asian Region' will be published by the end of this year.</p>	Jan. -Dec.	
<p>Sub-activity 2.2: Genetic study and information compilation SEAFDEC/MFRDMD started to compile genetic information on sharks and rays as an alternative identification method. Some shark and ray specimens were collected for the genetic study. Chemicals and kits for genetic study will be purchased. PCR reaction and primers used will be optimized and some samples of sharks and rays were sequenced for the genetic study.</p>	Jan.-Dec.	

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust:

Research and management of sharks and rays in the Southeast Asian waters/
Thrust IV: Providing Policy & Advisory Services for Planning & Executing Management of Fisheries

(2) Issues in the region at the beginning of the study:

About 126 thousand tons of sharks and rays were captured in 2009 in the Southeast Asian region. High demands for shark fin in Asia raise a concern about shark populations. In 1998, FAO proposed International Plan of Action for the Conservation and Management of Sharks (IPOA-SHARKS) corresponds to increase of shark catch. SEAFDEC conducted the basic study of sharks in the ASEAN region in 2003-2004. Species composition and landing were available for one year at major ports in Brunei, Cambodia, Indonesia, Malaysia, Myanmar, Philippines, Thailand and Vietnam. However, fisheries data on sharks and rays are still lumped in most Member Countries. More recently, on a regional level the pressure to list commercially important and valuable marine species on CITES is growing. Therefore, governments need to collect data on these species for sustainable utilization. Identification of elasmobranch species is fundamental of biological data collection. Expertise in identification and biological data collection on sharks and rays in the region need to be strengthened.

3.2.2 Expected Final Goal of the Project:

- To train technical officers in the participating Member Countries to be able to collect biological data on sharks and rays in the region;
- To provide basic biological data on sharks and rays in the region through research activities;
- To publish field guide books on sharks and rays in the region with key features and biology.

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: Workshop on taxonomy and identification of sharks and rays

- To conduct a workshop on taxonomy and identification of sharks and rays.

Step 2: Research on Biology of Sharks and Rays

- To collect biological data on sharks and rays at landing sites with an emphasis on their reproduction;
- To conduct genetic analyses of un-sequenced shark and ray species.

Step 3: Publish books on sharks and rays and identify human resources who work on sharks and rays in the region

- To publish field guide books on sharks and rays in the region with key features and biology;
- To identify experts on sharks and rays in the region for future regional cooperation;
- To publish a book on biological information on sharks and rays in the region.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Steps 2 & 3

(2) Program duration: (2012) 2013-2014

(3) Main activities:

- Workshop on taxonomy and identification of sharks and rays in 2012 (by the different project).
- Research on biology of sharks and rays
- Publication of field guide books on sharks and rays
- Publication of a book on biological information on sharks and rays in the region.

3.2.5 Progress and Achievements of the Current Project:

(1) Main activities conducted in the current project

- Workshop on taxonomy and identification of sharks and rays in 2012 (by the different project).
- Research on Biology of Sharks and Rays.

(2) Main achievements till the end of 2013 (tentative)

- Workshop on taxonomy and identification of sharks and rays
- Publication of ‘Field Guide to Sharks of the Southeast Asian Region’

<ul style="list-style-type: none"> - Publication of ‘Look-alike sharks and rays species in the Southeast Asian Region’ - Final draft of ‘Field Guide to Rays of the Southeast Asian Region’ 	
(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected outcomes/outputs	Achievement rate (%)
- Workshop/Meeting of sharks and rays	50%
- Research on biology of sharks and rays	100%
- Publish field guide books on sharks and rays in the region	100%
- Identify human resources who work on sharks and rays in the region	50%
- Publish a book on biological information on sharks and rays in the region	0%

3.2.6 Evaluation of Project Activities in 2013:

The total of 20 species of sharks (35 specimens) and 26 species of rays (45 specimens) has been collected at landing sites for biological study. Two field guidebooks were published before CITES-CoP16 using compiled data on sharks and rays in the region. Those books have been used to increase local expertise on taxonomy and identification of sharks and rays in the region. An additional book, ‘Field Guide to Rays of the Southeast Asian Region’ will be published soon.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
<p>Activity 1: Meeting/Workshop</p> <p><i>Sub-Activity 1.2:</i> Regional Core Expert Meeting SEAFDEC/MFRDMD will invite selected experts on sharks and rays from participating SEAFDEC Member Countries and SEAFDEC/SEC, and resource persons to participate in the Core Expert Meeting on Sharks and Rays in the third/fourth quarter of 2014. The meeting participants will review current available biological data on sharks and rays in the region, NPOA-sharks and a proposal of the new Japanese Trust Fund project on sharks and rays for sustainable fishery from 2015.</p>	Aug.-Oct.	
<p>Activity 2: Research on Biology of Sharks and Rays</p> <p><i>Sub-Activity 2.2:</i> Genetic study and information compilation SEAFDEC/MFRDMD will continue to compile genetic information on sharks and rays as an alternative identification method. Currently, DNA bar-coding research on sharks is progressing in the world. MFRDMD will conduct genetic research on some of the un-sequenced shark and ray species. Because of time and budget constraints, the new JTF project from 2015 will continue this sub-activity for elasmobranch species identification.</p>	Jan.-Dec.	
<p><i>Sub-Activity 2.3:</i> Publication of biological information on sharks and rays in the region SEAFDEC/MFRDMD will prepare and publish a book about biological information on sharks and rays in the Southeast Asian region.</p>	Sept.-Nov.	

4.2 Expected Outcomes/Outputs of the Year 2014

During the Regional Core Expert Meeting, participants will review current available biological data on sharks and rays in the region, NPOA-sharks and a proposal of the new Japanese Trust Fund project on sharks and rays for sustainable fishery from 2015. Moreover, the one report of biological information on sharks and rays will be published and distributed to Member Countries. The new publication with previous publications will contribute to strengthen data collection of sharks and rays. This will be an expected output.

PROJECT DOCUMENT

Project id: 051301			
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Assistance for Capacity Building in the Region to Address International Fisheries Related Issues		
Program Thrust:	V	Total Duration:	5 years (2013-2017)
Lead Department:	Secretariat	Lead Country:	Thailand
Project Sponsor:	Japanese Trust Fund	Project Partner:	ASEAN Secretariat
Proposed Budget:	USD 319,500	This year budget:	[2014] USD 44,000
Prepared by	Ms. Sawitree Chamsai, PPO-I	Project Leader	Dr. Somboon Siriraksophon

1. INTRODUCTION/BACKGROUND

1.1 Situation analysis

Global demand of fish and fisheries products is increasing, especially in East and South East Asia where an expanding middle class is leading to increased fish consumption especially high-quality and high-value products as purchasing power rises. Asia is an important player on the world fish and seafood market, both as a producer/exporter and buyer. Southeast Asia alone already accounts for 50% of global seafood production¹. Within the region, fisheries contribute up to 10 percent of the gross domestic product (GDP). Expanding of regional trade in fisheries products is to some extent a result of the elimination of tariffs and quotas². As reported by FAO in 2012 that there were differences in fish consumption exist between the more-developed and the less-developed countries and the figure showed that developed countries have become increasingly dependent on fish imports to satisfy their demand³. In this connection, improvements in post-harvest technology and distribution have facilitated the movement of fish products from local consumption to international markets⁴. Even though, the Southeast Asian region is one of the main exporting fisheries products of the world and the ASEAN will soon offer zero duty for all fish products between years 2010 to 2015, non-tariff barriers (NTBs) (food safety regulations, quality standards, market-driven measures) are becoming major factors affecting regional and international trade². With that concerns ASEAN towards 2015 are on track to the full removal of NTBs as well as enhance transparency of non-tariff measures (NTMs) and work where possible having regional rules and regulations consistent with international best practices as stated in the Roadmap for an ASEAN Community 2009-2015⁵.

1.2 Stakeholder analysis

The key stakeholder of this project is the officials of fisheries-related agency of the Member Countries who involved/responsible in high-level management/authority in fisheries trade-related issues as well as fisheries foreign affairs. This group of officials will raise the priority issues that would have potentially impact to trade and fisheries management at the regional level. Emerging issues that would impact sustainable fisheries development will be identified and proactive actions including a regional policy

¹ <http://www.worldoffoodasia.com/index.php?q=seafood>

² R. Pomeroy, Y. T. Garcia, M. M. Dey, and L. R. Garces, 2007. "Regional Economic Integration of the Fisheries Sector in ASEAN Countries," paper presented at the International Conference on Fisheries and Poverty, April 10–11, 2007, Makati City, Philippines.

³ FAO, 2012. The State of World Fisheries and Aquaculture 2012. The Food and Agriculture Organization of the United Nations, Rome.

⁴ Yeap, S.E. and M.C.W. Chung, 2011. Ensuring quality and safety of fish and fisheries products through improved post-harvest technologies and safety management systems. *In*: Fish for the People Vol. 9 No. 2 (2011). Southeast Asian Fisheries Development Center, Bangkok, Thailand. p. 51-57.

⁵ ASEAN, 2009. Roadmap for an ASEAN Community 2009-2015. Accessed on 15 September 2013 available online: <http://www.aseansec.org/wp-content/uploads/2013/06/RoadmapASEANCommunity-2.pdf>

recommendation would be developed and the results would be reported to higher authority within the countries as well as reflected at relevant international fora where appropriate.

Target groups:

- **Officials** of fisheries-related agency of the Member Countries who dealing with the identified priority issues,
- **Fishing associations or private sectors** who will be affected from specific issue would be identified and invited during the consultation to share/find solution on such priority issues
- **Relevant international/regional organizations** which have relevant information would be invited to take part in the consultation *e.g.* INFOFISH, ASEAN Seafood Federation.

Beneficiaries:

- **Officials** would get benefit from the in-depth studies which will provide information on relevant issues;
- **Fisheries industries** would receive benefit from the improvement of fish trade regulations/fisheries management in a sustainable manner. Trade of fish and fishery products would be secured while coordination among fisheries-related authorities/sectors would be enhanced.

1.3 Problem analysis

Recognizing the issues on trade in fish and fish products as well as sustainable fisheries development are greatly discussed and driven by international market/organizations such as the UN General Assembly, WTO Sanitary and Phytosanitary (SPS) agreement, fisheries subsidies, catch certification, FAO Port State Measures Agreement, EC Regulations to combat illegal, unreported and unregulated (IUU) fishing, CITES, traceability, eco-labelling, etc. A number of international instruments have been agreed or enforced by international organizations could determine impacts on sustainable development of fisheries in the Southeast Asian region. Some specific market requirements including unjustified and/or improper application of NTMs would make difficulty or costly on importation or exportation of fishery products.

In response to this, SEAFDEC initiated this project to facilitate the discussion among countries concerned to not only reconcile the international driven issues with the promotion on sustainable fisheries development, but provide proactive assess/evaluate the regional impact and addressing the regional concerns to international fora. Through the technical consultation, the results of regional discussions and conclusion would be analyzed and came up with recommendations for national/regional action plan as well as the regional common/coordinated position to safeguard the interests of ASEAN-SEAFDEC Member Countries at the global fora.

1.4 Links to regional provisions

As indicated in the 2011 Resolution and Plan of Action (Res&PoA), SEAFDEC could play an important role in facilitating the discussion and possibly provide negotiating process for Member Countries in order that proactive or tackle measures could be settled. This is also to strengthen cooperation and mechanisms among Member Countries to work towards ASEAN common positions that could be reflected in international fish trade-related fora (ASEAN Economic Blueprint, and 2011 Res&PoA 69) as well as to engage the private sector (*e.g.* ASEAN Seafood Federation) in addressing trade-related issues, and in collaborative efforts to promote and sustain regional and international trade (2011 Res&PoA 70).

1.5 Links to the SEAFDEC Program Thrust

This project is in line with the SEAFDEC Program Thrust V: Addressing international fisheries related issues from a regional perspective. The project also aims to facilitate the discussion as well as development of common/coordinated approaches on important issues to be adopted regionally.

1.6 Links with other SEAFDEC's projects

This project links with other projects especially the project which have common issues to be raised at regional level *e.g.* the project on “*Promotion of Countermeasures to Reduce IUU Fishing Activities*” has the issues on the exchange of records and relevant information on fishing vessels 24 meters in length and

over among the Member Countries. During its Experts Group Meeting, this issue was requested for endorsement by the SEAFDEC Council for policy consideration and for information of the ASEAN Sectoral Working Group on Fisheries. This issue therefore is raised during the RTC for comment and provides views on sharing of information for the said fishing vessel record that would support the regional cooperation on Monitoring, Control and Surveillance (MCS) in order to mitigate IUU fishing particularly illegal fishing activities in the Southeast Asian region.

This project also links with the project on “*Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in the Southeast Asian Region*” which provides relevant data and information on the commercially-exploited aquatic species and threaten species. One of activities of this project supports the improvement of data collection of commercially-exploited aquatic species and threatens species which would improve the understanding on status and knowledge of these species. This information would be used for discussion during the RTC.

2. PROJECT (2013-2017)

2.1 Goal/Overall Objectives and Performance Indicators:

The overall objective of the project is to enhance capacity of the Member Countries to address and develop (pro) active action on international fisheries related issues as prioritized and identified by the Member Countries. The project keeps monitoring the emerging international fisheries related issues, meanwhile providing support to Member Countries through appropriate channels in order to reflect the regional collaborative efforts in managing fisheries and assists the Member Countries in developing regional common/coordinated positions, as well as push forward integration of views from fisheries agencies into those international instruments. The performance indicator of this project is therefore the use of information and recommendations developed in this project by the Member Countries. The Member Countries are requested to provide feedback on how they utilized the information and recommendations from this project in their own context.

Specific objectives:

- 1) Adopted regional policy recommendation on international fish trade-related issues
- 2) Adopted ASEAN-SEAFDEC common position and/or coordinated positions on specific issues of the International Fish Trade-related Issues; and
- 3) Encourage participation of the Member Countries in the international fish trade-related issues fora, such as CITES, important commercially-exploited aquatic species, etc., of which are related to the interests of SEAFDEC Member Countries.

2.2 Expected Outcomes and Outputs:

The expected outputs of the project are firstly the in-depth study on specific subjects as a basis for discussion to develop regional policy recommendation or ASEAN-SEAFDEC common position and/or coordinated positions on international fish trade-related issues. Secondly, the project aims to develop regional policy recommendations or ASEAN-SEAFDEC common position and/or coordinated positions on international fish trade-related issues. Thirdly, it is expected that participation of the Member Countries in the international fish trade-related fora, such as CITES. And finally, the expected outcomes of the project are that the Member Countries make use of information and recommendations developed in this project to enhance their capability especially in reflecting the interests of SEAFDEC Member Countries in such events.

2.3 Project Description/Framework

In order to deal with the international fish trade-related issues that may impacts to the fisheries sectors in the region, it is crucial for SEAFDEC to keep monitoring the emerging international fish trade-related issues and provide platform to ASEAN-SEAFDEC countries to discuss as well as develop the regional policy recommendation on the specific issues. In addition, some important issues it is needed to develop the ASEAN-SEAFDEC common position or coordinated position for further adoption by the SEAFDEC Council Directors. In 2014, the project focuses on the following aspects: 1) Follow-up and monitoring the

results from the CITES-CoP16; 2) Development of the International Guidelines for Securing Sustainable Small-Scale Fisheries; 3) Global Records and Regional Records; 4) Market driven measures; and etc. The project activities in 2014 are as follows:

Activity 1: Monitoring & Enhancing the Capacity on International Fish Trade-related Issues

In order to monitor and enhance the capacity on the current movement of the international fish trade-related issues, participation to the event concerns and in-depth study on specific subjects are needed. Updated information and current situation on the issues from the international events will be shared to all SEAFDEC Member Countries for their consideration and information. In 2014, SEAFDEC will monitor the status of following fish trade-related issues:

- 1) Status and trends of tuna resources focusing on bigeye and yellowfin tuna as well as related measures developed by RFMOs;
- 2) Capacity building to developing countries on improving of shark data collection and their conservation; and
- 3) Development of the common catch documentation system for ASEAN countries to enhance the intra-regional trade and may include international trades.

Activity 2: Developing the Regional Policy Recommendations, Common/Coordinated Position

This is the key activity of the project, SEAFDEC will provide platform for Regional Consultation Meeting or even Senior Official Meeting (if required) in order to discuss and consider the international fish trade-related issues in which may impacts to the development of fisheries and aquaculture in the Southeast Asian Region. The outputs from the RTC are the regional interest to be address at the International fora such as the draft of Regional Policy Recommendation, the ASEAN-SEAFDEC Coordinated Position and the ASEAN Common Position. This draft would be further submitted to the SEAFDEC Council Directors for endorsement and also submitted to ASEAN for Common Position. It is expected that in 2014 the following fish trade-related issues will be addressed at the ASEAN-SEAFDEC RTC for regional policy development:

- 1) Common interests concerned on the International Guidelines for Securing Sustainable Small-scale Fisheries;
- 2) Regional approach to combating IUU fishing: Port State Measures, Flag State Control;
- 3) Regional approach on Commercially-exploited Aquatic Species: tuna, sharks; and
- 4) Others

Activity 3: Information and Dissemination of the Project Results

The outputs from the project such as regional policy recommendations, ASEAN-SEAFDEC Coordination Positions and ASEAN Common Position will be disseminated and promoted. It is expected that such outputs will be concluded and be addressed at the international fora as well as further implementing by the Member Countries.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Activities	Achievements
Activity 1. Monitoring & Enhancing the Capacity on International Fish Trade-related Issues	
1.1) In depth study	<ul style="list-style-type: none"> - Reviewing on tuna fisheries resources in the Southeast Asian region - Study on regional approach to promote the sustainable tuna fisheries in the Southeast Asian region - Study on requirement for ASEAN Catch Certification to support intra-regional trade in the Southeast Asian region - Analysis on requirement of the Regional Fishing Records to support combating IUU fishing in the region - Reviews the proposed proposal from CITES parties on listing of sharks and freshwater string ray in the CITES appendices and coordinate with SEAFDEC Member Countries on the detailed proposal
1.2) Participation in the international events	- The CITES-CoP16 held in Bangkok, Thailand from 3-14 March 2013. During the meeting SEAFDEC supported 1 Brunei Darussalam, 2 Cambodia, 1 Indonesia, 1 Malaysia, 1 Myanmar, 1 Philippines, 1Thailand, 1Vietnam to

Activities	Achievements
	<p>participate in the meeting which aimed to increase the lesson learned on the CITES procedure on voting and discussion on each proposal concerned commercially –exploited aquatic species. SEAFDEC coordinated with all ASEAN Member Countries to strengthen the ASEAN-SEAFDEC Common Positions on Sharks, Freshwater stingrays and CITES rule 25. SEAFDEC also developed e-news to update Member Countries day by day meeting results.</p> <ul style="list-style-type: none"> - The FAO Technical Consultation on International Guidelines on Securing Sustainable Small-scale Fisheries convened in FAO, Rome from 20-14 May 2013. The consultation could not complete and needed to resume the meeting in other session. However, almost 50% of the draft texts were agreed. The results from this will be informed to the next FCG/ASSP for consideration and seek opinion to develop regional common interests to be inputs at the next FAP session meeting. The meeting was participated in by representatives from Indonesia, Japan, Malaysia, Philippines, Thailand and Vietnam. - The Ninth Session of the Scientific Committee of the WCPFC was held in Pohnpei, Micronesia from 6-14 August 2013 with the aims to be updated on the status of tuna resources and management measures by WCPFC. The summary report related to the Southeast Asian tuna resources will be developed and presented to Member Countries during SEAFDEC relevant meetings. The meeting was participated in by representatives from Indonesia, Japan, Philippines, Thailand and Vietnam.
1.3) Technical meeting	- No activities
Activity 2. Developing the Regional Recommendations, Common/Coordinated Position	
2.1 Review important international fisheries-related issues to be addressed by the ASEAN	<ul style="list-style-type: none"> - SEAFDEC developed the executive summary on the important International Fisheries-related Issues for 2013-14 based on the RTC on International Fisheries-related issues held in late 2012 and other SEAFDEC meetings on IUU fishing, Catch Certification, etc. Regarding this the executive summary reports were included three main issues namely: 1) Common Position on CEAS; 2) Concept note on Development of the ASEAN Catch Documentation System; and 3) Concept note on the Establishment of the Regional Fishing Vessels Record for 24 m in length and over. - The Executive Summary report was presented to the 45th SEAFDEC Council Meeting, and 21st ASWGFi Meeting for their endorsements.
2.2 Conduct ASEAN-SEAFDEC Regional Consultation on Common/Coordinated Position of the Commercially-exploited Aquatic Species (CEAS) at the CITES-CoP16	<ul style="list-style-type: none"> - The Regional Consultation on the ASEAN-SEAFDEC Common Positions for the Commercially-exploited Aquatic Species to be addressed at the CITES CoP16 was organized on 22 January 2013 in Bangkok, Thailand. The meeting was attended by the SEAFDEC Council Directors, Alternate Council and senior officials. - The output from the meeting was the ASEAN-SEAFDEC Common Positions on Sharks and Freshwater stingray that were proposed to be listed in the CITES Appendices.
Activities 3. Information & Dissemination of the Results of SEAFDEC-JTF Project	
3.1 Drafting Project Results	<ul style="list-style-type: none"> - Reviewed paper on tuna fisheries resources in the Southeast Asian region - Developed policy paper on Regional Cooperation to Promote the Sustainable Tuna Fisheries in the Southeast Asian Region - Developed Concept note on ASEAN Catch Certification (in later called ASEAN Catch Documentations system) for consideration by 45th Council Meeting and 21st ASWGFi meeting
3.2 Production and Dissemination of the outputs/outcomes	<ul style="list-style-type: none"> - Developed concept note for Regional Fishing Records for vessels 24 m in length and over for consideration by 45th Council Meeting and 21st ASWGFi meeting. - Reviewed CITES issues on Commercially-exploited Aquatic Species especially on sharks - Developed Executive Summary on the International Fish Trade-related Issues for 2013-2014 (included the results of CITES-CoP16, Development of ASEAN Catch Certification Concept Note, and Development of Regional Fishing Records of Vessels 24 m in length and over. This issue was proposed for endorsement by the 21st ASWGFi in July 2013.

3.2 Evaluation of the Project Outcomes Till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme: Assistance for Capacity Building in the Region to Address International Trade-related Issues
(2) Issues in the region at the beginning of the study:
- Required cooperation among ASEAN-SEAFDEC Member Countries and developing the ASEAN-SEAFDEC Common/Coordinated Positions in order to address the Regional interests and concerns related at the International Fish Trade-related Issues fora.

3.2.2 Expected Final Goal of the Project:

- Better understanding of the international fish trade-related issues by the SEAFDEC Member Countries to meet the requirement of the international measures and secure the sustainable development of fisheries in the region.
- Regional cooperation dealing with international fisheries-related issues are strengthened
- ASEAN-SEAFDEC Common Positions on the fisheries-related issues.

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: In depth studies based on identified issues addressed by International fora on fish trade and environmental task-related issues
- To clarify the urgent issues addressed by the International organizations on fish trade and environmental task-related issues
- Information collection via internet or/and participation to the international fora/ meetings
- To have in depth studies on the specific measures/impacts which could be made directly to the southeast Asian Region or/and Japan as SEAFDEC Member Countries
- To consult with external experts on the specific issues for preparing the input and provide information to all Member Countries
Step 2: Regional Technical Consultation on the international fish trade and environmental task-related issues
- At least once a year the Regional Technical Consultation on the International Fish trade and Environmental Task-related Issues will be organized in order to seek policy recommendation on the specific issues and endorse to SEAFDEC Councils
Step 3: Raising the Policy Recommendation to ASEAN Sectoral Working Group on Fisheries for their consideration and discussion for the Region common position to meet/due on the issues.
Step 4: Publicize the progress/policy recommendation

3.2.4 Activities in the Current Project:

(1) Current position of the project: Step 3 and 4 (this is yearly basis results)
(2) Program duration: 2013-2017
(3) Main activities:
- Completed activities 1-2
- On going under the Activities 3-4

3.2.5 Progress and Achievements of the Current Project:

(1) Activities conducted in the current project Activities 1-3
(2) Achievements at this moment
1. Reviewed paper on tuna fisheries resources in the Southeast Asian Region
2. Developed policy paper on Regional Cooperation to promote the sustainable tuna fisheries in the Southeast Asian Region
3. Developed Concept note on ASEAN Catch Certification (in later called ASEAN Catch Documentations System) for consideration by 45 th Council Meeting and 21 st ASWGFi Meeting
4. Developed concept note for Regional Fishing Records for vessels 24 m in length and over for consideration by 45 th Council Meeting and 21 st ASWGFi Meeting.

5. Reviewed CITES issues on Commercially-exploited Aquatic Species especially on sharks 6. Developed Executive summary on the International Fish Trade-related Issues for 2013-2014 (included) <ul style="list-style-type: none"> a. The results of CITES-CoP16, b. Development of ASEAN Catch Certification Concept Note, and c. Development of Regional Fishing Records of Vessels 24 m in length and over. These issues were endorsed by the 21 st Meeting of the ASWGF in July 2013.	
(3) Expected output/outcome during the project period and expected achievement rate till next year	
Expected output/outcome	Achievement rate in 2013 (%)
In-depth study on <ul style="list-style-type: none"> - Review paper on Tuna Fisheries resources in the Southeast Asian Region - Concept note on ASEAN Catch Certification (in later called ASEAN Catch Documentations System) - Review paper on CITES issues on Commercially-exploited Aquatic Species especially on sharks - Concept note for Regional Fishing Records for Vessels 24 m in length and over 	100
Adoption of regional policy recommendations on international fish trade-related issues <ul style="list-style-type: none"> - Regional Cooperation to Promote the Sustainable Tuna Fisheries in the Southeast Asian Region - ASEAN Catch Documentations System - Regional Fishing Records for Vessels 24 m in length and over - Executive Summary on the Important International Fisheries-related Issues for 2013-14 	100
Adoption of ASEAN-SEAFDEC common position and/or coordinated positions on specific issues of the International Fish Trade-related issues <ul style="list-style-type: none"> - Common Position of the ASEAN-SEAFDEC Member Countries on Proposed listing of Commercially-exploited Aquatic Species (CEAS) for CITES-CoP16 - Common Position of the Countries on the Proposed Amendment of the Rules of Procedure of the Conference of the Parties 	100
Encourage participation in the international fish trade-related issues fora, such as CITES, important commercially-exploited aquatic species, etc., of which are related to the interests of SEAFDEC Member Countries	100
Use of information and recommendations developed in this project by the Member Countries	Will be reported in 2014

3.2.6 Evaluation of Project Activities in 2013:

The project outputs on development of in-depth studies as well as adoption of regional policy recommendations and ASEAN-SEAFDEC common position and/or coordinated positions were achieved while the utilization of information and recommendations developed by this project will be evaluated and reported in 2014.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Activities	Implementation Plan
Activity 1. Monitoring & Enhancing the Capacity on International Fish Trade-related Issues	
1.1) In depth study	<ul style="list-style-type: none"> - The identified issues to be included in the project for further regional policy development will be discussed with ASEAN Lead Country and other SEAFDEC Member Country. - It is expected that the priority issues to be studied include: 1) Regional inputs on the drafted International Guidelines for SSF; 2) Tuna regional cooperation for sustainable fisheries focusing neritic tuna in the Southeast Asia; 3) Development of Catch Documentation System; 4) follow up the Regional

Activities	Implementation Plan
	approach on sharks management and improving data collection, etc.
1.2) Participation in the international events	- SEAFDEC will enhance visibility of SEAFDEC and addressed our interest/ regional position based on the requests by SEAFDEC Member Countries at the international fora such as FAO-COFI, CITES-Animal Committee. The outcomes from this participation will be shared to SEAFDEC Member Countries.
1.3) Technical meeting	- The internal discussion/ meeting will be conducted to conclude the reviewed works.
Activity 2. Developing the Regional Recommendations, Common/Coordinated Position	
2.1 Reviews the Issues to be addressed by the ASEAN on International Fisheries Related Issues	- SEAFDEC will organize a Regional Technical Consultation (RTC) on International Fisheries-related Issues in early of 2014, to review up-coming critical trade-related issues especially those identified at the Meeting of ASEAN-SEAFDEC Strategic Partnership and Fisheries Consultative Group (FCG) as well as directives given by SEAFDEC Councils and ASWGFi. The meeting will invite all ASEAN-SEAFDEC Member Countries, resource persons, SEAFDEC relevant departments and ASEAN Secretariat
2.2 Conduct the <i>ad hoc</i> CITES CoP16	- No <i>ad hoc</i> meeting
Activities 3. Information & Dissemination of the Results of SEAFDEC-JTF Project	
3.1 Drafting Project Results	- The results on regional policy guidance and common positions on international fisheries-related issues will be concluded and published for distribution to all Member Countries.
3.2 Production and Dissemination of the outputs/outcomes	- Executive summary on the International Fish trade-related Issues for 2014-2015 will be developed - List of other concept note of specific issues will be developed for further consideration by above fisheries authorities.

4.2 Expected Outcomes/Outputs of the Year 2014

In 2014, the project will focus and expect to develop policy recommendations on the issues as follows: 1) Regional inputs on the drafted International Guidelines for SSF; 2) Draft Tuna regional cooperation for sustainable fisheries focusing neritic tuna in the Southeast Asia; 3) Draft Catch Documentation System; and 4) Draft Regional approach on sharks management and improving data collection. The project will also compile information from the Member Countries on their utilization of the previous recommendations developed in 2013.

PROJECT DOCUMENT

			Project id: 051302
Program Category:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Strengthening SEAFDEC Network for Sustainable Fisheries		
Program Thrust:	V	Total Duration:	5 years 2013-2017 ¹
Lead Department:	SEAFDEC Secretariat	Lead Country:	Indonesia
Project Sponsor:	Japanese Trust Fund	Project Partner:	none
Propose Budget:	USD 56,500 (2014)	This year budget:	2013 USD 55,500
Prepared by:	Ms. Suwanee Sayan Policy and Program Officer II	Project Leader:	Dr. Somboon Siriraksophon Policy and Program Coordinator

1. INTRODUCTION

SEAFDEC have been working on the promotion of Sustainable Fisheries Development in the Southeast Asian Region for more than 4 decades since established. The SEAFDEC program frameworks to support Member Countries has been significantly changed in 1998 when SEAFDEC adopted the Resolution on SEAFDEC Strategic plans at the 30th Meeting of the SEAFDEC Council and more clear after the new millennium in 2001 when ASEAN-SEAFDEC adopted the Resolution and Plan of Action on Sustainable Fisheries for Food Security in the ASEAN Region as well as the new decade Resolution and Plan of Action on Sustainable Fisheries for Food Security toward 2020 in 2011 as a policy framework for SEAFDEC and Member Countries. To support the implementation of the Resolution and Plan of Actions, taking into account environmental changes and many policy emerging issues pressing at global and regional levels including the problems of IUU fishing, SEAFDEC therefore proposes a continuing project to strengthening SEAFDEC network among ASEAN countries in order to move forwards on sustainable utilization of fisheries resources in the Region. In conjunction to this, the strengthening cooperation within the region and Member Countries needed to be strengthened and included in the project framework in order to share and exchange information and transferring messages/information to work together to meet the final goal of the ASEAN-SEAFDEC Resolutions and Plan of Action that has been committed by all Member Countries.

In addition, to ensure that proposed activities to support Member Countries could meet the final goal as proposed, the monitoring and evaluation of overall SEAFDEC programs particularly Japanese Trust Fund Projects will be strengthened. The regional outputs and publications from SEAFDEC activities could be published/disseminated and shared among Member Countries and among regional and international level through the quarterly magazine or specific publication including SEASOFIA.

2. PROJECT

2.1 Goals and Objectives:

Goal:

- 1) Strengthening effective network/framework among all ASEAN Member Countries for regional cooperation;
- 2) Strengthening collaborative research program with other international and regional organization(s) to share the regional interests meanwhile understand the regional and global situations;
- 3) Strengthening capacities of the Regional Fisheries Policy Network to facilitate the analysis of national issues into regional analysis;
- 4) Facilitating the evaluation of the SEAFDEC-JTF projects to ensure the results meet the goals and in line with the Resolution and Plan of Action; and
- 5) Publicizing the results of SEAFDEC-JTF projects into SEAFDEC publication(s) such as Fish for the

¹ Continued project under the *Japanese Trust Fund II: "Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishin- related Countermeasures" from 2011-12*

People, etc.

2.2 Expected Outcomes and Outputs:

Outcomes:

- 1) Long term effective coordinating mechanism among SEAFDEC and Member Countries through the Regional Fisheries Policy Network (virtual RFPNs); and
- 2) Long term benefit from effective SEAFDEC programs implementation through the ASEAN Lead Countries coordination mechanism.

Outputs:

- 1) Compiled results of the Japanese Trust Fund for 2013; and
- 2) SEAFDEC publication on SEAFDEC project implementation to promote sustainable fisheries in the region such as Fish for the People.

2.3 Project Description

Dealing with the international and regional fisheries related issues which might affects to national/regional concerns on sustainable development of fisheries and aquaculture, therefore it is needed to strengthen the SEAFDEC network not only among the Member Countries but to the Regional and International Organizations. To strengthen the SEAFDEC network and enhance cooperation from Member Countries meanwhile ensuring the activities meet the Member Countries requirements, therefore the project is designed to implement three main activities as follows:

Activity 1: Enhancing Regional Coordination and Collaboration Mechanism

There are two sub-activities namely: 1) to support the Regional Fisheries Policy Network (RFPNs) who are young and potential fisheries officer from ASEAN Member Countries to work together at SEAFDEC/secretariat by sharing and updating the situation of national policy emerging and management framework as well as enhancing the capacity of RFPNs to work on the regional issues, and coordinating between SEAFDEC and home country; 2) to strengthen the role of ASEAN Lead Countries under the collaborative program of the AFCF mechanism. It is expected that regional program implementing by SEAFDEC should be coordinated with lead countries to ensure highest benefit of the activities meet the requirement of region. Through the communication with Lead Country, and support from ASEAN countries during the ASEAN forum, ASEAN Lead Countries could play the role to lead discussion and support the project.

Activity 2: Monitoring and Evaluation of the SEAFDEC-JTF Programs

Aside from the SEAFDEC program committee meeting, to monitor and evaluate SEAFDEC-JTF program/activities are in line with the requirement of Member Countries which should be linked to the Implementation of the Resolution and Plan of Action and SEAFDEC Program Framework. The evaluation will be conducted by invited external experts who have experienced on fisheries in the Southeast Asian fisheries, through the seminar/meeting. It is envisaged that the outputs from evaluation would better support Member Countries in formulation of the next calendar work. The scope of work on the evaluation process under this activity will cover all projects in the component title: Promotion on Sustainable Fisheries in the Southeast Asia, regarding this to support the monitoring and evaluation process, project goals and objectives should be clear. Evaluation process, principally will include: 1) establishing standard/criteria (performance measures); 2) plan appropriate evaluation design; 3) data gathering method and data analysis; and 4) report and feedback results to Member Countries.

Activity 3: Information and Dissemination of SEAFDEC-JTF Project Results

This activities aims to compile all SEAFDEC-JTF project outputs/outcomes for further dissemination through promotional media, online website and SEAFDEC Publications. In addition, the project will support SEAFDEC publications/magazines such as Fish for the People; the quarterly fisheries magazine and the SEASOFIA in order to enhance it's visibility to the Member Countries, regional and international arenas.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Activity Title	Duration	Remarks/ Outputs
Activity 1: Enhancing Regional Coordination and Collaboration Mechanism		
<p><i>1.1 Strengthening Regional Fisheries Policy Network (RFPN)</i></p> <p>1. 3 Regional Fisheries Policy Network (RFPNs) for Cambodia, Lao PDR and Vietnam support SEAFDEC regional activities and coordinate with home country.</p> <p>2. Attended the ASEAN-SEAFDEC Meetings held in Thailand such as</p> <ul style="list-style-type: none"> - Regional Consultation on ASEAN Common Position for CEAS to be addressed at the CITES-CoP16, - Live Reef Fish Food Trade Inter-Governmental Forum - SEAFDEC Program Reviews under the JTF - International Seminar on JSPS Asia-Africa Science Platform Program on Marine Fisheries Policy in the Southeast Asia - CITES CoP16 - SEAFDEC-Sida Seminar/ Workshops <p>3. Regional Training/Workshop</p> <ul style="list-style-type: none"> - Regional Training Workshop on Optimizing Energy and Safety at Sea for Small-scale Fishing Vessels - 2nd On-site training on facilitating fisheries information gathering through introduction of Community-based Fisheries Management - Excursion to the coastal areas provinces and Cambodia bordering, including fish landings, etc.. 	Jan - Dec	<p>1. Enhanced the capacity and knowledge of 3 officers from Cambodia, Lao PDR and Vietnam through their participation in many Regional Meetings</p> <p>2. Strengthen the cooperation with others Regional Organizations e.g. CTI-CFF, Japanese Institutions (Hokkaido university)</p>
<p><i>1.2) Strengthening ASEAN Lead Countries Coordination</i></p> <p>1. Activity will start from August 2013</p>	August	
Activity 2: Monitoring and Evaluation of the SEAFDEC-JTF Programs		
<p><i>2.1 & 2.2) Monitoring and Evaluation of the Project Activities</i></p> <ul style="list-style-type: none"> - SEAFDEC developed the Tri-annual monitoring system in order to follow the progress and achievement of project activities every 4 months starting as suggested by Member Countries, However, the final annual achievement will be compiled in January of the following year, for preparation of the report to SEAFDEC Council. - SEAFDEC also organized the Meeting on Review of the Japanese Trust Fund Program for 2013 and Onward from 28 February-1 March 2013, at Jasmine Hotel, Bangkok, Thailand. With the aims to review and evaluate SEAFDEC programs under the Japanese Trust Fund which had been completed in 2012 and to discuss the proposed new project proposals under Japanese Trust Fund V starting from 2015. The evaluation report of SEAFDEC JTF project is circulated to all Departments for their consideration and improvement to meet the requirement of Member Countries. 	28 Feb -1 Mar 2013	<ul style="list-style-type: none"> - Tri-annual report of all SEAFDEC projects. - Project Evaluations for selected Japanese Trust Fund Projects (from the external evaluators).
Activity 3: Information & Dissemination of the Results of SEAFDEC-JTF Project		
<p><i>3.1) Compilation of the outputs/outcomes of SEAFDEC-JTF Project</i></p> <ul style="list-style-type: none"> - This activity will be started in November 2013, after the Program Committee Meeting 	Nov	On-going Will be finalized after 36 th PCM
<p><i>3.2) Productions and Dissemination of the Special Publication</i></p> <ul style="list-style-type: none"> - Fish for the People 2 volumes has been published and distributed. 	Jan- October	<p>1.2 Volumes of the Fish for the People were published and disseminated;</p> <p>2. 3rd Volume is on preparation.</p>

3.1 Evaluation of the Project Outputs Till the Year 2013

3.1.1 Theme and issues:

(1) Theme: Strengthening the Promotion of Sustainable Fisheries
(2) Issues in the region at the beginning of the study:
<ul style="list-style-type: none"> - Required cooperation among ASEAN-SEAFDEC Member Countries in order to work together to safeguard the ASEAN-SEAFDEC interests and ensure sustainable fisheries that could protect region from outside pressures. - Capacity building for young ASEAN officers to better understand the regional activities /programs for future cooperation.

3.1.2 Expected final goals of the project:

<ul style="list-style-type: none"> - Long term effective SEAFDEC network among ASEAN-SEAFDEC Member Countries dealing on the sustainable fisheries (including Aquaculture). - Highest benefit from the implementation of regional SEAFDEC-JTF Programs - Created SEAFDEC visibility on sustainable fisheries development at regional and international levels
--

3.1.3 “Steps” toward achieving final goals:

Step 1. Enhancing the International and Regional Coordination
1.1) Support/establish the Regional Fisheries Policy Network (RFPNs)
1.2) Strengthening ASEAN Lead Countries Coordination
Step 2. Monitoring and Evaluation of the SEAFDEC-JTF Programs
2.1) Monitoring SEAFDEC-JTF project/ activities
2.2) Conduct the evaluation meeting
Step 3. Information & Dissemination of the Results of SEAFDEC-JTF Project
3.1) Compilation of the outputs/outcomes of SEAFDEC-JTF Project
3.2) Productions and Dissemination of the Special Publication: Fish For the People, SEASOFIA, Newsletters, etc.

3.1.4 Activities in the current project:

(1) Current position of the project: 1-2 (yearly basis Activities)
(2) Program duration: 2013-2017
(3) Main activities:
<ul style="list-style-type: none"> - Evaluation of the SEAFDEC programs under the JTF and enhancing the RFPNs from 8 countries to know regional programs and support in implementation, coordination.

3.1.5 Progress and achievements of the current project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> - 1-3 (on-going) 	
(2) Main achievements till the end of 2013 (tentative)	
<ul style="list-style-type: none"> - Evaluation Report of the SEAFDEC JTF Programs Reviews 	
(3) Outputs during the project period and expected achievement rate till the end of 2013 (tentative)	
Expected Outputs	Achievement rate (%)
<ul style="list-style-type: none"> - Long term effective SEAFDEC network among ASEAN-SEAFDEC Member Countries dealing on the sustainable fisheries (indicator: RFPNs increased their ability and understand regional works). 	70%
<ul style="list-style-type: none"> - Highest benefit from the implementation of regional SEAFDEC-JTF Programs (involvement of ASEAN Lead Countries) 	0 (start August 13)
<ul style="list-style-type: none"> - Created SEAFDEC visibility on sustainable fisheries development at regional and international levels 	50%

3.1.6 Evaluation of project activities in 2013

- This project would enhance the capacity and knowledge of Representative Officers called RFPNs to better understand the Regional works and observe the international issues related to fisheries. This would be long term benefit/impact to the selected officers and indirectly to the Country;
- The project also strengthens the coordination mechanism between SEAFDEC and Member Countries in near future.
- SEAFDEC publications *e.g.* Fish for the People, SEASOFIA from the project implementation are useful to support and promote the sustainable fisheries concept in the region.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

The project will be implemented through the following activities and sub-activities:

Activity 1: Enhancing Regional Coordination and Collaboration Mechanism

1.1) Support the Regional Fisheries Policy Network (3RFPNs)

In 2014, Japanese Trust Fund continued to support 3 RFPNs from each country namely Cambodia, Lao PDR and Myanmar to work and learn on regional and international fisheries related issues. In addition it is noted that the other 5 countries RFPNs (*i.e.* Thailand, Indonesia, Malaysia, Myanmar and the Philippines) will be supported by SEAFDEC-Sida Project. The scope of activities for RFPN is only limited to national issues, but their task force will cover the Regional/international fisheries-related issues to support the overall coordination between SEAFDEC and Member Countries. Specific regional outputs from country inputs will be promoted in the Region.

1.2) Strengthening ASEAN Lead Countries Coordination

In order to enhance the cooperation among SEAFDEC and Member Countries on the ASEAN-SEAFDEC project under the AFCF mechanism by ensuring the highest benefit will meet the requirement of Member Countries. Therefore strengthening the role of ASEAN lead countries of each AFCF project are needed. There are many issues in 2014 that SEAFDEC requires ASEAN lead countries to lead and support the regional policy proposal for endorsement at the higher fisheries authority such as ASWGF_i, SOM-AMAF, and AMAF. Therefore working together with ASEAN Member Countries through coordination with the ASEAN Lead Countries is needed.

Activity 2: Monitoring and Evaluation of the SEAFDEC-JTF Programs

2.1) Monitoring SEAFDEC-JTF project/ activities

In 2014, SEAFDEC continues work in closed communication with the technical Departments and responsible person for each SEAFDEC-JTF project, the update/progress/outputs of the project activities will be monitored and compiled as the package results for 2014, this progress information package will be submitted to the PCM for information and reference.

2.2) Meeting on SEAFDEC-JTF Projects Evaluation

SEAFDEC will organize the evaluation meeting in the first quarter of 2014, to evaluate and comment on the progress work including planning for the following year of the SEAFDEC Projects under the Japanese Trust Fund support. The external evaluators will be invited who know well on fisheries issues in the Southeast Asian.

Activity 3: Information & Dissemination of the results of SEAFDEC-JTF Project

3.1) Compilation of the outputs/outcomes of SEAFDEC-JTF Project

In the 4th quarter of the year, SEAFDEC will compile all the progress and results of the implementations. The outputs of the results will be disseminated to all Member Countries and Donors for their consideration.

3.2) *Productions and Dissemination of the Special Publication*

Based on the project implementations, the good project results are encouraged to publish in the SEAFDEC publications such as Fish for the People, SEAFDEC Newsletters, and SEASOFIA.

4.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Enhancing Regional Coordination and Collaboration Mechanism		
Sub-activity 1.1 Support the Regional Fisheries Policy Network (RFPNs)	Jan-Dec	
Sub-activity 1.2 Strengthening ASEAN Lead Countries Coordination	Feb-Oct	
Activity 2: Monitoring and Evaluation of the SEAFDEC-JTF Programs		
Sub-activity 2.1 Monitoring SEAFDEC-JTF project/ activities	Jan-Oct	
Sub-activity 2.2 Conduct the SEAFDEC-JTF Program Evaluation Meeting	Jan-Mar	
Activity 3: Information & Dissemination of the Results of SEAFDEC-JTF Project		
Sub-activity 3.1 Compilation of the outputs/ outcomes of SEAFDEC-JTF Project	Sep-Dec	
Sub-activity 3.2 Productions and Dissemination of the Special Publication: Fish For the People, SEASOFIA, etc.	Mar, Jun and Sep-Dec	

4.2 Expected Outputs in the Year 2014

<ul style="list-style-type: none"> - Capacity of the RFPNs on regional and international issues are increased; - Cooperation among ASEAN Member Countries through the RFPNs mechanism are increased; - The outputs of all SEAFDEC projects are compiled; - The results of SEAFDEC projects are disseminated to all Member Countries; and - SEAFDEC Visibility are increased.

PROJECT DOCUMENT

Project id: 051303			
Program Categories:	Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism		
Project Title:	Fisheries and Habitat Management, Climate Change and Social Well-being in Southeast Asia		
Program Thrust:	Special Programs	Total Duration:	5 years (2013-2017)
Lead Department:	SEAFDEC/Secretariat	Lead Country:	Thailand
Project Sponsor:	Sida (through the Embassy of Sweden, Bangkok)	Project Partner:	BOBLME, CTI-CFF, FAO/APFIC, MRC, UNEP
Proposed Budget:	Total budget of 5 years, 48 Millions SEK	This year budget:	8,000,000 SEK (Approx 1,189,143 USD)
Prepared by	Ms. Pattaratjit Kaewnuratchadasorn SEAFDEC-Sida Project Manager	Project Leader	Ms. Pattaratjit Kaewnuratchadasorn SEAFDEC-Sida Project Manager

1. INTRODUCTION/BACKGROUND

In Southeast Asia, environmental degradation, overcapacity (illegal and destructive fishing) and threats from climate variability and climate change are seen as the significant problems for fisheries and aquatic habitats, threatening their sustainability and the livelihoods of the millions of people dependent on these resources. Through earlier Sida support, SEAFDEC in cooperation with the ASEAN (under the ASEAN-SEAFDEC Strategic Partnership (ASSP)) and the ASEAN countries have been implementing regional collaborative programs to clarify regional policies and priorities as well as to support national efforts in addressing habitat and fisheries management and the management of fishing capacity.

The new phase of project (2013-2017) is building upon the earlier work done under the SEAFDEC-Sida cooperation. The ultimate targets of the Project are the poor coastal and inland communities who continue to experience declining catch as well as increased competition and conflict over natural resource use and space in coastal and inland waters of Southeast Asia. Many of these communities are faced with increased exposure to natural hazards, climate variability and effects of climate change. In a broader context, beneficiaries will also include staff of governments (local and central), NGOs, and international and regional organizations. The beneficiaries will be provided with support and guidance through collaborative arrangements supported by SEAFDEC-Sida, in the process of developing better management of fisheries and important habitats in national and sub-regional contexts.

The basic strategy of the SEAFDEC-Sida project is to build upon the expressed needs to improve social well-being and environmental health, by promoting processes to improve the management of fisheries, fishing capacity and better management of aquatic environments and habitats of importance for key species. To incorporate all relevant aspects (social, governance and aquatic resources/environment), an ecosystems approach will be applied. This includes management matters, such as (larger) fish resources conservation areas (*e.g.* building upon MPAs, *refugia*, etc.), management of fishing capacity (combating IUU Fishing), social mobility and conflicts, etc. The perspective include the establishment of sub-regional agreements or other arrangements of relevance to fisheries and habitat management in the Gulf of Thailand; Andaman Sea and to support processes for the cooperation among countries in the Sulu-Sulawesi Seas and the Mekong River Region.

As part of the SEAFDEC-Sida Project Strategy, the project will not be implemented by SEAFDEC in isolation but will rely on cooperation with other regional/international and national bodies. In order to address issues related to the management of important habitats for fisheries, fishing capacity and socio-cultural aspects, SEAFDEC will work closely with institutions and organizations that are well placed to facilitate and support provincial and district capacity-building. The strategy also involves capacity building

for better management, including the capacity to engage more effectively with villagers in ASEAN-SEAFDEC Member Countries (plus Timor-Leste), which implies the involvement of broad stakeholder participation.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

Long-term sustainability of aquatic resources utilization/fisheries and reduced vulnerability to impacts of climate change of people dependent on aquatic resources/fisheries for their livelihoods in the ASEAN region

Performance indicators will include:

- Number of people involved in capacity-building and information sharing events
- Number of institutions and regional partners involved in developing concerted efforts
- Names and positions of resource persons
- Number of (documented) events in the region, sub-regions and on-site with partners
- (Draft) plans and agreements, including plans and maps of larger fisheries resources conservation areas
- Documented sets of information, background and baselines
- Documented recommendations and decisions, from sub-regional events and through responses from ASEAN bodies
- The recognition of results by ASEAN, APFIC, SEAFDEC, RPOA, etc. as reflected in reports from each organization
- Number of people involved in dialogue with ASEAN and ASEAN Secretariat and related bodies and institutions
- Documented cooperative frameworks and agreements

2.2 Expected Outcomes and Outputs:

- 1) Capacity built for integration of habitat & fisheries management and adaptation to climate change;
- 2) Capacity built and systems improved for the management of fishing capacity (monitoring; record and control); and
- 3) Capacity built and policy development processes improved for the drafting and implementation of regional & sub-regional agreements.

2.3 Project Description/Framework

For the purpose of implementation and follow up, activities will be planned under five “sub-components”, or output groups. This will allow for the cross-referencing (*i.e.* gender, health, environment, climate change and capacity building) between components, when assessing the results and related outcomes. Results, outcomes or outputs will be reported with reference to expected outcomes in achieving the objectives.

- 1) Integration of habitat and fisheries management
- 2) Monitoring, Record and Control – *large-scale* and *small-scale* (coastal/inland) fishing
- 3) Local knowledge, cross cutting issues (climate change, social well-being) and safety at sea/working conditions
- 4) Policy dialogue and promotion of regional cooperation on fisheries and habitat management
- 5) Project Management and Coordination

The geographical coverage includes four sub-regions (Andaman Sea, Gulf of Thailand, Sulu-Sulawesi Seas and the Mekong, the SEAFDEC-Sida project has been successful in follow up with each of the sub-regions to further develop cooperative dialogue and action. The perspective include the establishment of sub-regional agreements or other arrangements of relevance to fisheries and habitat management in the Gulf of Thailand; Andaman Sea and to support processes for the cooperation among countries in the Sulu-Sulawesi Seas and the Mekong River Region.

Process results and outcomes and indicators on positive achievements and impacts would, to a large extent be reflected in indications and reports from bodies, and individuals outside of the project, *i.e.* SEAFDEC Council, ASEAN, FAO/APFIC, RPOA, BOBLME, etc., in recognition of steps being taken and impacts achieved.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities in the Year 2013

Activity Title	Duration	Remarks
Major events organized in 2013		
1. International Forum on Live Reef Fish Food Trade, Bangkok	31 Jan-1 Feb 2013	With CTI-CFF and USAID
2. Introduction of the new SEAFDEC-Sida Cooperation 2013-2017	12 Mar 2013	
3. SEAFDEC-Sida Project Annual Review Meeting	14 Mar 2013	
4. Study trip and preparation for on-site events and bilateral dialogue to Eastern Coast of the Gulf of Thailand and Koh Kong Cambodia	April-August 2013 2-6 July 2013	
5. On-the-Job Training Workshop on Project Designing, Monitoring and Evaluation (using the Result-Based Management)	4-7 Sept 2013	
6. The Consultative Meeting on Regional Cooperation on Neritic Tuna Fisheries in Southeast Asian Waters	8-10 Oct 2013	
7. Field-level work: Sub-contracts drafted and/or signed for field work and capacity-building in follow-up to requests from Member Countries and as recommended during sub-regional consultations. Cambodia and Thailand, Myanmar being discussed	June – October 2013	
8. Participation in the following events:		
- Consultation on the Establishment of Inland Fisheries and Development Center, Palembang, Indonesia	23-26 Jan 2013	
- Potential Intervention for Protection of Transboundary Indochina Mangrove Ecosystems, Phuket	15 Feb 2013	
- 4 th BOBLME Project Steering Committee Meeting, Chennai, India		
- 45 th Meeting of SEAFDEC Council, Cebu city, the Philippines	20-21 Mar 2013	
- National Workshop on Developing MPA Network in Vietnam: Status and Challenges, Vietnam	1-5 Apr 2013	
- FAO/RPOA Expert Workshop on the Development of Tools to Combat IUU Fishing the Comprehensive Global Record of Fishing Vessels	6-8 June 2013	
- The Regional Workshop on Public Information Campaign	25-26 June 2013	
- 4 th Sub-regional Meeting on Regional Plan of Action and Illegal Unreported and Unregulated (IUU) Fishing in the Southern and Eastern Areas of the South China Sea and Sulu-Sulawesi Seas, Manila, the Philippines	27 June 2013 28-29 June 2013	
- Annual Workshop on Assessing Economics and Welfare Values of Fish in the Lower Mekong Basin, Cambodia		
- 5 th ASEAN Fisheries Consultative Forum (AFCF), Lao PDR	28 June 2013	
- 2 nd CTI-CFF Regional Priorities Workshop, Manado, Indonesia		
- 8 th Meeting of the Technical Advisory Committee	22-23 July 2013	

Activity Title	Duration	Remarks
of the Bay of Bengal Program, Bangladesh	20-22 Aug 2013 25-26 Sept 2013	

Remark: The Project supported the Regional Fisheries Policy Network (RFPN) for Indonesia, Malaysia, Myanmar, the Philippines, Thailand to be seconded at the Secretariat.

3.2 Evaluation of the Project Outcomes till the Year 2013

The process of implementation of the present Project phase started in the beginning of 2013 (funds arriving in May 2013) based on a continuation of the process of works initiated during the earlier stages 2009-2012. The independent Mid-term review will be carried out by mid-2015 and an independent evaluation will be carried out by 2017.

3.2.1 Themes and issues:

<p>(1) Themes The Project will implement capacity building activities for each of the Output objectives. Most of these activities will be developed as part of collaborative working efforts and cooperation with partners, at regional, national and local levels.</p>
<p>(2) Issues in the region at the beginning of the study: Many of these communities are faced with increased exposure to natural hazards, climate variability and effects of climate change. There is a need to integrate fisheries and habitat management which requires fisheries agencies and environmental agencies (those responsible for MPA's, etc), to work more closely together. In this process there is also a need to ensure the involvement of coastal communities, fisherfolks (including women) and local authorities, to address local poverty issues and the need for diversified income opportunities.</p> <p>Without a clear policy, at national, sub-regional or ASEAN levels, the long-term sustainability of marine and freshwater resources is unlikely to be achieved. A common aim is to ensure that sector related working conditions, including that of migratory workers, meet the standards set out in the ASEAN Socio-Cultural Community Blueprint.</p> <p>Based on the experiences from the ongoing Swedish supported programme, consultations held and communication with other related projects, a number of important areas to be addressed have been identified. These include:</p> <ol style="list-style-type: none"> 1. Ensuring that the constitutional rights and livelihood rights of fisher-folk, fishing communities and migratory workers on fishing vessels and workers in processing industries are respected. Provide awareness to communities on existing and documented rights. 2. The vulnerability of poorer coastal communities to natural hazards and the risk of being further marginalized during rehabilitation processes is a concern. Strengthen coastal community roles in planning and management of natural resources and coastal development, including developments of alternative livelihoods. Recognize and support to the role and capacity of women and youth in generating income from fisheries-related activities, alternative employment and search and promotion of work outside of the fisheries sector. 3. In Southeast Asia, overcapacity in the fishing industry is seen as the largest single fisheries management problem and threatens the sustainability of small-scale coastal fisheries as well as larger scale, fishing fleets. Management of fishing capacity and combating of illegal and destructive fishing needs to be addressed in conjunction with that of the management of available resources and that of important habitats. 4. Give priority to efforts to combat illegal (IUU) and destructive fishing to sustain regional fisheries resources in promotion of trade within and outside of the Region in order to live up to regional (RPOA) requirements and international binding agreements on the need to combat illegal fishing (AEC 39.v). 5. Develop or establish incentives or rewards for fisheries, fishing crews and/or fishing villages as a whole that are conducting environmentally sound and sustainable fisheries practices. 6. Trans-boundary agreements on fisheries and aquatic/coastal environmental management should be promoted. There is a need to organize regional, sub-regional and sub-sub-regional consultations with an aim to promote regional understanding on fisheries and aquatic/coastal environmental

management.

7. The need for better fisheries/environmental management together with efforts to find a balance between large and small-scale fisheries in managing fishing capacity should be recognized.
8. Address the vulnerability of poorer coastal and inland communities who often cannot compete against those possessing economic (and political) power, be it owners of larger fishing fleets or investors in coastal and inland infrastructure. Secure access to available aquatic resources and working opportunities inside and outside of the sector.
9. Recognize the importance of improved safety and health standards for people working with fisheries related activities (processing, trade, etc). Develop safety at work regulations and guidelines for fisheries and aquaculture, consistent with the relevant provisions of the International Labor Organization (ILO) Conventions, including safety at sea (ASCC Chapter C).
10. Traditional knowledge and local organizations should be more actively integrated in planning processes to integrate fisheries management into habitat management, to manage the active fishing capacity and to build up systems for protection against natural hazards.
11. Build up adaptive capacity of people dependent and involved in activities related to fisheries and aquatic resources utilization to cope with changing environments, including the effects caused by climate change. Strengthen local organizations and it has been shown that well organized groups, with strong social structures, have more resilience than other groups.

3.2.2 Expected Final Goal of the Project: (outcome objective):

Sustainable use of aquatic resources and reduced vulnerability to climate change, by fishing communities in the ASEAN region

3.2.3 “Steps” Toward Achieving Final Goal: (bridging objectives):

Step 1: Implementation of regional & sub-regional aquatic resources management actions by national institutions and organizations

Step 2: Establishment of regional & sub-regional fisheries and habitat management agreements & action plans.

3.2.4 Activities in the Current Project:

(1) Current position of the project: Not applicable as the strategy is based on a rolling planning schedule and steps of progress in implementation and achievements emerge in parallel

(2) Program duration: 2013-2017

(3) Main activities:

The Project will implement capacity building activities for each of the Output objectives. Most of these activities will be developed as part of collaborative working efforts and cooperation with partners, at regional, national and local levels based on the main components as follows:

- Integration of fisheries and habitat management
- Monitor, record and control of active fishing capacity
- Local knowledge, cross cutting issues
- Policy dialogue and promotion of regional cooperation
- Project management and coordination

3.2.5 Progress and Achievements of the Current Project:

1. *Expanding sub-regional cooperation from one sub-region (Andaman Sea) to four sub-regions (thus providing a better coverage of “Southeast Asia”), including strengthened regional and sub-regional programs and organizations*

The geographical coverage that includes four sub-regions (Andaman Sea, Gulf of Thailand, Sulu-Sulawesi Seas and the Mekong) is endorsed by the SEAFDEC Council. The SEAFDEC-Sida project has been successful in follow up with each of the sub-regions to further develop cooperative dialogue and action. More specific: a prospectus for a Gulf of Thailand sub-regional action oriented consultation developed and sent to the countries (tentative time third week of December 2013 in Bangkok. The plan and prospectus to be reported to the RPOA-IUU Steering Committee, 19 – 21 November 2013). The SEAFDEC-Sida framework were introduced to the CTI-CFF (Sulu-Sulawesi Seas) priority setting event in August 2013 and it was agreed to establish cooperation in common priority areas. In cooperation with the BOBLME the cooperation will be strengthened on activities in the Andaman Sea and a trans-boundary forum will be

organized by SEAFDEC between Myanmar and Thailand in January 2014 and an Andaman Sea sub-regional consultation during first quarter of 2014. With the MRC and the Mekong; an understanding is established to strengthen cooperation on fisheries and aquatic environment. A process of consultations will be developed to track “lessons learnt from 15 years of Mekong Cooperation on fisheries, aquatic resources and wetlands. This would allow to highlight experiences from a number of earlier and present Sida supported initiatives, such as the Environment and Fisheries Programmes of the MRC, the AIT Aqua Outreach, the ICLARM/WorldFish Center Mekong Wetlands Approach with a view to provide solid indications for future action and opportunities.

2. Cooperation with regional and international organizations, such as ASEAN, CTI-CFF, BOBLME, MRC

The cooperation with a range of regional and international organization has been strengthened during the year. This has already been indicated above with regards to sub-regional cooperation. This cooperation is to be further strengthened and SEAFDEC is in the process to draft MoUs with the MRC and the CTI-CFF. The cooperation with the RPOA-IUU has been further strengthened (see the work plan of the RPOA-IUU) and the project will be featured at the RPOA-IUU Steering Committee in November 2013. The cooperation with FAO/APFIC is already well established but will continue to be strengthened through the cooperation with the BOBLME and APFIC. At the onset of the implementation of initiatives under the new (March 2013) Sida agreement has increased dialogue with UNEP, IUCN/MFF, WWF and ICSF as well as local/national organizations. The links and cooperation with ASEAN is of special importance through the ASEAN-SEAFDEC Strategic Partnership (ASSP) and, as indicated by FAO during the inception seminar (to introduce the new SEAFDEC-Sida cooperation) in March 2013 this role is expected to become stronger and in principle establish SEAFDEC as the ASEAN Center for Fisheries.

3. Resolution on Live Reef Fish Food Trade in cooperation with the CTI-CFF

SEAFDEC together with CTI-CFF and USAID organized in February 2013 a sub-regional consultation in Bangkok on Live Reef Fish Food Trade (LRFFT). The event was successful and implied a flying start for cooperation between CTI-CFF and SEAFDEC. Outcome: A resolution adopted, in February 2013, among CTI-CFF Countries – Indonesia, Malaysia, Philippines, Timor-Leste, Papua New-Guinea and Solomon Islands (plus Vietnam) on “Sustainable Live Reef Fish Food Trade for the Southeast Asian and CTI-CFF Member Countries” with SEAFDEC serving as Interim Secretariat for LRFFT Regional Forum.

4. Neritic tuna: Response to request by SEAFDEC Council to initiate a process to develop a regional plan of action for regional cooperation on neritic tuna

The SEAFDEC-Sida has, in response to the request by SEAFDEC Council to initiate a process to develop a regional plan of action for regional cooperation on neritic tuna, been able to launch the process with Member Countries through the organization of a consultation with Member Countries, private sector and other partners in Songkhla, Thailand, 8 – 10 October 2013. The main agreed emphasis is to be able to show and document the sustainability of fisheries, processing and trade on neritic tuna in the region and sub-regions. The initiative will also be important in that it will include and build upon another Sida supported initiative (with Abba Seafood) to verify the sustainability of Tonggol tuna fisheries, processing and trade.

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Project/Activity Title	Duration
<p>Activities on rolling basis will be developed out of the results and experiences- and the need from countries.</p> <p>The action will be refer to the following output groups:</p> <ol style="list-style-type: none"> 1. Integration of fisheries and habitat management 2. Monitoring, Record and Control; <i>large-scale</i> and <i>small-scale</i> fishing 3. Local knowledge, cross cutting issues and safety at sea 4. Policy dialogue and promotion of regional cooperation on fisheries management 5. Project management and coordination <p>To address the components above, expected events to be carried out in 2014:</p>	

Project/Activity Title	Duration
1. Second planning and management committee and Consultation on the Management of the North Andaman Sea (Myeik Archipelago) in collaboration with BOBLME Project	Jan 2014
2. Second consultation on the management and implementation of joint action for the South Andaman Sea (Indonesia, Malaysia and Thailand)	Second quarter 2014
3. Joint Workshop between Cambodia and Vietnam (Kampot and Kien Giang)	Feb 2014
4. Joint Workshop between Cambodia and Thailand (Koh Kong and Trat)	Mar 2014
5. Dialogue meeting between Malaysia and Thailand in the Gulf of Thailand	Second quarter 2014
6. Lessons learnt from 15 years of Mekong Cooperation on fisheries, aquatic resources and wetlands	June 2014
7. Establish an activity plan for cooperation with the MRC on fisheries and aquatic resources management in the Mekong	First quarter 2014
8. LRFFT: follow-up to the recommendations to the LRFFT in cooperation with CTI-CFF	Jan-Dec 2014
9. Establish a letter of agreement with the CTI-CFF on cooperation for activities in the Sulu-Sulawesi Seas	Jan-Dec 2014
Field-level work: More sub-contracts drafted and/or signed for field work and capacity-building in follow-up to requests from Member Countries and as recommended during sub-regional consultations. Two for Cambodia and two for Thailand, two Myanmar being discussed and already being implemented following the signing of sub-contracts. Further contracts to be developed for Vietnam and Indonesia including habitat restoration	Jan – Dec 2014
On-site events to be organized in Indonesia, Malaysia, Thailand, Myanmar, Cambodia, Vietnam, Lao PDR and the Philippines in support of sub-regional dialogue and cooperation in the four target sub-regions.	Jan – Dec 2014
Active participation envisaged by the project to regional and international events organized by FAO/APFIC, Sida, CTI-CFF, UNEP, MRC, RPOA-IUU, BOBLME, SEAFDEC, SwAM SEAFDEC/JTF, and others.	Jan – Dec 2014
Aspects of climate change, gender will be integrated in all outputs groups as a cross-cutting matter to be considered.	Jan – Dec 2014

NEW PROJECT DOCUMENT

Project id: 051404			
Program Categories:	Other Programs		
Project Title:	Establishment and Operation of a Regional System of Fisheries <i>Refugia</i> in the South China Sea and Gulf of Thailand (UNEP/GEF/SEAFDEC/SCS)		
Program Thrust:	New Special Project	Total Duration:	1.5 yrs (2014-2015)
Lead Department:	Training Department	Lead Country:	To be appointed
Project Sponsor:	Global Environmental Facility (GEF)	Project Partner:	Cambodia, Indonesia, Malaysia, Philippines, Thailand, Vietnam
Proposed Budget:	USD 100,000	This year budget:	none
Prepared by	Yuttana Theparoonrat Coastal and Small-scale Fisheries Management Division, SEAFDEC/TD	Project Leader	Yuttana Theparoonrat Coastal and Small-scale Fisheries Management Division, SEAFDEC/TD

1. INTRODUCTION/BACKGROUND

At the Fourth Meeting for the Fifth Replenishment of the GEF Trust Fund, held in Washington, D.C on November 13, 2009, Participants discussed GEF/R.5/22, *Revised GEF-5 Programming Document*, covering, *inter alia*: (i) focal area strategies; (ii) an approach to enhancing engagement with the private sector; (iii) a corporate programs strategy, and (iv) a results-based management framework, including monitoring and reporting on results. The programming document introduced replenishment scenarios that reflect 50%, 75%, and 100% increases over the GEF-4 replenishment levels.

Since the last replenishment meeting, the 15th Conference of the Parties to the UNFCCC was held in Copenhagen in December 2009. The discussions highlighted, among others, the importance of enhanced action and international cooperation on adaptation and national communications in measurement, reporting and verification of mitigation actions by non-Annex 1 countries. Parties also discussed establishing “a Technology Mechanism to accelerate technology development and transfer in support of action on adaptation and mitigation that will be guided by a country-driven approach and be based on national circumstances and priorities”. There was also recognition of “the crucial role of reducing emission from deforestation and forest degradation and the need to enhance removals of greenhouse gas emission by forests and agree on the need to provide positive incentives to such actions through the immediate establishment of a mechanism including REDD-plus to enable the mobilization of financial resources from developed countries.”

The GEF’s Secretariat has prepared this revised document, GEF/R.5/25, *GEF-5 Programming Document*, for discussion at the March 2010 replenishment meeting, taking into account: (i) the feedback received at the November 2009 meeting; and (ii) the implications of the discussions at the UNFCCC COP15 for GEF replenishment with regard to the climate change focal area and the proposed sustainable forest management program.

Following a restructuring in 1994, the GEF Trust Fund was replenished (GEF-1, 1994-1998) at \$2.0 billion for a 4-year period. In 1998, the Trust Fund was replenished at \$2.75 billion (GEF-2, 1998-2002); in 2002, donors committed \$3 billion to GEF-3 (2002-2006); and in 2006, contributing Participants committed \$3.135 billion to GEF-4 (2006-2010). Negotiations on the Fifth Replenishment of the GEF began in March 2009.

The Fifth Replenishment period is expected to cover GEF operations and activities for the four years covering July 1, 2010 to June 30, 2014. The focal area strategies are built on work undertaken by the

Technical Advisory Groups (TAGs)² established by the CEO and on feedback received from the GEF Agencies and other stakeholders.

The overall approach to programming in GEF-5 builds on achievements in the pilot and first four phases of the GEF and on the refinements made to the focal area strategies during GEF-4. These strategies, while continuing to address the main objectives of the conventions, are designed to be supportive of the sustainable development needs of recipient countries in their pursuit of the millennium development goals, particularly goal #7 on environmental sustainability.

Addressing gender and social issues in GEF projects are critical as they are important drivers and incentives for achieving global environmental benefits and for the overall success of the projects. Gender and social issues will be addressed through the focal area strategies and project cycle, particularly with gender sensitive social and economic analysis, gender disaggregated indicators, and monitoring and evaluation exercises.

Overall, the GEF-5 focal area strategies reflect: (i) a strategic positioning for GEF-5; (ii) a move towards a transformational scaling-up of activities; and (iii) the associated replenishment target scenarios for GEF-5.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The GEF enables countries to generate agreed global environmental benefits and services, and to support global environmental conventions. The proposed results architecture presented in this section identifies four broad, corporate-level strategic goals, each with a select number of indicators and accompanying targets. For some indicators, where targets cannot be set, *e.g.*, new areas of intervention, a baseline will be undertaken for each project and targets will be established at the project-level. The four strategic goals cover all activities under the mandate of the GEF:

- (a) Strategic Goal 1 - Conserve, sustainably use, and manage biodiversity, ecosystems and natural resources globally, taking into account the anticipated impacts of climate change.
- (b) Strategic Goal 2 - Reduce global climate change risks by: 1) stabilizing atmospheric GHG concentrations through emission reduction actions; and 2) assisting countries to adapt to climate change, including variability.³
- (c) Strategic Goal 3 - Promote the sound management of chemicals throughout their life-cycle to minimize the effect on human health and global environments.
- (d) Strategic Goal 4 - Build national and regional capacities and enabling conditions for global environmental protection and sustainable development.

2.2 Expected Outcomes and Outputs:

Four replenishments and a pilot phase have provided the GEF resources totaling over \$10 billion over its 15-year history. Having leveraged these resources four times over, the GEF, along with its partner Agencies, has established a strong track-record of catalyzing innovative approaches for investment, technical assistance, and scientific assessment, and of helping developing countries generate global environmental benefits in the context of national sustainable strategies. The programming targets must be achievable for the GEF partnership over the next four years while setting the stage for increasingly more robust replenishments subsequently. A significant increase in the replenishment level over that of the GEF-4 level is essential to ensure that the GEF performs as a credible financial mechanism in fulfilling its current mandate with respect to the various conventions and is also geared to undertake additional mandates that may emerge. The programming strategies for GEF-5 reflect this up-scaling of activities and are in line with the obligations and guidance from the conventions.

² The TAGs are comprised of experts selected by the Secretariat from research institutions and NGOs, STAP panel members, and representatives of the various conventions. The TAGs have been active since January 2009.

³ The GEF Trust Fund will provide resources for climate change mitigation, while climate change adaptation will be funded through the Least Development Country Fund (LDCF) and Special Climate Change Fund (SCCF), both UNFCCC funds mandated to be managed by the GEF.

2.3 Project Description/Framework

Activity 1: Establishment of Nation Focal Point and Working Group on development of full project documentations and future plan of implementation

Activity 2: Technical workshop/consultation on preparation of final project document on Project Identification Form (PIF) Clearance for Work Program Inclusion and Project Preparation Grant (PPG)

3. PROPOSED ACTIVITIES FOR THE YEAR 2014

3.1 Planning of the Project Activities

Activity/inputs	Duration	Remarks
Activity 1: Establishment of Nation Focal Point and Working Group on development of full project documentations and future plan of implementation	Jan. –Mar.	
Activity 2: Technical workshop and consultation on preparation of final project document on Project Identification Form (PIF) Clearance for Work Program Inclusion and Project Preparation Grant (PPG) for submit to GEF.	Mar.-Dec.	

3.2 Expected Outcomes/Outputs of the Year 2014

- | |
|--|
| <ol style="list-style-type: none"> 1. Establishment of Nation Focal Point and Working Group on development of full project documentations and future plan of implementation with composed of representative from Cambodia, Indonesia, Malaysia, Philippines, Thailand, Vietnam and SEAFDEC. 2. The full project document to be submitted to GEF/SEC by October 2014. |
|--|

	<h2>ASEAN Cooperation Project Document</h2>
<p>Project Purpose Code:</p>	
<p>Project Title: Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management</p>	
<p>Project Description: This project aims to improve the socio-economic status of the coastal dwellers through community fisheries organization and governance in order that the coastal resources utilized by the fishers could continue to sustain its function as the local livelihoods and source of food for the region's fishing communities. The target beneficiaries of this project are the Muslim communities in the region's coastal areas.</p>	
<p>Sponsoring ASEAN Body</p>	
<p>Sectoral Committee/Main Body: ASEAN Sectoral Working Group on Fisheries (ASWGF_i) Meeting Number/Date:</p>	
<p>Working Group/Sub-Committee: Meeting Number/Date:</p>	
<p>Proponent's name and address: Southeast Asian Fisheries Development Center (SEAFDEC)</p>	
<p>Date of preparation: 16 January 2009</p>	
<p>Proposed funding source: Islamic Development Bank (IDB)</p>	
<p>Project budget</p>	
Description	Total Allocation (\$)
1. Contracts with Individuals	_____
2. Contracts with Organizations	_____
3. Equipment	_____
4. Supplies and Services	_____
5. Travel and Per diem	_____
Total:	250,000
<p><i>Information below to be completed by the PCU</i></p>	
<p>Recommendation of Secretary-General/Project Appraisal Committee</p>	
<p>PAC Meeting Number/Date:</p>	
<p>Endorsements:</p>	
<p>Approval of ASEAN Standing Committee</p>	
<p>Meeting Number/Date:</p>	
<p>Endorsements:</p>	



ASEAN Cooperation Project Document Format

1. Problem to be addressed

The first paragraph of the Project Document will define the problem (s) that the project will address. This section should be limited to a brief statement of the problem, as determined in the problem analysis. In general, one project should focus on one large problem. The statement of a single problem will lead to the statement of a single objective.

The coastal areas in the Southeast Asia provide the means of livelihood to the coastal dwellers, where hundred thousands of coastal families are directly engaged in fishing activities and coastal aquaculture including related activities such as fish processing, marketing, boat building, net making, etc. The fishers' over-dependence on the coastal fisheries resources has however, led to over-exploitation and degradation of the resources. The conflict on the multiple resource use also threatens the livelihood of coastal fishing communities. Moreover, the recent devastations caused by natural disasters hamper the vulnerability of these communities. Impacts of climate change also add complexity to the problems that they are encountering. Many fisher communities seem to be isolated and/or insufficient benefit from government services net systems that may exist in other areas of the country. In addition, the communities have to pay more for fuel, food and services, while the income from their products is an inverse. These problems brought about unsustainable use of fishery resources, by reason of the fisher communities have to continuously intensify their fishing efforts to maintain their livelihoods.

2. Background, problem analysis and justification

a. Background

The Background section of the Project Document should provide factual information about the context of the problem that is to be addressed. This section should also include description of the present situation, any related current and past ASEAN activities, and the relevant ASEAN policies and plans of action.

The Southeast Asian region is home to the largest Muslim populations in the world (estimated to be about 240,000,000 in 2007), which is almost one-half (about 42%) of the region's total population (in 2007: 571,337,070) with Indonesia having the world's biggest Muslim population (88% of its total population of 225,000,000). Most of the Muslim communities are in coastal areas with fishing as an ethnic occupation. Since the region's coastal fisheries resources, once viewed as inexhaustible source of fish protein for human consumption have deteriorated, concerns have therefore increased for the protection and conservation of the coastal resources for sustainable livelihoods and food security of the coastal dwellers.

The ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: "Fish for the People" (hereafter refers to "the Millennium Conference") held in Bangkok from 19 to 24 November 2001, recognized the importance of sustainable fisheries for food security and the livelihoods and well-being of the ASEAN people. The Conference was successfully concluded by the adoption of "***the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region***" by the fisheries related ministers and senior officials of ASEAN-SEAFDEC Member Countries as the regional common fisheries policy and priority actions.

Within the regional context, fisheries sector is being addressed among other priorities to accelerate the regional economic integration as spelt out in the **ASEAN Vientiane Plan of Action** as well as regional collaboration in promoting sustainable fisheries development through the ASEAN-SEAFDEC Fisheries Consultative Group Mechanism under the recently adopted **ASEAN-SEAFDEC Strategic Partnership Program (FCG/ASSP)**.

Most of the coastal fisheries communities in the ASEAN Region are characterized as small-scale fisheries. The production from small-scale fisheries contributes to national economic growth. Nevertheless, the endowment, potential, and resilience of the small-scale sub-sector have not been recognized and highlighted, while it is immensely contributed to resource utilization. This critical issue should also be addressed along line with the **ASEAN Socio-Cultural Community (2008-2015)** that the region's aspiration to lift the quality of life of its peoples through cooperative activities that are people-oriented and environmentally friendly geared towards the promotion of sustainable development.

In addition, the coastal dwellers are also prone to the drastic change of coastal environment. In December 2004, coastal communities in Indonesia, Thailand, Malaysia, and Myanmar had to suffer from the great loss of lives and assets due to the unprecedented scale of earth quake and Tsunami. Such large-scale natural disaster further aggravated their poverty status of the people in the areas. In respond to the tragic incident, ASEAN community adopted "**ASEAN Declaration on Action to Strengthen Emergency Relief, Rehabilitation, Reconstruction and Prevention on the Aftermath of Earthquake and Tsunami Disaster of 26 December 2004**" as their policy commitment to support Tsunami affected people. The coastal villages throughout the region are also facing hardships due to the impact from climate change such as sea level rise, increase of sea temperature, change of fish habitat and its ecosystem, natural hazards, etc. The ASEAN-SEAFDEC Member Countries have put a serious concern on this issue and recently identified the **required adaptive measures and activities to mitigate the impacts of climate change** to be undertaken by SEAFDEC and the national agencies responsible for fisheries in the Member Countries. In addition, Indonesia as the lead country also prepared a proposal on the **ASEAN Strategy Addressing the Impact of Climate Change on Agriculture, Forestry and Fisheries**, for further submission to the SOM-AMAF.

Since the enhancing of coastal fisheries communities' resilience is involved with various cross cutting issues and required strong commitment and coordination from national government, organizations, local institutions, this project is therefore proposed in order to improve livelihoods of the Muslim coastal dwellers, who is the majority of coastal population, through community fisheries organization and governance in order that the coastal resources utilized by the fishers could continue to sustain its function as the source of food and provide means of livelihood for the region's fishing communities. The target beneficiaries of this project are the Muslim communities in the region's coastal areas.

b. Problem analysis and justification

The Problem Analysis and Justification section is the most important section of the Project Document. The section should present a logical analysis that justifies regional action by ASEAN. The section should discuss the following topics and questions:

Problem analysis What are the underlying causes of the problem to be addressed? Details from the problem analysis should be presented here.

Fishing related coastal communities often demonstrate high levels of vulnerability, many small-scale fishing families are increasingly caught in a poverty trap. This situation could be reasoned from a variety of factors including dependence on dwindling coastal resources, unpredictable nature of fishing, high occupational risk, sensitivity to macro-economic changes, exposure to natural disasters, high competition from multi-resource users; and social, economic and political marginalization.

The growing domestic and international demand for fish and fish products has resulted in the excessive exploitation of aquatic resources in the region. The number of small fishermen keeps increasing; the size and number of coastal villages are becoming larger and larger. Whenever the fishery resources are threatened, it is definitely impact to the Muslim coastal communities where their livelihoods depend very much on coastal resources. The local income of coastal fishery communities and people involve in fisheries associated activities (i.e. fish processing, marketing, boat building, net making, etc.) are determined by coastal resources for a significant part of their livelihoods. The fishermen have to compete with both people and natural resources, the fishermen therefore continuously intensify their fishing efforts to maintain a status quo. This leads to the tragedy of resources utilization which the fishermen are driving resources down both



in terms of quality and quantity; and they will be finally caught in a poverty trap.

Apart from the degradation of fishery resources, biophysical and socio-economic condition in the coastal zone is highly vulnerable to the impacts of climate change and natural such as erosion, cyclone, sea-level rise, increases in sea-surface temperature and unpredictable effects of climate change on the coastal environments changes (i.e. natural hazards, resources productivity, degradation of habitat and ecosystem, etc.). These climate change-related stresses could increase risk of coastal fisheries communities and effect to the development of fisheries more difficult in improving people livelihood and ensuring food security as well as addressing on fisheries management approach. These could bring about degeneration of economic well-being, risk in safety and efficiency of fishing operation, lost of fish caught, as well as implication on employment and vital source of protein for poor people. To assist the fisheries communities from these subsequences, there is a need to build up community resilience in coping with such cases.

Coastal dwellers are facing degradation of fishery resources, at risk of natural disaster, dealing with low standard of living and poverty. Many fisher communities are outside of any social safety net systems that may exist in other areas of the country. Thus, the need to strengthen community fisheries organization and capacity building for better development and management of the coastal resources to ensure sustainable livelihood of coastal communities, has become very urgent. It is indeed important that appropriate coastal resources management, alternative livelihoods as well as research and development for simple early warning system at local community level should be put in place.

This project aims to improve the socio-economic status of the coastal dwellers through community fisheries organization and governance in order that the coastal resources utilized by the fishers could continue to sustain its function as the source of food for the region's fishing communities. The target beneficiaries of this project are the Muslim communities in the region's coastal areas.

Regionality Is the problem regional in nature? Can the problem and its causes be effectively and appropriately addressed at the regional level? Answers to these questions derived from the regionality analysis exercise should be presented here.

As aforementioned the ASEAN region is home to the largest Muslim populations in the world, majority of occupation in the Muslim coastal communities is mostly characterized by small-scale fisheries and associated activities. It is noteworthy that the role of small-scale fisheries has contributed to the large amount of fisheries production within the fisheries sector. It is also recognized that fisheries play and important direct role in livelihoods, food security, national economic growth and foreign exchange earnings. The Member of ASEAN Countries, main exporters of fish products to the world market, is unquestionably count upon the production from coastal communities. Degradation of fishery resources, impacts of climate change, global economic crisis in 2008 and vulnerability of the coastal communities could bring about the retard of national economic growth and would be more difficult to strengthen regional economic integration by fisheries sector.

The ASEAN Member Countries should address the issue and build up firm foundation for coastal community through policies and institutions as well as local levels of governance of natural resources utilization to ensure effective co-management between the local government and the communities. The most of the projects have usually been implemented as national programs with appropriate national policy. However, if the program is appropriately focus on the issues and to facilitate exchange of experiences among the participating countries (regional approach) and to develop the common stand and concerns on the subjects may greatly promote the issues in the region.

Participation Which ASEAN member countries want to participate in this project?

For the project implementation, high priority will be given to ASEAN countries with the highest Muslim populations, such as Indonesia, Malaysia, and Brunei Darussalam (88%, 59% and 67% Muslim populations, respectively). Other Muslim communities in the Philippines, Thailand and Cambodia will also be involved in the project implementation through technology transfer and dissemination of experiences learned from the three priority countries considering their respective problems and needs.

Beneficiaries Who will be the likely beneficiaries of a solution to the problem or need?

The direct beneficiaries are the people in the eight selected coastal Muslim communities in ASEAN region. Communities will be selected based on criteria identified by the project. In order to support capacity building activities, approximately 160 fishers, 25 local fishery officers and other personnel working in support of fishery communalities will be involved in the project activities. On the other hand, experiences and lesson learn during the conduct of project activities and outcomes of the project implementation could be useful for strengthening of national policy in supporting coastal fisheries communities in respective ASEAN Member Countries.

Commitment and sustainability What complementary national actions are interested member Governments currently implementing to address the problem or would be needed along with regional action to fully address the problem? Are the concerned ASEAN member Governments committed to bearing the costs of required complementary national actions and the long-term costs of regional action?

Project implementation requires strong commitment to achieve the objectives and activities of under the project both at national and local levels. National fisheries related agencies are requested to provide in-kind contribution and keep close collaboration with SEAFDEC to facilitate the project implementation, especially coordination with stakeholders, and also ensuring that the implementation of the project would along line with national instruments. Financial contribution from national government will be only required in extraordinary cases which could not be covered by the project. The identified future follow-up activities based on the outcomes of the project should be follow-up by respective national governments to maintain sustainability of the project promotion.

3. Possible solutions

The purpose of the Possible Solutions section of the Project Document is to ensure that alternative strategies or approaches to solving the project problem have been identified and assessed. What possible approaches to the problem were identified in the problem analysis? Are there other possibilities? What are the advantages and disadvantages of pursuing each option? What would be the consequences of doing nothing? What strategy has been selected as the best approach to solve the problem? Why is this option regarded as the best approach?

Coastal communities are highly dependent on fishing for their livelihoods with fewer possibilities to generate alternative source of income. They are thus a strong potential group to risk to the resource base and habitats. Declining of fish stocks due to over fishing lead to lower production, while increasing competition and conflict between different users. It is widely recognized that not only improving coastal fisheries management that important but also controlling the effects of human activities on the environment are necessity. Linkage between sustainable environment and sustainable livelihoods is a direct variation. Past and present, there are the areas that solve the problems by centralized management and it has proved of ineffective results. There is a growing trend towards a more decentralization of governance in general as well as in fisheries management. Management responsibilities are to share among national government, local organization and institutions, communities and other stakeholders. This type of so called 'co-management system' are becoming popularity and have been successfully implemented in some countries in ASEAN.



To address the issues and problems in coastal communities, policies and institutions in respective ASEAN Member Countries need firm foundation in coastal communities and local levels of governance of natural resources utilization to ensure effective co-management arrangements between the local government and the communities. This has to be coupled with capacity building of communities and local organizations on participatory, inter-disciplinary and community-based strategies in community organization as well as the transfer and adoption of knowledge-based coastal resources management and adoption of sustainable resource use technologies and practices.

People participatory approach will be adopted as the fundamental approach for implementing the project. Specifically, the people participatory approach in community-based fisheries management (CBFM) and co-management (CM) will be used as tools in establishing community fisheries organizations and governance. The community fisheries organizations will take the leading role in community development and management of the coastal resources through the adoption of top-down and bottom-up approaches. In considering the bottom-up approach, community fisheries organizations will be self-formulated to implement their own community development and coastal resource management plans. Following the top-down approach, the community fisheries organizations will also adopt the community development and coastal resource management plans and programs formulated by local governments and higher level authorities.

4. Objective and success criteria

a. Objectives

This section of the Project Document, the highest element in the logical framework, should present the best approach as (1) the statement of the results to be achieved by the project or activity (the objective) and (2) the statement of criteria for successful achievement (the success criteria). In other words, the objective should define a desired solution to the identified problem.

The project aims to formulate a practical framework for strengthening and promoting community fisheries and building the capacity of the fishing communities to enable them to organize community economic development activities and sustain their livelihoods in fisheries. Community fisheries organization is a basic and crucial local management body that could lead and function in the promotion livelihood opportunities in fisheries and management of the coastal resource in sustainable and effective ways. Therefore under this project, such community fisheries organizations would be promoted to also take the role as local coordinators for across-sectors' communications among the concerned stakeholders. Such function is fundamental and important to implement the top-down and bottom-up approaches in supporting sustainable livelihood and coastal resource management.

1. establishment of sustainable livelihood opportunities and promotion of coastal resource management particularly in the region's Muslim fishing communities;
 2. poverty reduction in fishing communities for food security through promotion of responsible fisheries and coastal aquaculture that is friendly to the environment; and
 3. strengthening of the community fisheries organizations in the region's Muslim fishing communities by providing opportunities for community economic development and coastal resource management.
-

b. Success Indicators

The success criteria will set the **qualitative** standards for successful achievement. These criteria will enable the measurement of the extent of project success. Such measurement will enable the evaluation of the project in terms of the purpose for which it was formulated.

Success criteria can be mainly on the participation of the fishery communities in the activities and its impact on their livelihoods as well as enhance capacity of fishers, and extend to both government and non-government co-operation in ASEAN Member Countries. As the effective implementation of people participatory approach in community-based fisheries management

(CBFM) and co-management (CM) at the local level, the firm local governance and institutions can be established to sustain the resource utilization and reduce conflict among resource users. Promote people's participation in organizing community fisheries organizations will be the key to achieve communities' resilience and improvement of livelihoods and coastal resource management. These are especially the participating countries which propose to host the on-site activities. In addition, adoption of technology/initiatives by respective Member Countries, which may lead to strengthening of linkage and working mechanism for local institutions and government, can also be used as a success criterion. The above criteria are parts and puzzles in the long-term achievement improvement of people livelihoods as well as coastal fisheries resources utilization and management in Muslim communities.

c. **Success Measures**

The success criteria will set the **quantitative** standards for successful achievement. These criteria will enable the measurement of the extent of project success. Such measurement will enable the evaluation of the project in terms of the purpose for which it was formulated.

Enhancing of community resilience and improving livelihoods would be difficult to measure in term of quantity or calculate a monetary value in reality. However, focusing on participatory approach applying in this project could count on the number of people involved in all level of activities under this project.

5. Outputs

Outputs are results or products that are produced and utilized in order to achieve an objective. Several outputs may be necessary to enable the achievement of an objective. The vocabulary chosen to define outputs should describe finished products or completed results, e.g., "a feasibility study" or "trained personnel". This section should list and briefly describe the outputs to be produced for the achievement of each project objective.

The following outcomes are envisaged through the project activities:

1. the region's Muslim fishing communities and other stakeholders undertaking sustainable livelihood activities in fisheries and adopting sustainable coastal resource management
2. the way of life of local people in fishing communities improved and food security specifically in terms of food supply and job opportunities enhanced while the coastal environment is protected and conserved
3. the community fisheries organizations strongly leading the practice of planning and implementing community economic development activities for sustainable livelihood and functioning well specifically in the area of coastal resource management

Log Frame on Project Follow-up, Monitoring and Evaluation:

See [Annex 1](#)

6. Indicative work plan

The indicative work plan should be prepared using scheduling software. This work plan should identify and graphically illustrate the activities in the logical order that is necessary for the production of each output. The vocabulary of activities should describe actions, e.g., "implementation of training" or "consultations with member countries' customs departments". ASEAN cooperation often deals with similar outputs. Therefore, the activity lists for common outputs can be based on some standard models.

See [Annex 2](#)

7. Management and implementation arrangements

a. Management arrangements

The management arrangements should identify the project's Sponsoring ASEAN Body, e.g., "the Committee on Social Development" or "the working group on non-tariff barriers". That body has the responsibility to designate a manager for the project who will be responsible for the achievement of the project objectives. The project manager must see that the planned work is actually done and that



finished work actually achieves the objective. The management arrangements should specify to whom the project manager must report and with which other ASEAN bodies he/she must coordinate the project's work.

The ASEAN Sectoral Working Group on Fisheries (ASWGF) will be designated as a manager for the project.

The project management and administration will comprise two levels (project-level and site-level managements) and two stages (preparation and implementation stages). At project-level management, SEAFDEC, local government officials and local stakeholders representing Malaysia, Indonesia and Brunei Darussalam will be nominated as members of the project steering committee. Representatives from the Philippines, Thailand and Cambodia may also be nominated as members of the steering committee.

The steering committee will look at the possibility of implementing project activities in their respective countries. The steering committee may convene an inception meeting during the preparation stage of the project in order to confirm and finalize the project site selection. During the implementation stage, the steering committee may convene regular meetings at least twice a year to monitor the logistics and progress of the project implementation. At site-level management, the selected countries may establish an implementing committee to assist the steering committee in the implementation of the project action plan. During the implementing stage, the implementing committee may convene quarterly meetings (four times a year).

b. Implementation arrangements

The implementation arrangements define the organizational unit or the personnel who will actually produce the project's outputs. The implementers, who may be consultants, experts or personnel of ASEAN Governments or the Secretariat, should be identified for each output. Reporting requirements and relationships should be explained as an element of the implementation arrangements. To ensure full understanding of roles and responsibilities, the project manager should identify "parties responsible" for implementation of each activity when he/she revises the indicative work plan into the actual work plan after project approval.

SEAFDEC is an inter-governmental organization specialized in fisheries through providing technical supports to the ASEAN Member Countries in the field of training, research and information dissemination for over 40 years. It has accumulated its competence in various fields of fisheries including management, assessment of aquatic fisheries resources, capture fisheries, aquaculture and fishery post-harvest development. ASEAN and SEAFDEC have so far continued its strong collaboration in the field of fisheries to secure sustainable fish supply for food security for each ASEAN Member Country. SEAFDEC will therefore be an executing agency for this project.

The SEAFDEC shall be responsible for implementing the Project with due diligence and efficiency, in accordance with the Project Proposal attached and the Budget approved by the ASEAN Secretariat and the Islamic Development Bank (IDB), and with any supplementary arrangement which may be agreed between the Parties. SEAFDEC shall provide technical assistance through organization's human resources within our competent and further collaborate with relevant national and regional experts to accomplish the project activities.

Name of Institution: Southeast Asian Fisheries Development Center
Secretariat
Suraswadi Building
Kasetsart University Campus
P.O. Box 1046 Kasetsart Post Office
Bangkok 10903, Thailand
Tel: +662-940-6326
Fax: +662-940-6336

The project will be coordinated by:
Mr. Somnuk Pornpatimakorn, Administration and Finance Coordinator, and
Mr. Somboon Siriraksophon, Policy and Program Coordinator

The project will be jointly implemented by SEAFDEC and its Departments with the appropriate inputs based on the respective competent developed by these Departments.

c. **Monitoring and Evaluation Arrangements**

Describe the evaluation strategy for this project, including when the review/evaluation is to take place, the key evaluation issues to be addressed, and how it is to be financed. (It is recommended that the project budget include an allocation for the review/evaluation.)

A performance evaluation report on enhancing coastal community resilience activities will be considered as the project final report reflecting the outcomes of the individual project activities and overall evaluation of the project.

8. Inputs

There may be many possible combinations of inputs that can produce the proposed outputs. The formulator of the Project Document should seek to identify inputs that will enable efficient project implementation, that are appropriate to the work to be done, and that are cost effective. As an aid to the determination of inputs, the project formulator should refer to the indicative work plan. The questions that project formulators need to consider in regard to the selection of inputs include:

- Which inputs should be used?
- What kind of inputs?
- How many? (for consultants or equipment)
- What duration? (for personnel assignments)
- How much does it cost?

Major inputs required for the production of each output should be presented on a table. This table can be created using word processing or spreadsheet software. The purpose of the table is to facilitate the selection of appropriate inputs and to enable project implementers and appraisers to easily understand the relationships between inputs and outputs. The table should describe inputs in five categories: contracted personnel, contracted organizations, equipment, supplies and services, and travel and per diem. Additional details, such as TOR for contracts, should be provided and attached as annexes.

Project Activities:

Activity 1: Community surveys and needs assessment

The main objective of this activity is to establish an overview of the traditional community information and scientific database in order to formulate appropriate action plan and activities for sustainable management of the coastal resources and livelihoods in fisheries. Three basic methods will be used, namely: 1) regular conduct of data collection and special topic surveys; 2) using the survey results to set up and prioritize activities that include technology transfer and human resource development; 3) dissemination of survey results to community fisheries organizations through community meetings, extension programs and services. Special topics of the surveys will focus on social, economic, administrative and environmental aspects to assess the capacity, problems and needs of the fishing communities. The participation of community stakeholders in planning and designing the surveys will be promoted. At the project activities planning, the issue on prevention of coastal fisheries community from natural disaster will be also taken into account.

Activity 2: Development of fisheries governance on coastal management

This activity aims to develop the capacity of the local resource users and stakeholders in community fisheries organizations and institutions for coastal resource management applying the well-documented concept of fisheries management. This activity is also intended to strengthen existing institutions of people's groups or organizations in developing community economics and coastal resource management plans. The community fisheries organizations will take the leading role in promoting food security in terms of sufficient fish food supply, various job opportunities and environment-friendly coastal protection activities as well as identification of areas for research and development of simple early warning system for natural disasters. A strategic plan

for this activity is the conduct of community fisheries meetings on regular basis to discuss and make decisions as well as exchange information. Training and capacity building activities related to community fisheries organization and institution will be provided to stakeholders concerned. The extension programs and services are aimed to assist the community fisheries organizations and stakeholders in self-managing the coastal resources within their own boundaries and in developing alternative livelihoods.

Activity 3: Contribution of community fisheries to sustainable livelihood

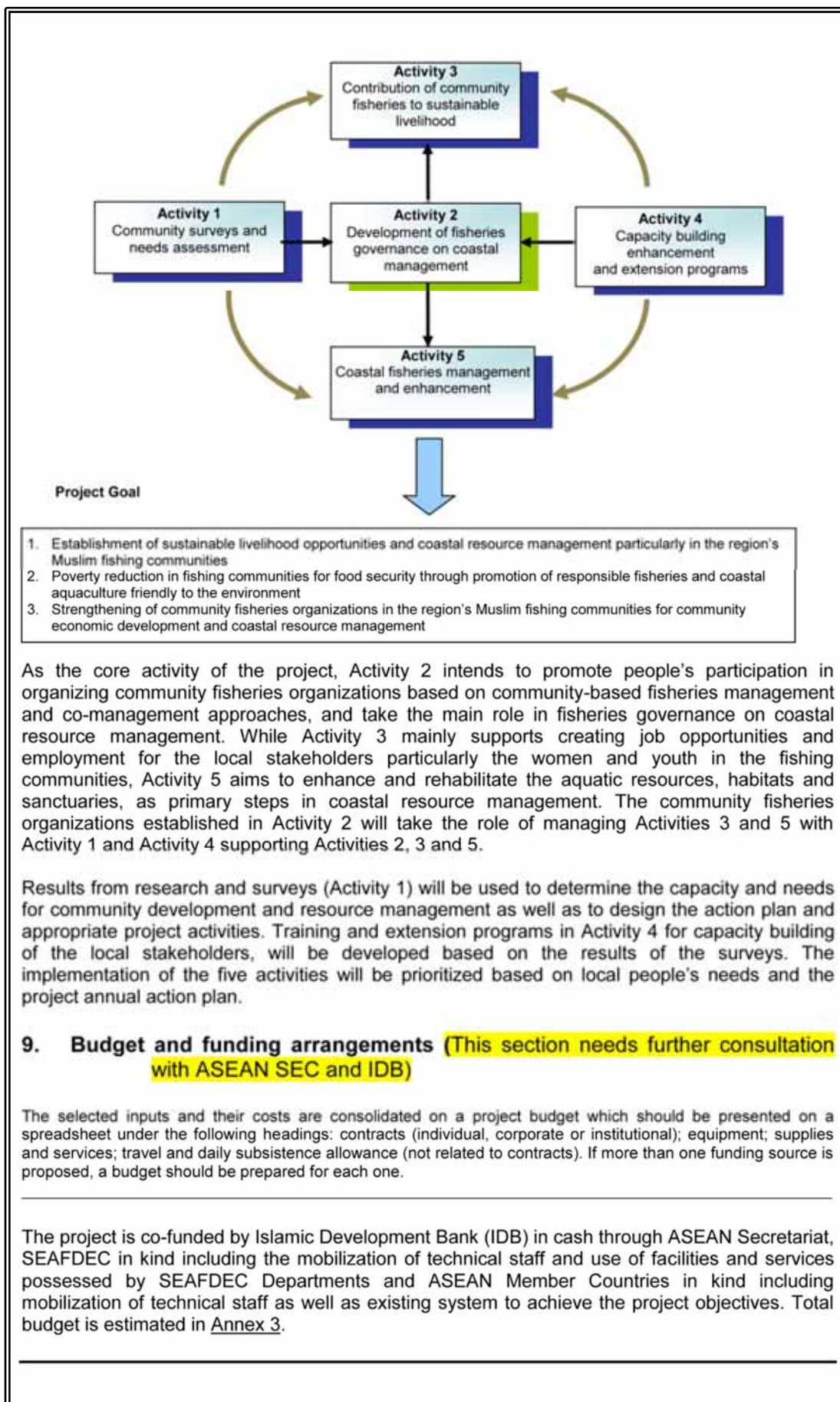
This activity aims to secure means of fisheries livelihood in fishing communities as well as to increase incomes and provide job opportunities particularly outside the fisheries sector. Three strategies will be adopted, namely: fisheries post-harvest technology transfer, responsible fisheries and environment-friendly aquaculture, and recreation fishing. Fisheries post-harvest technology transfer will be conducted through training activities in order to improve the traditional knowledge of women and sanitation in producing community fishery products. This is envisaged to develop and strengthen the capability of women in fishing communities individually and at the organizational level, for the establishment of local community business ventures. Responsible fisheries and environment-friendly aquaculture will be promoted as means of sustainable livelihoods in fisheries. Recreation fishing will also be promoted as possible alternative job opportunities in eco-tourism in the fishing communities.

Activity 4: Capacity building enhancement and extension programs

This activity is intended to enhance the capacity of resource users and stakeholders to be able to actively participate in coastal resource management, sustainable livelihoods development, through a series of training courses and extension programs by strengthening and building upon the traditional awareness and knowledge of the resource users and stakeholders on coastal resource management. Their capacity in developing local business ventures and income-generating activities as well as in financial management will be enhanced. Lessons and experiences gained will be compiled and published as guidelines, manuals and other information formats for dissemination. In addition, the activities will also extend to cope with adaptive to the impacts of climate change and build people's capacity to reduce the vulnerability due to natural disasters. The coastal community should understand and aware of potential impacts of climate change on the coastal environments and able to reduce the risk of their life and livelihoods, this can promote through extension programs and training activities, which the issues cover education on impacts of climate change, training on safety at sea for small-scale fishermen, development of simple early warning system for coastal community, etc.

Activity 5: Coastal fisheries management and enhancement

This activity, which emphasizes on the resilience of coastal resources, aims to enhance and rehabilitate the aquatic resources, habitats and sanctuaries through the traditional fisheries management practices and modern fishing technologies. Resource users and stakeholders will be encouraged to actively participate in fish releasing and installation of fish aggregating devices. Fish releasing will consider the species' economic and conservation aspects, and will be conducted at the right season and in appropriate fishing grounds. Fisheries management practices and fish aggregating devices installation will be implemented based on traditional and scientific knowledge, technology and information. Resource users and stakeholders will be encouraged to take the leading role in the enforcement of rules and regulations based national fisheries laws to strengthen their functions in coastal resource management and enhancement.



As the core activity of the project, Activity 2 intends to promote people's participation in organizing community fisheries organizations based on community-based fisheries management and co-management approaches, and take the main role in fisheries governance on coastal resource management. While Activity 3 mainly supports creating job opportunities and employment for the local stakeholders particularly the women and youth in the fishing communities, Activity 5 aims to enhance and rehabilitate the aquatic resources, habitats and sanctuaries, as primary steps in coastal resource management. The community fisheries organizations established in Activity 2 will take the role of managing Activities 3 and 5 with Activity 1 and Activity 4 supporting Activities 2, 3 and 5.

Results from research and surveys (Activity 1) will be used to determine the capacity and needs for community development and resource management as well as to design the action plan and appropriate project activities. Training and extension programs in Activity 4 for capacity building of the local stakeholders, will be developed based on the results of the surveys. The implementation of the five activities will be prioritized based on local people's needs and the project annual action plan.

9. Budget and funding arrangements (This section needs further consultation with ASEAN SEC and IDB)

The selected inputs and their costs are consolidated on a project budget which should be presented on a spreadsheet under the following headings: contracts (individual, corporate or institutional); equipment; supplies and services; travel and daily subsistence allowance (not related to contracts). If more than one funding source is proposed, a budget should be prepared for each one.

The project is co-funded by Islamic Development Bank (IDB) in cash through ASEAN Secretariat, SEAFDEC in kind including the mobilization of technical staff and use of facilities and services possessed by SEAFDEC Departments and ASEAN Member Countries in kind including mobilization of technical staff as well as existing system to achieve the project objectives. Total budget is estimated in Annex 3.



Attachments

The attachments listed and described below should be appended to the Project Document as necessary or appropriate.

a. Mobilization Plan.

A plan should be prepared that describes how the project will be activated once it is approved. The preparation of this plan is especially important when the finalization of funding arrangements remains to be done. This plan could also include the designation of the project manager and any other steps that must be taken to enable the project manager to initiate implementation of the project.

b. Explanation of Budget Estimates.

This attachment should explain how budget estimates were determined for major inputs. In many cases, this attachment may simply refer to ASEAN pro forma figures for budgeting. Otherwise, supporting information should explain how budget figures were calculated.

c. Terms of Reference (TOR) for Contracts.

In the event that important elements of the project will be done on a contractual basis, the TOR should be prepared in draft as attachments. Contracts can be for individuals, firms, non- governmental organizations or other institutions. The format and instructions for the preparation of TOR for contracts provided in Form APDM/TOR.

d. Specifications for equipment.

An attachment should be prepared with the specifications for any equipment item over \$10,000 in value or for multiple purchases of a smaller item whose aggregate value exceeds \$10,000.

e. Other Attachments.

Other attachments may be provided in order to explain or clarify the Project Document. These might include explanatory technical data or a bibliography. Such additional attachments are not mandatory and should be prepared only if deemed essential for understanding of the Project Document by appraisers or potential funding agencies.

Review

The project proponent should review the draft project document for (1) clarity of the logical connections among elements of the project; (2) completeness, according the requirements of the project document format; and (3) correctness (facts, grammar, spelling). The first draft of the Project Document should be circulated for substantive comments within the concerned ASEAN body and revised accordingly before submission to the THE COORDINATION UNIT (PCU) for appraisal and further processing.

Annex 1 Log Frame on Project Follow-up, Monitoring and Evaluation:			
Expected output	Indicators	Source of verification	Risks
1. the targeted fishing communities and other stakeholders undertaking sustainable livelihood activities in fisheries and adopting sustainable coastal resource management	-30 % of total households -5 sustainable livelihood activities both fisheries and non-fisheries sectors	-District or Provincial annual reports -result of base line survey -result of workshop	-natural disaster -limitation of local resources -poor infrastructure
2. the way of life of local people in fishing communities improved and food security specifically in terms of food supply and job opportunities while the coastal environment is protected and conserved	-30% of total households -30% of total households income increases higher than national poverty line -20% of total households have alternative job	-national and provincial economic report -district or provincial annual reports -result of base line survey -result of workshop	-natural disaster -change of poverty line
3.the community fisheries organizations strongly leading the practice of planning and implementing community economic development activities for sustainable livelihood and functioning well specifically in the area of coastal resource management	- 20% of total households enable designed community plan -30% of total households function in the area of coastal resource management -4 main types of people group or organization such as women, savings, fisheries and consumer /store cooperative	-District or Provincial annual reports -result of base line survey -result of workshop	-different group interest -limitation of people's participation and society
Activity	Indicators	Source of verification	Risks
Activity 1 community survey and need assessment			
<u>1.Need assessment</u>			
1.1 community development and coastal resource management	list of problems, need and priority	-District or Provincial annual reports	-limitation of stakeholder concerned and participation
1.2 fisheries governance development and management	list of people's organization, institution, group, and list of activities	-District or Provincial annual reports	-out of date of the report
<u>Community survey</u>			

1.3 base line survey	30% of total local residence	-District or Provincial annual reports	-out of date report and data -lack of local residence participation in the survey
1.4 fish marketing survey	list of fish trader and marketing channels diagram	-District or Provincial annual reports	-out of date report and data
1.5 impacts of climate change/natural disaster	List of impacts and destruction reduction	-District or Provincial annual reports	-limitation of official and agency concerned -loss of record
<u>Monitoring & Survey</u>			
1.6 monitoring and evaluation survey on project implementation and termination	50% of local residence participated in project enabling to practice as three main expected output	-national and provincial economic report -district or provincial annual reports -result of base line survey -result of workshop	-out of date report and data
Activity 2 development of fisheries governance on coastal management			
2.1 regular meeting of community fisheries organization and development	85% of local residence attended the meeting receiving knowledge and information.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
2.2 a meeting on discussing and planning on coastal resource management formulation by community fisheries organization	50% of local residence participated in the meeting are able to design community plan coupled with activities.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
2.3 a meeting on plan and activity of local stakeholder participating in community development on voluntary and business basis	Community plan and activities both voluntary and credible performing business activities for implementation.	-district master plan -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
2.4 ad hoc meeting for special issue and activities	List of activities setting up for deal with special issues.	-district or provincial annual reports -result of base line survey -result of workshop -other report or	-limitation of stakeholder concerned and participation

		record related to	
Activity 3 contribution of community fisheries on sustainable livelihood			
3.1 A workshop on identifying possible approaches to improve community livelihood for women's group and fisher's group	95% of women and fishers participated in the workshop gained skill of SWOT analysis to improve community livelihoods.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-poor women and fishers participation
3.2 Promotion of various fisheries products and micro credit schemes	50% of local residence received and practiced knowledge on creating and improving fisheries products and micro credit system.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
	10% of community products from fisheries and non-fisheries.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of local resources -poor infrastructure -poor contribution
	50% of local residence particular women would recognize earning income.	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-out of date of report -limitation of society
3.3 Promotion of coastal aquaculture, cage culture and shell culture	20% of local residence carry out aquaculture activities	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of local resources -poor infrastructure -poor contribution
3.4 Promotion of eco-tourism, fishing sport and home stay	5% of local residence carry out eco-tourism activities	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of local resources -poor infrastructure -poor contribution
3.5 Promotion of consumer/store cooperative /group	60% of local residence benefit from the activities	Report of the cooperative/ group	-poor system and management

Activity 4 capacity building enhancement and extension program			
<u>Training arrangement</u>			
4.1 the orientation of community fisheries organization function and responsibility	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
4.2 develop community leaders, religious leaders and stakeholders in management and organization of community fisheries	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
4.3 develop women and youth in fishing communities on community development and coastal management	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
4.5 capacity building of income and financial management	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-limitation of stakeholder concerned and participation
<u>Extension program</u>			
4.6 capacity building on responsible fisheries practice and modern fishing technologies	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to -project report	-limitation of stakeholder concerned and participation
4.7 capacity building to reduce vulnerability from climate change /natural disaster	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to -project report	-limitation of stakeholder concerned and participation

4.8 coastal resource restoration based on the findings of the surveys	50% of local residence participated in the activity	-district or provincial annual reports -result of base line survey -result of workshop -other report or record related to -project report	-limitation of stakeholder concerned and participation -limitation of society
4.9 provision of information on community development and coastal resource management through printed materials and local wired announcement (if available)	50% of local residence participated in the activity	district or provincial annual reports -result of base line survey -result of workshop -other report or record related to -project report	-illiteracy -limitation of stakeholder concerned and participation
4.10 coordination with religious leaders and community leaders on logistic works and project implementation	50% of coordinated activity accomplished	-community report and record -project report	-limitation of stakeholder concerned and participation -limitation of society
Activity 5 coastal fisheries management and enhancement			
5.1 aquatic resources and habitat enhancement and rehabilitation through traditional fisheries management practice	1 % of total areas of the habitat such as mangrove forests	-Dept. of Forestry's report -district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-natural disaster -limitation of geographic factors -limitation of stakeholder concerned and participation
5.2 promotion of fish releasing and fish aggregating device installation	20% of fishers access and benefit	-Dept of Fisheries -district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-natural disaster -limitation of stakeholder concerned and participation
5.3 enforcement of rules and regulation on new habitat improvement tools by resource users and stakeholders	20% of fishers respected to rules and regulations	-Dept of Fisheries -district or provincial annual reports -result of base line survey -result of workshop -other report or record related to	-natural disaster -limitation of geographic factors -limitation of stakeholder concerned and participation
	1% of coastal areas has no interruption	-Dept of Fisheries -district or provincial annual reports -result of base line survey -result of workshop	-natural disaster -limitation of geographic factors -limitation of stakeholder concerned and



		-other report or record related to	participation
6. Project evaluation and reporting	30 % of total households -5 sustainable livelihood activities both fisheries and non-fisheries sectors -30% of total households income increases higher than national poverty line -20% of total households have alternative job - 20% of total households enable designed community plan -30% of total households function in the area of coastal resource management -4 main types of people group or organization such as women, savings, fisheries and consumer /store cooperative	-national and provincial economic report -district or provincial annual reports -result of base line survey -result of workshop	-natural disaster -change of poverty line

PROPOSED INDICATIVE WORK PLAN

Project Activity	1 st Year				2 nd Year				3 rd Year			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
1. Community survey and needs assessment 1- community development and coastal resource management 2- fisheries governance development and management 3- baseline survey 4- fish marketing surveys 5- impacts of climate change/natural disasters surveys 6- monitoring and evaluation surveys on project implementation and upon termination												
2. Development of fisheries governance on coastal management 1- problem-solving and situation analysis with involvement of former and/or newly established community fisheries organizations 2- formulation of plans and activities on coastal resource management and sustainable livelihood with participation of community fisheries organizations 3- support for the functions and networking of community fisheries organizations in the area of conflict management 4- ad hoc meeting for special issues and activities												
3. Contribution of community fisheries to sustainable livelihood 1- Workshop on identifying possible approaches to improve community livelihoods for women's groups and fisher groups 2- Promotion of various fisheries products and micro credit schemes 3- Promotion of coastal aquaculture, cage culture and shell culture 4- Promotion of eco-tourism, sports fishing and home stay 5- Promotion of cooperative dry goods grocery store												

Project Activity	1 st Year				2 nd Year				3 rd Year			
	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4	Quarter 1	Quarter 2	Quarter 3	Quarter 4
4. Capacity building enhancement and extension program 1- Orientation on community fisheries organization functions and responsibilities 2- develop the community leaders, religious leaders and stakeholders in management and organization of community fisheries 3- develop women and youth in fishing communities on community development and coastal management 4- promotion of fish marketing and product development 5- capacity building for increased income and financial management 6- capacity building on responsible fisheries practice and modern fishing technologies 7- capacity building to reduce vulnerability from climate change/natural disasters 8- coastal resource restoration based on the findings of the surveys 9- provision of information on community development and coastal resource management through printed materials and local wired announcements (if available) 10- coordination with religious leaders and community leaders on logistic works and project implementation												
5. Coastal fisheries management and enhancement 1- aquatic resources and habitat enhancement and rehabilitation through traditional fisheries management and practices 2- promotion of fish releasing and fish aggregating device installation 3- enforcement of rules and regulations on new habitat improvement tools by resource users and stakeholders												
6. Project Evaluation and Reporting												

Preliminary cost estimate			
Categories	Year 1	Year 2	Year 3
1) Activity 1: Community survey and needs assessment	10,000	10,000	10,000
2) Activity 2: Development of fisheries governance on coastal management	12,000	25,000	20,000
3) Activity 3: Contribution of community fisheries to sustainable livelihood	10,000	35,000	20,000
4) Activity 4: Capacity building enhancement and extension program	12,000	20,000	20,000
5) Activity 5: Coastal fisheries management and enhancement	10,000	30,000	15,000
6) Administrative	5,000	5,000	5,000
Sub-total	59,000	125,000	90,000
Contingency (10%)	5,900	12,500	9,000
Total	64,900	137,500	99,000
Total Proposed Budget			301,400

Estimated budget year 1						
EXPENDITURE	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	BUDGET
Travel Cost	1,920	1,920	1,920	1,920	1,920	9,600
SEAFDEC staff (Per diem)	1,440	1,440	1,440	1,440	1,440	7,200
Local staff (per diem)	720	720	720	720	720	3,600
Consultants	200	200	1,000	200	200	1,800
Invited Travel Cost	200	200	200	200	200	1,000
Meeting Cost	320	3,000	-	1,000	1000	5,320
Communications	200	200	200	200	200	1,000
Publications and Stationery	200	600	650	1,000	120	2,570
Supplies and Materials	300	1,800	1650	120	-	3,870
Survey Expenses	3,000	-	-	-	-	3,000
Training Expenses	-	-	2,000	2,500	3000	7,500
Workshop	1,100	520	-	1,500	-	3,120
Transportation	400	1,000	220	1,200	200	3,020
Furniture and Equipment	0	400	0	0	1000	1,400
Sub-total	10,000	12,000	10,000	12,000	10,000	54,000
Administrative	1000	1000	1000	1000	1000	5,000
Contingency (10%)	1000	1200	1000	1200	1000	5400
Contingency (10%) of administrative	100	100	100	100	100	500
Total	12,100	14,300	12,100	14,300	12,100	64,900



Estimated budget year 2						
EXPENDITURE	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	BUDGET
Travel Cost	1,920	1,920	1,920	1,920	1,920	9,600
SEAFDEC staff (Per diem)	1,440	1,440	1,440	1,440	1,440	7,200
Local staff (per diem)	720	720	720	720	720	3,600
Consultants	200	200	200	200	200	1,000
Invited Travel Cost	-	200	200	200	200	800
Meeting Cost	-	2,000	1,000	1,000	-	4,000
Communications	200	200	200	200	200	1,000
Publications and Stationery	100	1,000	1,000	1,000	1,000	4,100
Supplies and Materials	-	1,320	1,000	120	8,000	10,440
Survey Expenses	3,220	-	-	-	-	3,220
Training Expenses	-	10,000	20,000	7,500	6,000	41,000
Workshop	-	3,000	2,000	2,500	6,000	11,000
Transportation	1,200	1,800	2,320	1,200	1,320	7,840
Furniture and Equipment	1,000	1,200	3,000	2,000	3,000	10,200
Sub-total	10,000	25,000	35,000	20,000	30,000	115,000
Administrative	1000	1000	1000	1000	1000	5,000
Contingency (10%)	1,000	2,500	3,500	2,000	2,500	11,500
Contingency (10%) of administrative	100	100	100	100	100	500
Total	12,100	28,600	39,600	23,100	33,600	137,000

Estimated budget year 3						
EXPENDITURE	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	BUDGET
Travel Cost	1,920	1,920	1,920	1,920	1,920	9,600
SEAFDEC staff (Per diem)	1,440	1,440	1,440	1,440	1,440	7,200
Local staff (per diem)	720	720	720	720	720	3,600
Consultants	200	200	200	200	200	1,000
Invited Travel Cost	-	200	200	200	200	800
Meeting Cost	-	2,000	1,000	1,000	-	4,000
Communications	200	200	200	200	200	1,000
Publications and Stationery	100	700	420	1,000	620	2,840
Supplies and Materials	-	1,000	1,000	120	500	2,620
Survey Expenses	3,220	-	-	-	-	3,220
Training Expenses	-	6,120	5,000	7,500	4,000	17,620
Workshop	-	4,000	4,000	2,500	4,500	6,000
Transportation	1,200	1,000	2,000	1,200	350	4,750
Furniture and Equipment	1,000	500	1900	2,000	350	4,750
Sub-total	10,000	20,000	20,000	20,000	15,000	85,000
Administrative	1000	1000	1000	1000	1000	5,000
Contingency (10%)	1,000	2,000	2,000	2,000	1,500	8,500
Contingency (10%) of administrative	100	100	100	100	100	500
Total	12,100	23,100	23,100	23,100	17,600	99,000

SEAFDEC DEPARTMENTAL PROGRAMS OF ACTIVITIES FOR THE YEAR 2013-2014**I. Aquaculture Department**

Appendix No.	Project Title	2013	2014
Appendix 1	SEAFDEC Departmental Programs of Activities for 2013-2014: Aquaculture Department		
Appendix 2	Adapting to Climate Change Impacts	Y	Y
Appendix 3	Healthy and Wholesome Aquaculture	Y	Y
Appendix 4	Maintaining Environmental Integrity through Responsible Aquaculture	Y	Y
Appendix 5	Meeting Socio-economic Challenges in Aquaculture	Y	Y
Appendix 6	Quality Seed for Sustainable Aquaculture	Y	Y

II. Training Department

Appendix No.	Project Title	2013	2014
Appendix 7	SEAFDEC Departmental Programs of Activities for 2013-2014: Training Department		
Appendix 8	Promotion on strengthening of SEAFDEC visibility and image	Y	Y
Appendix 9	Tailor-made Training Programs	Y	Y
Appendix 10	Improvement of Fisheries Technology and Reduction of the Impact from Fishing	Y	Y

Y = Program implemented during the year

N = Program not implemented during the year

SEAFDEC Departmental Programs of Activity for the year 2013-2014: AQUACULTURE DEPARTMENT

Overall Review

SEAFDEC/AQD has continued to demonstrate its strong commitment to sustainable aquaculture development and responsible stewardship of aquaculture resources by implementing Programs/Projects that are in line with the recommendations made during the 2011 ASEAN-SEAFDEC Conference on Sustainable Fisheries and the framework of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region in the next decade.

For 2013, AQD has implemented 94 studies under five thematic Programs which focus on: (i) Quality Seed for Sustainable Aquaculture, (ii) Healthy and Wholesome Aquaculture, (iii) Maintaining Environmental Integrity through Responsible Aquaculture, (iv) Adapting to Climate Change Impacts, and (v) Meeting Social and Economic Challenges in Aquaculture. Activities in these Programs involve research, verification and demonstration of aquaculture technologies in the priority areas of broodstock development and seed production, farming systems and ecology, nutrition and feed development, fish health management, and socio-economics. In addition, training and information dissemination activities were likewise conducted.

This report presents the highlights of activities and accomplishments in 2013 (January to September) under various Departmental Programs:

Quality seed for sustainable aquaculture

One of the main constraints to enhancing aquaculture production in the region is the inadequacy of supply of good quality seed stocks and the required domesticated broodstocks. The issue on the supply of good quality seed is of primary concern in order for the Member Countries to meet the increasing internal demands for aquatic products and to maintain their positions as major suppliers of aquaculture products to international markets. In this Program are studies and activities that will determine the optimal conditions and methods for the production of quality seed stock in sufficient quantities. The research activities entail the use of methods of stock improvement such as domestication, broodstock management, strain evaluation and selective breeding or genetic improvement of traditional and emerging freshwater and marine species.

Development of good quality broodstock and implementation of proper broodstock management protocols

As a pre-requisite to selective breeding programs, domestication is initially pursued through monitoring of the genetic structure of base populations, establishing husbandry techniques, developing suitable diets for the different life stages and culture of live food necessary for good reproductive performance. With regard to shrimps, juveniles and sub-adults of *Penaeus monodon* are currently being grown as potential broodstock that will produce 'high health' F3 post-larvae.

Molecular markers that will identify stocks and consequently aid in determining genetic quality are currently being developed for several commercial aquaculture species including the seaweeds, *Kappaphycus* and *Eucheuma*. Another study which ultimately aims to improve existing seaweed strains deals with the isolation and culture of protoplasts from red seaweeds with potentially superior genetic traits. With regard to milkfish, through collaboration with the Philippine Department of Science and Technology and SEAFDEC/AQD, and University of the Philippines (in the Visayas and in Quezon City), studies on the development of quality milkfish broodstock using conventional stock monitoring and management protocols were continued. Local milkfish hatcheries have been surveyed and a molecular marker-based broodstock management method on the Philippine milkfish, *Chanos chanos*, stocks is on-going. Once this work is completed, genetic differences among these stocks shall be determined and information on the best possible sources of milkfish broodstock will be known.

Apart from genetic intervention, nutritional approaches to improve egg production and quality have been done as well. A maturation diet for grouper (*E. fuscoguttatus*) that incorporates pigments has been formulated and feeding trials on its effect on seed quality and production is on-going. To improve reproduction in the donkey's ear abalone, maturation diets are currently being assessed. Dietary formulations with varying levels of protein/energy have been done and their effects on abalone reproductive performance have been tested using wild and hatchery conditioned broodstock. The nutrient composition of the natural diet in comparison with formulated diets has also been identified. With regard to freshwater prawn, efficient low-pollution diets for use in rearing potential broodstock are being developed and tested. Feeding trials in lake-based cages showed that specific growth and survival rates were not affected by the replacement of fishmeal with cowpea meal as protein source in the test diets. Giant freshwater prawn spawners stocked in tanks at 1 M: 4 F sex ratio and fed test broodstock diets showed that fecundity increased with increasing levels of cowpea meal in the diet.

With regard to emerging species, efforts are being undertaken to develop broodstock conditioning methods for the sandfish, *Holothuria scabra*, since it has been observed that old spawners decrease in body size and exhibit reduced reproductive performance. Hence, in addition to conditioning techniques, sandfish reproductive performance is being improved through refinements in the spawning protocols. Apart from spawning trials, stocking density experiments for nursery production are also ongoing. Growth was noted to be satisfactory during the first month of culture but declined in the succeeding months. This indicates that the natural biofilm in hapa nets that serve as the food of the organisms can only optimally support sandfish growth in cages for up to one month only.

Concerning the species for stock enhancement, efforts are being made to develop broodstock of Napoleon wrasse as permits for broodstock collection have been filed in areas where potential stocks are to be collected. While waiting for the approval of permits and clearances, a preliminary survey was conducted in the Igang Marine Station (IMS) where sightings of small Napoleon wrasse juveniles were noted. Fin clips of some of the specimens collected namely from IMS, Bohol and Tawi-Tawi were sent to Hokkaido University for genetic characterization.

Refinement of hatchery and nursery management methods to improve seed stock quality and production

A study on the refinement of mass production techniques for copepods is being conducted with the view of supporting intensive marine fish larviculture. In addition, in search for potential natural food as an alternative to *Artemia* in intensive production of marine fish, life history parameters, as well as mass culture technique of the euryhaline cladoceran was undertaken.

To improve the production of marine fish larvae, especially the carnivorous species, nutritional interventions by way of tryptophan supplementation in the diets were used to minimize cannibalism. Preliminary trials using grouper larvae which involved weaning fish to a formulated diet were started but proved to be difficult as the larvae were very sensitive to experimental activities that require routine tank maintenance. Sea bass larvae were then tried and the larval rearing trial proceeded well. Samples of larval sea bass have been collected for serotonin level analysis and for correlation with aggressive behavior. With regard to pompano, *Trachinotus blochii* (Lacepede), optimum conditions for breeding and seed production were determined. The potential use of copepods as larval diet was also tried as alternative to *Artemia*. Results showed best survival (96%) in the copepod-fed larvae while highest weight and length increment were noted in *Artemia*-fed larvae.

A verification study on the brackishwater nursery pond culture of seabass that shall assess the optimal stocking density, feeding frequency and effect of in-pond sorters on the yield of sea bass juveniles is ongoing. Preliminary results indicated that after 30 days of culture, fish stocked at lowest density (500/m³) in cages with sorters had better survival and were bigger than those stocked at higher densities (1,000/m³ and 1,500/m³). Meanwhile, another verification study on the nursery culture of pompano in floating net cages in marine waters compared the use of pompano diet with siganid diet. It was noted that pompano fry grew better when fed pompano feeds than the siganid diet. A confirmatory run is underway to verify the observation. With regard to milkfish, initial feeding trials involving a comparison in the growth and reproductive traits of broodstock fed fortified vs non-fortified (control) diets were conducted. Diets are fortified through inclusion of phospholipids, carotenoids, vitamin C, beta carotene and arachidonic acid. It



was noted that more spawning episodes were observed in young (5-year old) milkfish broodstock fed fortified diets compared to the old stocks (17-29 year old) that were fed fortified diets as well. Older stocks fed fortified diets, however produced more eggs compared to the younger stocks. Concerning the high value marine fish species such as red snapper and pompano, it was observed that survival rate in the hatchery improved when fed sodium iodide enriched rotifer and *Artemia*. Meanwhile, in another study, the thraustochytrid *Schizochytrium* sp. (LEY7) which was used to enrich feeds for fish larvae and abalone were mass produced and further tested. Feeding trials using pompano revealed that larvae fed rotifer enriched with hatchery prepared thraustochytrids emulsion and those fed rotifer enriched with freshly harvested thraustochytrids gave the highest body weight increase. In another study which aims to improve the hatchery rearing techniques of abalone using benthic diatom feeds, preliminary runs indicated that *Nitzschia* and *Cocconeis* are promising diets based on final survival rates. Feeding with *Nitzschia* also showed high settlement rate in abalone larvae. Another nutritional intervention to improve abalone hatchery production is the administration of micro-particulate diets as alternative feed. An agar-bound micro-particulate diet has been formulated based on the nutrient profile of post larval abalone. Results showed that feeding this kind of diet to abalone when bound with 7.5mg/ml agar solution on a daily feeding frequency improve post-larval settlement and survival.

The influence of stocking density and tryptophan diets on the survival and growth of mud crab, *Scylla serrata*, in the nursery phase is also being determined. It was noted that tryptophan did little to reduce incidence of cannibalism. Hence, the following modifications to further reduce the risk of competition and cannibalism are being tried: a) reduction of culture duration from four weeks to three weeks per phase and b) use of a more complex substrate design or more substrates to maximize surface area and interstitial spaces. Refinements such as determination of the optimal natural food and artificial diet ratio and feeding rate are also being conducted. Other approaches to improve hatchery and larval rearing protocols also include: a) the evaluation of commercially available shrimp formulated diets that can be used for mud crabs and b) use of immunostimulants, prophylactics and disinfectants.

Concerning the emerging species for aquaculture such as the silver perch, *Leiopotherapon plumbeus*, studies on the type of fertilizer to improve natural food production and the optimum stocking density for tharapon larval rearing are in-progress. Results showed that larvae stocked in tanks with organic fertilizer (chicken manure) had higher specific growth rates ($7.20\% d^{-1}$) than those in tanks with inorganic fertilizer and no fertilizer treatments. As for the stocking density, growth was found to be significantly higher at 750 larvae per tank than when stocked at 1250 larvae per tank. Another stocking density experiment was also initiated and this aimed to improve the sandfish juvenile survival in floating hapas at the Igang Marine Station.

With regard to species for stock enhancement, the seahorses, *Hippocampus barbouri* and *H. comes*, are continuously being propagated in the SEAFDEC/AQD hatchery for possible stock release. Meanwhile, monthly on-site assessment at Molocaboc Island, Sagay City was conducted to monitor baseline population of wild seahorses.

Development of schemes for the production, management, maintenance and dissemination of genetically selected and improved stocks

To address this objective on commercial species, selective breeding programs have commenced for selected crustaceans (for mud crab, shrimps and freshwater prawns). For the mud crab, stress tests (particularly formalin tolerance and disease challenge response tests) were done to determine strain level differences to identify stocks with better fitness attributes. For the giant freshwater prawn, the approach for genetic improvement is to assess and determine the effective broodstock management scheme to enhance growth and/or reproductive performance. This year, potential broodstocks from two sources, Calumpit, Bulacan and Pampanga River are being grown for growth and reproductive performance comparison. Broodstock management methods (crossbreeding and optimal sex ratio) already tried as effective for the AQD hatchery stocks from Calumpit are being assessed using these different stocks.

Hybridization is currently being done on the local commercial abalone species (*Haliotis asinina*) by crossing this with other Philippine abalone species, *H. planata* and *H. glabra*, to enable the production of stocks with improved traits. A new trial was done using *H. asinina* female and male *H. planata* (Palawan

strain). Meanwhile, in an earlier growth comparison trial, in terms of body weight and shell length, pure *H. asinina* attained optimum growth at a shorter period of time compared to the hybrid HAFPM (or hybrids of *H. asinina* female parent and *H. planata* male parent). In a related study, after 180 days of culture, the third hybrid HAFVM (cross of female *H. asinina* and male *H. varia*) attained optimum growth similar with pure *H. asinina*. The new hybrid (HAFVM) is bigger compared to pure *H. asinina*. The survival of both strains is also similar (100%). In another study, efforts to produce triploid abalones are also underway. Samples of hybrid stocks and triploid abalones were sent to Hokkaido University for genetic analysis and confirmation of success in hybrid and triploid induction.

With regard to seaweeds, methods to develop resistant strains of *Kappaphycus* and reduce epiphytes are being studied. Also, the performance of haploid and diploid *Kappaphycus* is being evaluated. Preliminary results showed that growth rates of sporophytes and gametophytes are significantly different in the land-based nursery.

Adoption of economically viable systems to produce sufficient seed stock

Several fish/shellfish production projects are being implemented at SEAFDEC/AQD to demonstrate the viability of small-scale and/or large-scale seed production systems. Mass production of sex-reversed and mixed-sex Nile/red tilapia fingerlings as well as large-scale production of abalone juveniles, are continuously being done.

Healthy and wholesome aquaculture

The goal of the Program is to improve aquaculture production through innovations in nutrition and feeding and fish health management, and in preserving the environmental integrity of aquaculture areas.

Investigation on the efficacy of probiotics and rationalization of the needs and application of diagnostics that will ensure biosecurity within culture systems

The experiment to investigate the application and mode of action of probiotic *Bacillus* species in larviculture was continued. Mixed bacterial cultures obtained from various aquaculture environments were inoculated on agar medium supplemented with acyl homoserine lactone (AHL)(MM+) as sole source of carbon and nitrogen for microbial growth. Bacteria that grew on minimal medium were sub-cultured to ascertain that they are AHL-degrading bacteria. The AHL degradation rate of the isolated AHL-degrading bacteria was subsequently obtained. In another experiment, the effect of application and mode of action of polyhydroxybutyric acid (PHB) in the larviculture of *Penaeus* spp. was examined. Dietary treatments of 0, 2, and 5% PHB supplementation in SEAFDEC-formulated shrimp diets were tested. Weight gain was highest for shrimps fed 2% PHB supplementation and was significantly different from all the other shrimp groups. Percent survival, on the other hand, was highest for shrimps fed 5% PHB supplementation. With regard to abalone (*Haliotis asinina*), the experiment was continued to determine the bacterial diversity and algal community structure in biofilms of settlement plates for the larvae. A total of 67 bacterial isolates were gathered from biofilm on abalone rearing plates for identification. Meanwhile for tilapia cultured in earthen grow-out ponds, quantitative and qualitative analyses of bacterial microbiota were used as a tool to investigate the emerging and re-emerging diseases. To date, a total of 685 bacterial isolates were purified and stored at -80°C for further analyses.

Promotion on the wider use of conventional diagnostic as well as new methods for newly reported, emerging diseases

With regard to an epidemiological study aimed to elucidate on the spread of shrimp viral diseases in Southeast Asian countries, shrimp (*P. monodon*) samples, gills and pleopods were taken from 10 of the 15 farms in Region 9 (Zamboanga Peninsula, Philippines) for viral detection/analysis. Also, a total of 14 shrimp farmers in Region 9 were interviewed. None of the farmers interviewed observed the occurrence of yellow head virus disease in their crop. In another study, as part of the surveillance of emerging diseases in wild and farmed mud crab, samples were collected from six provinces – Albay, Camarines Sur, Camarines Norte, Capiz, Northern Samar and Sorsogon. The samples were processed for bacterial and fungal isolation, parasite and viral detection.

Finding effective alternative safe drugs/chemicals to manage aquaculture diseases in lieu of harmful chemicals and drugs

One of the initiatives being undertaken to address this objective involves examining the host response to pathogens and developing control methods such as the use of natural immunostimulants for marine fishes. To counter the epizootics that occurred in the AQD marine fish hatchery, a study on host defense of marine fishes against *Amyloodinium oocellatum* was continued. Experiments were designed to describe the infection of *A. ocellatum* on sea bass. Optimization of *A. ocellatum* in vivo passage procedure using pompano and siganids was conducted. Fish died within 3 days for pompano and 6 days for siganids after placing in infected tank. Optimization of dinospore hatching under laboratory condition, quantification and infection procedures were also conducted. To determine the genes expressed and the levels of expression during infection, tissue samples were collected both from moribund naturally infected and experimentally infected fish for monitoring the expression of immune response genes by RT-PCR. Apart from these experiments, a study was continued to screen for antimicrobial activities of crude extracts from the seaweed, *Gracilaria* spp. Experiments were also initiated to develop novel strategies that will reduce disease incidence in mud crab hatchery and grow-out. Live crab and pond sediment samples were collected from Pontevedra, Capiz, Ajuy, Iloilo, Aklan and Roxas City. Bacterial isolates from crab body surface and hepatopancreas, and pond sediments were submitted for genus level identification using conventional biochemical test. In addition, natural products and powdered leaves of plants were solvent extracted and tested for in vitro antimicrobial activity against aquaculture and human pathogens.

Finding different sources of fish meal substitutes and development of effective feed management schemes that incorporate sound management

Studies were continued in 2013 to address this objective. One of such studies was the optimization of the feeding and management strategies of growing milkfish in marine floating net cages and brackishwater ponds using improved milkfish practical feed with optimum inclusion of soybean meal (SBM) and soy protein concentrate (SPC). Experiment conducted in floating net cages at AQD's Igang Marine Station after 84 days of culture showed the highest percent mean weight gain of 720 in stocks fed daily. Efforts were also continued to improve the nutritional value of locally available feed resources by fermentation. Experiments have indicated that milkfish fed different natural food bases or practical diet have different microbiota composition which could be used for fermentation studies involving various feed ingredients for the improvement of milkfish diet formulations. In a related experiment, lactic acid bacteria from abalone gut, *Pedicoccus* sp. have been isolated, purified and characterized and will be used in the fermentation of ingredients. Nutritional evaluation and growth experiments will be done on fish fed the fermented ingredients. Meanwhile, preparations have been made to initiate studies that will evaluate the milkfish by-product hydrolysate as ingredient in juvenile grouper, *Epinephelus coioides* diets and the use of distillers dried grain with soluble evaluation as protein ingredient for milkfish diets. With regard to mud crab, different pellet shapes were tested to determine the feed shape preference. Results showed that spherical balls and cube shapes were preferred by mud crab compared to the spaghetti-like and tablet shape. For giant freshwater prawn, *M. rosenbergii*, the experiment to test the different total effective substrate area showed no significant differences in length, weight and survival on various treatments (0, 40, 80, 120 %). Significantly better growth was also observed at lowest stocking density (5 pieces/m²) but no significant effects on the survival.

Development of aquafeeds for selected species at specific growth stages especially for species or stages for which no artificial feed has been formulated

The golden pompano is one of the test species that is being assessed to address this objective. Nine test diets at different protein levels (54, 46 and 38% CP) and lipid levels (8, 11 and 14%) were formulated for feeding experiment in tanks using pompano fry. Nutrient composition for pompano feed formulation showed no effects of lipid dietary level in terms of growth rate in all levels of protein. Requirement of these fish species for essential amino acids will be determined in the next feeding trials. Another species tested to address the objective is the mud crab. Studies were initiated in 2013 to evaluate the existing feed formulation during grow-out culture.

Promotion of better understanding of the concept of feed conversion ratio, and adequate nutrition and efficient feeding practices among fish farmers to promote fish health

Various experiments are being implemented to address this objective. Separate semi-intensive grow-out experiments were conducted to assess the economic feasibility of rearing pompano, grouper and rabbitfish in brackishwater ponds using either commercial diet or AQD-formulated diet. Concerning the combined culture of tilapia and freshwater prawn, experimental runs to test the effects of AQD formulated feed and commercial feed during rearing in net cage in freshwater dam/reservoir in Dingle, Iloilo showed that this is technically and economically feasible. With regard to mud crab, pond trials were started in 2013 to develop protocols for the production of hatchery-reared juveniles for soft-shell crab farming. The other demonstration trial started in 2013 was on the seaweed, *Gracilariopsis heteroclada*. Comparison on the growth performance of *G. heteroclada* using fixed bottom line and broadcast method showed that fixed bottom line yielded better growth compared to the broadcast method both in pond and intertidal area.

Maintaining environmental integrity through responsible aquaculture

The program aims to develop environment friendly-based aquaculture technologies by integrating environmental factors in SEAFDEC/AQD research activities and promoting responsible aquaculture. Specifically, the program will: a) assess impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems; b) identify appropriate extractive species that may be used in integrated multitrophic aquaculture (IMTA); c) develop and promote efficient and suitable environment-friendly culture systems; and d) conduct biological and ecological studies on species with potentials for resource enhancement.

Assessment of impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems

As an initial step to address this objective, AQD conducts regular monitoring of all its research stations. With regard to Igang Marine Station, a monitoring system for water and substrate quality has been established. The biodiversity of various ecosystem types as well as near the cage set-up has been determined, with 805 species in 292 families and 20 major taxa identified. At Tigbauan Main Station, sampling of the shore areas revealed some 516 species in 10 major taxa which have been collected and photographed. Moreover, at the Binangonan Freshwater Station, a comparison of phytoplankton, zooplankton and fish and other vertebrate diversity in two sites (east cove and west cove) around the station was made.

A project on the biodiversity in the milkfish and shrimp fry fishery in the surf zones in southern and western Panay, Philippines is also being implemented. Various fry collection sites in Antique and Guimbal were sampled. The fry collectors attributed the decline in fry catch from previous years to rice field pesticides, oil spills and fishing. More than 12 species of fish larvae and juveniles were identified in catches from Guimbal and Antique.

Identification of appropriate extractive species that may be used in integrated multitrophic aquaculture (IMTA)

Various experiments are on-going to assess the compatibility and to identify appropriate extractive species that may be used in IMTA. Among the extractive species being investigated are the sandfish *Holothuria scabra*, the bivalve mollusk *Anodontia philippiana* and the seaweed *Gracillaria heteroclada*. The co-culture of these extractive species with other commercially important commodities is being investigated. One of these is the polyculture of sandfish, *Holothuria scabra*, with milkfish and other selected marine fish species. The co-culture of seaweed *G. heteroclada* with sea bass is also being investigated. After 150 days of culture, the specific growth rate of sea bass in monoculture and co-culture with seaweed was 3.70 and 3.59% day, respectively. Since *A. philippiana* is known to assimilate sulfide, the potential of this bivalve together with the seaweed to improve the culture conditions of milkfish is being investigated.

Development and promotion of an efficient and suitable environment-friendly culture systems

As part of the effort to develop and promote efficient and suitable environment-friendly culture systems,

activities are in-progress to evaluate the culture parameters for optimal growth and survival of sandfish, *H. scabra*. For the pond/pen culture, a survey of various pond sites has been done with Concepcion, San Dionisio and Ajuy showing good potential. For the sea ranching of this commodity, among the various sites, Concepcion was selected to be the initial pilot site. Community preparation for the project has been completed.

In another study, the information on the carrying capacity of some freshwater systems in the Philippines based on modeling through an ACIAR (Australian Centre for International Agriculture Research) has been completed. Model results and sensitivity analysis showed fish carrying capacity tonnages within the range of literature values for Asia and slightly higher than annual production recorded for some Philippine lakes. The dominant parameters driving carrying capacity were initial nutrient loading then increasing lake surface area, mean lake depth and flushing rates.

Conduct of biological and ecological studies on species with potentials for resource enhancement

A number of biological and ecological studies on species with potentials for resource enhancement are in-progress to address this objective. These species are the giant clam *Tridacna gigas*, abalone *Haliotis asinina*, and three species of mud crabs *Scylla serrata*, *S. olivacea* and *S. tranquebarica*. Concerning the giant clam, the study on stock enhancement in the marine protected areas in San Joaquin, Iloilo has been completed. The activity was able to elicit positive results in promoting protection of wild clams. More wild clams are being discovered and those that were measured showed to have good growth and high survival.

Adapting to climate change impacts

The Program aims to identify the accompanying changes in the environment brought about by the changing climate that may affect the aquaculture sector, prepare the sector to the possible effects that these changes may have on aquaculture operations, minimize and mitigate the adverse impacts of climate in aquaculture, and ensure the continued operation of all aquaculture production systems under changing climatic conditions.

For 2013, studies have focused on examining how climate change affects the biology of various species presently farmed and the various support systems. In tropical aquaculture fishes, very little information is known on how gonadal maturation and spawning is affected by elevated temperature. Hence, to address this, initial investigation was made in rabbitfish. Spawning success was best in breeders maintained at ambient temperature (29-30°C), followed by those maintained at 31°C. However, spawning was affected when breeders were exposed to temperature of 33°C. The effects of elevated water temperature were also evaluated on embryonic development of the other important marine fishes such as the milkfish, rabbitfish and the Asian sea bass and on important mollusks such as the abalone. For the three marine fishes, embryonic development success and hatching rate were always high when embryos were incubated in ambient temperature of 28-29°C. Moreover, survival of larvae was always best when reared at ambient water temperature. With regard to abalone larvae, it was found that survival and settlement rate were highest at ambient temperature and very low at 33°C and 31°C. In another study, the interactive effects of temperature, pH and salinity were examined in rotifers and copepods, two important zooplankton that are commonly used in fish hatcheries. Rotifer and copepods were found resilient to elevated temperature but acidic conditions have significant effects on their growth and survival. Another study initiated during the year aimed at examining the relationship of environmental parameters on occurrence of disease and physiological responses of infected seaweeds. Photosynthetic responses of epiphyte-infected *Kappaphycus alvarezii* to irradiance, pH and salinity variation are in-progress.

Meeting social and economic challenges in aquaculture

This Program aims to address the recommendations which were adopted during the June 2011 ASEAN-SEAFDEC Fisheries Conference and these cover the following areas: (i) prioritizing collaborative R&D in aquaculture in the region to have a clear regional assessment and understanding of the role of aquaculture in poverty alleviation and provide basis for policy formulation; (ii) allocating R&D resources to address emerging issues on the impacts of climate change and global trade on aquaculture with emphasis on small-holder fish farmers; and (iii) enhancing multi-agency collaboration, sharing of information and resources

between and among SEAFDEC and its Member Countries and other organizations in addressing the common problems of alleviating the socioeconomic conditions of the poor sector of region. The accomplishments are described below:

Prioritizing collaborative R&D in aquaculture in the region to have a clear regional assessment and understanding of the role of aquaculture in poverty alleviation

The program is implementing three studies that engage different modalities of collaboration, demonstration and participation of small-scale aquaculture technology adopters in the Philippines. For freshwater aquaculture, two demonstration runs, conducted with a farmer cooperative, on the grow-out culture of giant freshwater prawn, *M. rosenbergii*, in net cages in Laguna Lake were completed. Both the monoculture (36% and 52% prawn survival rates for the two cooperators, respectively) and polyculture (43% prawn survival rate and 39% for tilapia) runs, however, did not meet the target yield due to the increase in lake water level (2.2m) during southwest monsoon, algal blooms and other technical limitations. The interest and motivation of small-scale fish farmer-collaborators also needs improvement.

Meanwhile, the study on community-based stock enhancement of abalone, *H. asinina*, in a demonstration site in Barangay Molocaboc within the Sagay Marine Reserve (SMR) in Negros Occidental has continued and this involves the participation of Barangay Molocaboc Fisheries and Aquatic Resources Management Council (BFARMC) representing the fishers, the SMR representing the local government of Sagay and the local abalone traders. Apart from practicing the “stock-protect-partial harvest” protocol, the study has applied financial management strategy which is intended to sustain the demo-site and enable the BFARMC to be an independent enterprising organization of fishers when the AQD-GOJ support for this study ends in 2014. Community-managed stock enhancement of sea cucumbers is also being done in SMR, while baseline studies and seed production trials for stocking of sea horses are also on-going.

The lessons from the study in Sagay City are being applied in another study on developing area capability in coastal communities which started in 2012 with funds from the Research Institute for Humanity and Nature (RIHN-Japan). The project involves various stakeholders and collaborators including fisherfolks’ association, the local government of New Washington and a local fisheries university that is engaged in information, education and communications (IEC) activities and in fisheries baseline data collection and monitoring systems. Aquaculture provides hatchery-bred shrimp, *P. monodon*, juveniles that go through intermediate culture in ponds prior to release in Batan Bay. The intermediate culture of shrimp juveniles in July 2013 for release in September 2013 was, however, challenged by low survival rates. Its causes and potential remedial measures are being evaluated.

Allocating R&D resources to address emerging issues on the impacts of climate change and global trade on aquaculture with emphasis on small-holder fish farmers

Through the abovementioned collaborative studies, the Program has initiated and allocated R&D resources for demo-sites to show potential commercially viable business using aquaculture technologies and stock enhancement protocols. In particular, the demo-site in Laguna Lake enabled a fish farmers’ cooperative to harvest and sell freshwater prawns, although in limited quantities, in addition to the usual tilapia monocultured in cages within the municipality of Binangonan, Rizal.

In Sagay City, the BFARMC composed of fishers obtains monthly rice allowances bought using the proceeds from sale of partial harvests in the abalone stock enhancement demo-site. Gleaners also began to report catching some abalones in the shorelines of Molocaboc Island. Traditionally, abalones caught in Sagay are sold cooked and chilled without shells. This stock enhancement study has recommended buying live abalones from fishers to complement the adoption of the 6 cm shell length catch size regulation endorsed by this study. Buying of live abalones from fishers also ensures better quality and food safety of products from Sagay for domestic and export trade.

Enhancing multi-agency collaboration, sharing of information and resources in addressing the common problems of alleviating the socioeconomic conditions of the poor sector of the region

As of 2013, the Program has not yet engaged the participation of Member Countries. However, the Program sees the forthcoming International Workshop on Resource Enhancement and Sustainable Aquaculture of AQD and GOJ, scheduled to be held in March 2014, as an opportunity to initiate the social

science network in the Region. Some areas of collaboration could be on testing of community-based stock enhancement strategies in Member Countries with emphasis on developing country-specific techniques.

Other R&D Activities

Institutional Capacity Development on Sustainable Aquaculture (ICDSA) and other Collaborative Projects

The ICDSA seeks to promote aquaculture technologies developed by AQD through institutional capacity development, hence the program is being implemented in partnerships with the local government units, donor agencies, fisherfolks/farmers and other stakeholder groups. ICDSA provides a mechanism for the assessment of socioeconomic and environmental impacts of AQD aquaculture technologies and for building the capacity of beneficiary communities.

For the collaborative projects with BFAR, SEAFDEC/AQD has rendered technical assistance in the construction of multi-species marine fish hatcheries in different parts of the Philippines. The multi-species marine fish hatcheries in Baler, Aurora; Sta. Lucia, Palawan; Bongabong, Oriental Mindoro have been completed and are already operational. The construction of the hatchery facilities in Sta. Cruz, Davao is almost completed; construction of the hatchery facilities in Sagnay, Camarines Sur and Laoang, Samar are in the early stages. Schedule of work was delayed because of the national elections.

SEAFDEC/AQD has also provided technical assistance for the operation of the hatcheries that are already operational (Baler, Aurora; Sta. Lucia, Palawan; Bongabong, Oriental Mindoro), the marine fish hatcheries in Ubay, Bohol; as well as the newly-established community-based hatcheries in Medellin, Cebu (Region VII) and CARAGA (Region 13).

SEAFDEC/AQD will be working with Winrock International (an NGO) in implementing a development project for improved production efficiency in the CARAGA region. AQD's role is on capacity building in aquaculture through introduction of technologies that will enhance production of aquaculture species that are economically important in the region. A consultation meeting was organized with the provincial fisheries officers and key personnel of BFAR Region 13.

As an offshoot of the USAID-ASEAN led dialogue on public-private partnership, SEAFDEC/AQD has been working with MARKET (a USAID funded-initiative) on a project-proposal that will promote best feeding practices in aquaculture in selected Southeast Asian countries (Indonesia, Philippines, Thailand and Viet Nam).

ABOT AquaNegosyo

The ABOT (Agree-Build-Operate-Transfer) AquaNegosyo (aquaculture business) Program aims to disseminate science-based aquaculture technologies to encourage private sector investments in aquafarming for livelihood generation and food security. Technology packages are promoted to potential local and international business investors through the provision of technical assistance in every phase of on-farm operations, from site selection to fish stocking, feeding, water and health management, monitoring, harvesting and post-production.

The Program received 42 local and 10 foreign inquiries from January to September. Inquiries received were on the culture of sea bass, grouper, milkfish, mud crab, abalone, shrimp, tilapia and freshwater prawn. Seven local and three foreign ABOT clients were served. For local clients, the requests were mostly on the evaluation of sites and pond operation. For foreign clients, technical assistance on sandfish hatchery and nursery was provided to Century Marine Products, Inc. in Kota Kinabalu, Malaysia. Site assessment for tilapia farming was provided to Microtrend Enterprise LDA in Luanda, Angola. Meanwhile, AQD assistance to Agricultural Cooperative Development International and Volunteers in Overseas Cooperative Assistance (ACDI/VOCA) in Timor Leste on mud crab culture has been an on-going activity since 2011.

Training and Information

The training courses conducted from January to September 2013 were on the following areas: marine fish (grouper, snapper, sea bass, pompano, rabbitfish and milkfish) hatchery operations; hatchery, nursery and grow-out of tilapia, catfish, giant freshwater prawn, abalone, mud crab; hatchery and nursery of sea cucumber; seaweeds nursery; community-based mangrove rehabilitation; algal culture; and techniques in bacteriology and microbiology. A distance learning course on principles of health management in aquaculture (AquaHealth Online) which started in September 2012 was completed in February 2013. Another distance learning course on principles of nutrition for tropical aquaculture is on-going (AquaNutrition Online). Training courses lined up for the rest of the year include additional training sessions on hatchery, nursery and grow-out of mud crab and sea cucumber; seaweeds nursery; and community-based mangrove rehabilitation; training courses on shrimp hatchery and grow-out, stock enhancement of abalone, community-based freshwater aquaculture and feed formulation and feeding management. The Training Section also facilitated the internship program availed of by 39 individuals and student on-the-job training program availed of by 225 students from 31 local schools/universities.

The recipients of AQD's capacity building programs are mostly from SEAFDEC Member Countries. Over 3,000 participants from various stakeholder groups have been trained from 2002-2013. Philippines, being the host country to AQD, had the most number of participants (70.78%) to the various capacity building programs of the Department. Overall, AQD's capacity building programs have already produced a large number of technical personnel who are now in the aquaculture business themselves or conduct or direct further R&D in their home countries.

With regard to information dissemination, apart from scientific publications in international peer-reviewed journals, AQD produced/disseminated a new manual (production of microalgae for aquaculture) and a field guide for mangroves, flyers about SEAFDEC/AQD, and reports from the Development Bank of the Philippines-funded Sustainable Mariculture Investment Program Survey. The other manuals which are in various stages of publication are: intensive culture of milkfish and polyculture with white shrimp, mud crab in brackishwater ponds, hatchery production of pompano, and breeding and seed production of rabbitfish. Other information materials produced were the in-house newsletters, annual reports, and institutional videos.

To further enhance AQD's visibility to various stakeholders, the Department also did frequent updating of its website, posted stories about the Department's events in Facebook, facilitated press releases and airing of important AQD events and technological developments in the weekly Philippine television program (Mag-Agri Tayo or Let us do Agriculture), and participated in fairs and exhibits.

PLANS IN 2014

To meet the objectives of the thematic Programs and fast track AQD's overall development goal, AQD will continue most of the studies/projects conducted in 2013. This will also include putting in high 'gear' the activities that will ensure adoption and uptake of AQD's viable aquaculture technologies by its targeted clients.

2. List of Programs

Departmental Programs Implemented in 2013:

- 1) Quality seed for sustainable aquaculture
- 2) Healthy and wholesome aquaculture
- 3) Maintaining environmental integrity through responsible aquaculture
- 4) Adapting to climate change impacts
- 5) Meeting social and economic challenges in aquaculture



Proposed Departmental Programs for 2014:

- 1) Quality seed for sustainable aquaculture
- 2) Healthy and wholesome aquaculture
- 3) Maintaining environmental integrity through responsible aquaculture
- 4) Adapting to climate change impacts
- 5) Meeting social and economic challenges in aquaculture

PROJECT DOCUMENT

Program Categories: Departmental Programs
Project Title: Adapting to Climate Change
Responsible Department: Aquaculture Department
Total Duration: 2012-2016
Funding Sources: Philippine Government
Estimated Budget for 2014: USD100,000

1. INTRODUCTION

The changing global weather patterns brought about by increased global emission of carbon dioxide into the atmosphere are predicted to have serious impacts on many life forms on earth. This year alone, an estimated all-time high of 34 billion tonnes of carbon dioxide emission was already recorded, an increase of 3% compared to last year (European Commission's Joint Research Center). The high level of carbon dioxide in the atmosphere has already resulted in global warming and has changed the chemistry of the world's oceans in ways that are already harming the coral-reef ecosystem and shell-building organisms (IPCC 2007). These changes could lead to broad impacts on marine ecosystems. The extreme weather disturbances, like more frequent and stronger typhoons, long dry spells resulting to droughts, frequent heavy rains resulting to severe flooding, that are observed in recent years are some of the phenomena that are linked to climate change.

The changes in the climate are projected to impact broadly across ecosystems increasing pressures on all livelihoods and food supply chains, including the fisheries and aquaculture sectors. The future food supply will be a central issue as food resources come under greater pressure. In particular, the sustainability of aquaculture will be further challenged in this scenario since the effect of these climatic changes on the aquaculture organisms in general, the different aquaculture systems and structures, the various support systems to aquaculture operations, and to the fish farmers, are largely unknown. The small-scale fish farmers in the region that produce the great bulk of the aquaculture production are largely vulnerable since they are dependent on aquaculture operations for food and income. Some urgent adaptation measures are therefore required in response to the threats to food and livelihood provision that may arise due to the changing climatic conditions observed around the globe.

2. PROJECT

2.1 Goal /Overall Objectives

The overall goal of the program is to identify the accompanying changes in the environment brought about by the changing climate that may affect the aquaculture sector, prepare the sector to the possible effects that these changes may have on aquaculture operations, minimize and mitigate the adverse impact of climate change in aquaculture, and ensure the continued operations of all aquaculture production system under changing climatic conditions.

Objectives:

- 1) Gather scientific information on susceptibilities of various aquaculture species to the combined effects of increasing water temperature and acidity.
- 2) Gather scientific data on the effect of climate change to production of natural live food for the hatcheries and fishponds.
- 3) To promote public awareness on the possible effects of climate change to aquaculture activities and to fish farmers.
- 4) To assist the government agencies in the country and in the region in gathering baseline information on aquaculture areas that are susceptible to climate change effects.
- 5) Gather scientific information that will serve as basis for the formulation or design of alternative aquaculture systems that are adaptive to climate change.

- 6) To collaborate with other institutions in the country and in the region in gathering baseline information on the effects of climate change to mangrove and coral reef ecosystems.
- 7) To explore potential adaptive measures to mitigate the impacts of climate change to the aquatic system.

2.2 Expected Outputs

- Scientific information generated on the effects of increasing temperature on: i) the reproductive performance of important aquaculture commodities; ii) the embryonic and early larval development of important aquaculture commodities; iii) growth, survival of important aquaculture commodities ; iv) susceptibility to diseases of fish, shrimp and seaweeds.
- Scientific information generated on the effects of increasing temperature, pH and salinity on reproduction and growth of natural food organisms used in fish hatcheries.
- Field data gathered on the relationship of environmental parameters on seaweed production and occurrence of diseases.
- Availability of scientific information that will serve as basis for the formulation or design of alternative aquaculture systems that is adaptive to climate change.
- Public awareness on the possible effects of climate change to aquaculture activities and to fish farmers promoted.

2.3 Program Description/Framework:

Activities of the program include the important issues and recommendations that were discussed during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020, Fish for the People 2020: Adaptation to a Changing Environment. Areas in the region that are vulnerable to climate change-related effects will be identified and the kind of probable impact(s) will be determined so that appropriate adaptive measures can be proposed. The fish farmers and the general public will need to have better understanding about climate change and its likely impact(s) to their livelihood opportunities for better preparation and adaptation. Since largely almost nothing is known how climate change will affect the biology of various species presently farmed and the various support systems, series of experiments will be conducted to gather important scientific data that will serve as basis for the mitigation measures that will be provided. Improvements and innovations on the different aquaculture holding systems and structures are also necessary in order to lessen and/or reduce the impact to fish supply production.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

- a. *Generate scientific information on the effects of increasing temperature on the reproductive performance of important aquaculture fishes*

Rabbitfish

Very little information on how gonadal maturation and spawning in tropical aquaculture fishes is affected by temperature. This was investigated in rabbitfish (*Siganus guttatus*). The reproductive performance of rabbitfish maintained at constant water temperature of 33°C was very poor – for a 12-month period, spawning was observed only twice and in both cases, the eggs were not hatched. Spawning success was best in breeders maintained at ambient temperature (29-30 °C) followed by those maintained at 31 °C. However, when the water temperature in the broodstock tanks was set to follow the diurnal temperature fluctuation (day time temperature is higher than night time temperature and a difference of 2 °C was set between day time and night time temperature), the reproductive performance of rabbitfish improved significantly. As expected, gonadal development and spawning success were good in breeders maintained at ambient water temperature and in the group maintained at 31 °C (day time temperature) and 29 °C (night time temperature). Interestingly, gonadal development was also significantly improved in the group exposed to day time temperature of 33°C and night time temperature of 31°C (33 °C -31 °C temperature cycle) compared to fish that were exposed to constant temperature of 33 °C. However, the fish still did not spawn.

- b. *Generate scientific information on the effects of increasing temperature on embryonic and larval development of important aquaculture commodities.*

Marine fishes – Rabbitfish, Milkfish, Asian Sea bass

On embryonic development

The effect of elevated water temperature [ambient (28-29°C), 31°C, 33°C] on embryonic development was examined in milkfish, Asian sea bass and rabbitfish. Embryonic development success and hatching rate were always high when embryos were incubated in ambient temperature of 28-29°C. Embryonic development was aborted in all 3 species when fertilized eggs were incubated at 33°C. Although embryonic development proceeded normally in embryos incubated in 31°C, hatching rate was lower compared with those incubated in ambient temperature.

On subsequent larval performance

The effect of elevated water temperature on larval survival after 10 days of rearing was also investigated in milkfish, rabbitfish and the Asian sea bass. For the 3 species, survival was always best when reared at ambient water temperature. Survival was significantly low (< 2%) in milkfish and rabbitfish when reared in constant water temperatures of both 31 and 33°C. Among the 3 species, sea bass larvae survived the best at higher temperatures of 31°C (18% average survival) and 33°C (6.5% average survival).

During larval rearing of rabbitfish where the water temperatures follow a diurnal fluctuation (higher temperature during day time and lower temperature during night time - 2°C difference in the temperature), survival was not improved.

Mollusk- abalone

The effect of elevated temperature was examined on the embryonic development and hatching success in abalone. Highest embryonic development success and hatching rates was observed in groups reared in ambient temperature and lowest at 33°. Larval survival and settlement success were also examined and results showed that survival and settlement rate was very low in 33°C and 31°C, and highest in ambient temperature.

- c. *Generate scientific information on the effects of increasing temperature, pH, salinity on reproduction and growth of natural food organisms used in the hatchery*

A factorial experiment, interactive effects of temperature (29, 31, 33°C), pH (7.5, 7.8 and 8.0 ± 0.10), and salinities (20, 30 and 38 ppt) on reproduction, growth and survival of rotifer and copepods, both are important food organisms for hatcheries, was conducted.

Rotifer

Population growth of rotifer was significantly higher at high temperature (33°C) and low salinity (20ppt), and low at low pH (pH 7.5), although no interactive effects on population growth was observed in combined conditions. The size of rotifers was not significantly different among treatments. No abnormality in swimming or morphology was observed in all treatments.

Copepods

Two species of copepod were used in the experiment, *Pseudodiaptomus annandalie* and *Acartia tsuensis*. Survival of *P. annandalie* was significantly lower in low pH (7.5) and high salinity (38 ppt) while survival of *A. tsuensis* was significantly low in low salinity (20ppt) and low pH (7.5).

Based from the above data, rotifer and copepods are more resilient to elevated temperature but acidic conditions have significant effect on their growth and survival.

d. Generate scientific information on the relationship of environmental parameters on occurrence of disease and physiological responses of infected seaweeds

Photosynthetic responses of epiphyte-infected *Kappaphycus alvarezii* to irradiance, pH and salinity variation is on-going, however no significant results has been generated due to unavailability of epiphyte-infected seaweeds.

Major program activity	Duration	Remarks
<p>Generate scientific information on the effects of increasing temperature on the reproductive performance of important aquaculture commodities</p> <p>Reproductive performance of rabbitfish</p>	2013	Rabbitfish will not spawn when exposed to water temperature of 33°C
<p>Generate scientific information on the effects of increasing temperature on embryonic and larval development of important aquaculture commodities.</p> <p>Marine fish</p> <p>Milkfish</p>	2013	Embryonic dev and hatching rate was best in ambient T°C; aborted in 33°C
Rabbitfish	2013	Larval survival best in ambient temperature and very low in both 31 and 33°C
Asian Sea bass	2013	Sea bass survived better in 31 and 33°C compared to milkfish and rabbit fish
<p>Mollusk</p> <p>Abalone</p>	2013	Hatching rate, larval survival and settlement success in abalone is very low in 33°C
<p>Generate scientific information on the effects of increasing temperature, pH, salinity on reproduction and growth of natural food organisms used in the hatchery</p> <p>Zooplankton</p> <p>Rotifer</p>	2013	<p>Rotifer</p> <p>Population growth of rotifer is significantly higher in high temperature (33°C) and low salinity (20ppt) and low in low pH (pH 7.5)</p>
Copepods	2013	<p>Copepods</p> <p><i>P. annandalie</i></p> <p>Survival was significantly lower in low pH (7.5) and high salinity (38ppt)</p> <p><i>A. tsuensis</i></p> <p>Survival (10-15%) and fecundity (0-15 nauplii/female) were significantly lower in low salinity (20ppt) and low pH</p>
Generate scientific information on the relationship of environmental parameters on physiological responses of	2013-2014	Photosynthesis experiment for healthy <i>Kappaphycus alvarezii</i>

Major program activity	Duration	Remarks
<i>infected seaweeds</i>		completed but need to compare results with epiphyte-infected <i>K. alvarezii</i>

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Major program activity	Duration	Remarks
<i>Generate scientific information on the effects of increasing temperature on the reproductive performance of important aquaculture commodities</i>		
Milkfish	2014	This will be conducted when funds from DOST for the purchase of heaters become available
Abalone	2014	Spawning performance will be monitored at elevated temperatures (31 and 33°C).
<i>Generate scientific information on the effects of increasing temperature on embryonic and larval development of important aquaculture commodities.</i>		
Pompano/Grouper/Snapper	2014	The effect(s) of elevated temperatures on other stages of larval development will be tested.
<i>Generate scientific information on the effects of increasing acidity on embryonic and larval development of important aquaculture commodities.</i>		
Abalone	Mid 2014	This will be conducted if CO ₂ chamber will be available by middle of 2014
<i>Generate scientific information on the effects of increasing temperature, pH, salinity on reproduction and growth of natural food organisms used in the hatchery</i>		
Zooplankton	2014	Nutritional composition of zooplankton reared in different environmental conditions will be evaluated
Phytoplankton	2014	Effect of salinity, temperature and pH will be done on phytoplankton production.
<i>Lack of scientific information on the effect of cc on natural food production in ponds.</i>	2014-2016	Determine lablab composition during extreme weather events; Determine temp/salinity/pH levels and their combination that affect lablab

Major program activity	Duration	Remarks
<i>Generate scientific information on the effects of increasing temperature on growth, survival and reproduction in seaweeds</i>	2014-2015	composition (laboratory expt.); Determine growth/survival of milkfish fry fed lablab of diff composition The effects of increasing temp/pH on growth/survival and spore shedding of <i>Kappaphycus</i> will be done
<i>Generate scientific information on the relationship of environmental parameters on occurrence of disease / physiological responses of infected seaweeds</i>	Until mid 2014	Continuing study of MS student. -Determine effects of temp, UV and salinity on the physiological responses of infected seaweeds

4.2 Expected Outputs in 2014:

- Reproductive performance of milkfish in water temperatures of 31°C and 33°C determined
- Spawning performance of abalone in elevated temperature assessed
- Developmental success and survival of embryos of groupers, red snapper and pompano at elevated water temperature of up to 33°C known
- The ability of the other stages of abalone larvae to survive elevated water temperature and acidic conditions established.
- Data gathered on whether growth, survival and spore shedding of *Kappaphycus* are affected by elevated water temperature (33°C) and acidic water pH
- Data generated on the relationship/correlation between changes in environmental parameters to seaweed production and occurrence of diseases in seaweed farms
- Data generated on whether growth, reproduction, survival and nutritional composition of rotifers and other zooplankton (copepods) are affected by elevated water temperature and increased water acidity
- Data generated on whether lablab composition is affected during extreme weather events (long dry spell and heavy rains)
- Data gathered on temperature/salinity/pH combinations that affect lablab growth and composition

PROJECT DOCUMENT

Program Categories: Departmental Programs
Project Title: Healthy and Wholesome Aquaculture
Responsible Department: Aquaculture Department
Total Duration: 2012-2016
Funding Sources¹: Philippine Government
Estimated Budget for 2014: USD 510,000

1. INTRODUCTION

Healthy and wholesome aquaculture is one of the thematic programs aimed to address the role of attaining sustainable aquaculture production through provision of protein needs for the growing human populace. Although research and development efforts on these aspects have already resulted in phenomenal growth of the sector in the last decades or so, there is still a need for further studies on this aspect since we are faced with challenges posed by ecological, economic, and climatic changes among others that we now encounter in our present situation. In order therefore to be assured of significant improvements and production sustainability for future generations, there is a need to consider working more on this healthy and wholesome aquaculture program. This Program aims to contribute to improvement of aquaculture production through innovations in nutrition and feeding and fish health management and in preserving the environmental integrity of aquaculture.

2. PROJECT

2.1 Objectives

- 1) Investigate the efficacy of probiotics and rationalize the need and application of diagnostics that will ensure biosecurity within culture systems and keep out exotic pathogens, especially transboundary pathogens.
- 2) Promote the wider use of conventional diagnostic as well as new methods especially for newly reported, emerging diseases.
- 3) Find effective alternative safe drugs/chemicals (including natural products) to manage aquaculture diseases in lieu of the harmful chemicals and drugs which have been discouraged or banned for use due to quality and safety issues
- 4) Find different sources of fish meal substitutes and develop effective feed management schemes that incorporate sound management
- 5) Develop aquafeeds for selected species at specific growth stages especially for species or stages for which no artificial feed has been formulated
- 6) Promote better understanding of the concept of feed conversion ratio (FCR) and adequate nutrition and efficient feeding practices among fish farmers to promote fish health

2.2 Outcomes and Expected Outputs

- The application of probiotic *Bacillus* species in larval rearing of *Peneaus* is established
- Field-tested immunostimulants for important marine species
- Identified causative agent for the two months mortality syndrome including ways to prevent or control disease occurrence/outbreak
- Bacterial and viral vaccines for the grow out of fish and crustaceans developed
- Zoonotic bacteria and parasites from cultured organisms identified
- Health status of wild shrimp stocks (primarily WSSV and other potential pathogens) updated
- Economics of producing mudcrab juveniles for soft-shell crab farming identified
- Fish health specialists from Member Countries trained on fish disease diagnostics (through Government

¹ Supplemental funds are also provided by other donors such as the Philippines' Department of Science and Technology, USAID, JIRCAS, United Soybean Board (USA), ACIAR, Japan Fisheries Research Agency

of Japan trust funds)

- Effective feed management developed and different sources of fish meal substitutes identified
- Efficient diets developed for specific species at specific growth stages
- Netcage culture of freshwater prawn and tilapia in semi-commercial scale demonstrated

2.3 Project Description

The Program is critical in attaining significant improvements and sustaining aquaculture production in the face of many challenges posed by present and future ecological, economic, as well as, climatic changes. The strategies invoked in this Program will concentrate on improving the nutrition and feeding management practices to promote healthy farmed aquatic animals; disease diagnosis, control, monitoring and surveillance of aquatic animals; and environmental integrity, certification, and food safety. The optimization and sustainability of aquaculture production shall be based on Best Management and Good Aquaculture Practices to ensure the least impact on the environment.

All the activities in this Program are in line with the Resolution and Plan of Action, which were adopted by the Member Countries during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 held in Bangkok in June 2011.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2013

Investigation on the efficacy of probiotics and rationalization of the need and application of diagnostics that will ensure biosecurity and keep out exotic pathogens

Application and Mode of Action of Probiotic Bacillus Species in the Larviculture of Penaeus

Mixed bacterial cultures obtained from various aquaculture environments were inoculated on minimal medium supplemented with acyl homoserine lactone (AHL) (MM+) as sole source of C and N for microbial growth. Bacteria that grew on MM+ were sub-cultured thrice onto fresh MM+ for 48 h at 30°C to ascertain that they are AHL degraders. To determine the degradation capacity of the isolated AHL-degrading bacteria, a plate diffusion method was used using *Chromobacterium violaceum* CV026 as reporter strain. This strain does not produce AHL but produces the purple pigment violacein in the presence of exogenous AHL. Initially, a standard curve correlating the diameter of purple-pigmented *C. violaceum* CV026 to different AHL concentration was determined. The AHL degradation rate of the isolated AHL-degrading bacteria was subsequently obtained.

Application and mode of action of polyhydroxybutyric acid (PHB) in the larviculture of Penaeus spp.

The effect of PHB supplementation in the proximate composition, total lipids and fatty acid methyl esters profile of *P. monodon* postlarvae was examined. Dietary treatments (6 replicates/dietary treatment) of 0 (control diet), 2 and 5% PHB supplementation in SEAFDEC-formulated shrimp diets were fed twice daily at 9 and 16 h. Total length (cm) of shrimps fed the different dietary treatments significantly differed ($p < 0.05$). Highest increase in total length was recorded in shrimps fed 2% PHB supplementation and was significantly higher than those fed with 5% PHB supplementation but not significantly different from shrimps fed the control diet. Weight gain (mg) was also highest for shrimps fed 2% PHB supplementation and was significantly different from all the other shrimp groups. Percent survival on the other hand was highest for shrimps fed 5% PHB supplementation and was significantly different from the other shrimp groups.

Bacterial Diversity and Algal Community Structure in Biofilms of Settlement Plates for Abalone Haliotis asinina Larvae

Induced unsuccessful larval rearing run was started on March 8, 2013 and ended at June 10, 2013. Run was done under sub-optimal feeding and water change schemes in which feeding will be less frequent as per visual inspection of plates and 75% reduction in water change rate. Microbial population of water and biofilm on rearing plates are shown below. The rearing run was initially stocked with 1,500,000 veliger larvae. After 3 months of culture, 3,535 abalone juveniles were harvested amounting to 0.24% survival

rate. A total of 67 bacterial isolates were gathered from the biofilm on abalone rearing plates for identification.

Quantitative and Qualitative Analyses of the Bacterial Microbiota of Tilapia (Oreochromis niloticus) Cultured in Earthen Ponds as Tool for Investigating Emerging and Reemerging Diseases of Tilapia

A total of 8 samplings were done fortnightly for microbial investigations of culture pond water, sediment, gills and intestine of tilapia in 6 tilapia grow-out earthen ponds located in Balaring and Lantad, Silay City, Negros Occidental. Three to five dominant colonies were randomly selected from each sample (pond water and sediment, and gills and intestine of tilapia) collected from the grow-out ponds in Balaring and Lantad. To date, a total of 685 bacterial isolates have been purified and stored at -80°C. In addition, no significant variations were noted for the water temperature, salinity, and pH among the ponds examined. On the contrary, significantly wide variations were noted in the levels of DO, total dissolved solids, NH₃, NO₃ and NO₂.

Promotion of the wider use of conventional diagnostic as well as new methods especially for newly reported, emerging diseases

Epidemiological Study and Elucidation on Spread Route of Shrimp Viral Diseases in Southeast Asian Countries

Shrimp samples, gills and pleopods fixed in 95% alcohol, were taken from 10 of the 15 farms in Region 9 for possible viral detection/ analysis. *P. monodon* samples were also collected from several provinces in the country, fixed in 95% alcohol and samples are ready for detection of viruses using PCR. A total of 14 shrimp farmers in Region 9 were interviewed: 1 into *P. monodon* semi-intensive monoculture, 2 into *P. monodon* extensive monoculture and 11 into *P. monodon* extensive polyculture with milkfish/crab. One of the farms was experiencing mortality during the sampling/ interview. None of the farmers interviewed observed yellow head in the present crop.

Surveillance of Emerging Diseases in Wild and Farmed Mud Crab: Application of Conventional and Molecular Approaches

Six provinces namely, Albay, Camarines Sur, Camarines Norte, Capiz, Northern Samar, Sorsogon were visited. Mudcrab samples were collected from ponds, aquasilviculture ponds and from the wild. A total of 142 mudcrab samples were processed for bacterial and fungal isolation, parasite detection and viral detection. External abnormalities were also noted.

Finding effective alternative safe drugs/chemicals (including natural products) to manage aquaculture diseases in lieu of the harmful chemicals and drugs

Host Response and Defense Against Amyloodinium ocellatum Infestation in Marine Fish Species and Development of Control Methods

Immune parameters of *L. calcarifer* are being determined after experimental exposure of juveniles to *A. ocellatum*.

From April to May 10 2013, three experiments based on Masson et al. (2011), were designed to describe the infection of *A. ocellatum* on seabass: dinospore infectivity (*Experiment 1*); dinospore 48-h LD₅₀ and trophont lethal loads at 48-h LD₅₀ (*Experiment 2*); and trophont detachment and trophont size (*Experiment 3*); *Experiment 1* will provide data for the number of trophonts obtained after challenging fish with a given dose of dinospores. Infection rate or dinospore infectivity is the probability that a dinospore infects a fish per day and is estimated as the proportion of dinospores that develop into trophonts. *Experiment 2* will provide data for 48-h LD₅₀ and trophont lethal loads. *Experiment 3* will provide data for number of trophonts that detach daily for 6 days, and will include the diameter of trophonts.

Optimization of *A. ocellatum* in vivo passage procedure using pompano and siganids was conducted. *A. ocellatum* was passaged by cohabitation or adding naïve fish on tanks containing dinospores or tomonts.

Fish died within 3 days for pompano and 6 days for siganids after placing in infected tank. One to 4-inch pompanos or siganids were used for the passage. These two species were found to be more susceptible to *A. ocellatum* and were more available, and were thus, better for maintenance of the parasite. Adequate aeration was maintained, and water level was around 200-300L. When fish died, they were left in the tank for 3-8 h to allow trophonts to transform to tomites and fall to the tank bottom. Dead fish were removed, and new naïve fish were added. Every 2 weeks, 2-4 infected fish were transferred to new tank with new water, and were cohabited with naïve fish. This was to keep the parasite in water with good quality to prevent growth of other contaminating microorganisms. The parasite has been successfully passed for 9 months with this procedure.

Optimization of dinospore hatching under laboratory condition, quantification, and infection procedures was conducted in May 2013. Hatching of dinospores under laboratory conditions was optimized by combining methods of Bower et al (1987) and Masson et al (2011). This involved filtration purification of tomites, and incubation to allow hatching. Infection was done by adding a certain volume of dinospores of known concentration to the rearing tank or aquaria. Around 8ml of 300,000 dinospores per ml were made available for infection.

To determine the genes expressed and the levels of expression during infection, tissue samples were collected both from moribund naturally infected and experimentally infected fish for monitoring the expression of immune response genes by RT-PCR. Seabass 28.8 cm (mean TL) and 250g (mean weight) were challenged with *A. ocellatum* by cohabiting with 10 moribund pompanos with at least 800 trophonts attached in each fish for 24 h. Fish were maintained in 250L tanks, and were sampled for gills, spleen, and head kidney at different time points: 0 h, 6 h, 12 h, 24 h, 2 d, 4 d, 8 d, 16 d, and 32 d. The tissues are being stored in TRIZOL at -80°C for RNA extraction. Infected and control cDNA library will be constructed and submitted for sequencing. From the sequences, primers will be designed to analyze changes in tissue-specific gene expression over the course of the infection cycle.

Screening for Antimicrobial Activities of Crude Extracts from Philippine Red Seaweeds

Virus titer assay was conducted to quantify the level of CPE reduction observed in the seaweed extract-treated EPC cells inoculated with SVCV. Pre-treatment of 10 mg/mL and 1 mg/mL *Gracilaria* sp. extracts 30 minutes prior to inoculation of the SVCV resulted in 1.55 and 0.98 log virus reduction, respectively. Co-treatment with SVCV of the same seaweed extracts, also showed significant reduction in virus titer – with 1.25 log and 0.75 log difference (relative to positive control) for the *Gracilaria* sp. (1 mg/mL) and Vanguard (1 mg/mL) treatment groups, respectively. Significant virus titer reduction was also observed in groups co-treated with mixed (mostly kappa) carrageenan (0.65 log), iota carrageenan (0.65 log) and lambda carrageenan (0.85 log). However, it is not clear if the observed reduction is due to the action of bioactive compounds (*i.e.*, carrageenan) or due to the reduced “opportunity” of the virus to access (and infect) the EPC cells due to the high viscous nature of the said carrageenan suspensions.

Novel strategies to reduce disease incidence in mudcrab hatchery and grow-out

Sampling/collection trip to Pontevedra, Capiz and Ajuy, Iloilo in May and in Aklan and Roxas City was conducted to collect live crab and pond sediment samples to isolate putative probiotics. Thirty nine bacterial isolates from crab body surface and hepatopancreas, and pond sediments were submitted for genus level identification using conventional biochemical test. Further tests such as glucose fermentation, Na⁺ requirement for growth, and growth in TCBS and GSP agar media revealed that 27 out of 29 (93%) Gram (-) isolates belong to genus *Vibrio*, and the remaining 2 Gram (-) isolates (7%) belong to genus *Aeromonas*. Pathogenicity testing will be conducted on these isolates to ascertain their suitability as probiotics for crab. In addition, natural products and powdered leaves of plants were solvent extracted with either 90% or 70% ethanol and the crude extracts were tested for *in vitro* antimicrobial activity against aquaculture and human pathogens (*i.e.*, *Vibrio harveyi*, *Vibrio* sp., *Micrococcus luteus*, and *Escherichia coli*) using the agar disc diffusion method. Cell free supernatants from 24 h cultures of putative probiotics were similarly tested for antimicrobial activity. Crude extracts from *Curcuma longa*, *Echinacea aungustifolia*, and *Garcinia mangostana*, and *Terminalia catappa* showed significant antibacterial activity against *V. harveyi* with inhibition zones of 10 cm or more. *C. longa* and *T. catappa* also showed antibacterial activity against *M.*

luteus and *E. coli*. Extracts of putative probiotics that did not show *in vitro* antibacterial activity will be further tested for quorum sensing inhibitory activity.

Use of soybean meal and soy protein concentrate as alternative to fishmeal in practical diets for milkfish Chanos chanos

Results of experiments at AQD's Igang Marine Station net cages after 84 days of culture on optimizing management of milkfish-fed SEAFDEC-USB diet showed highest mean weight gain (720%) when fed daily compared with those fed every other day (545%) and fed every two days (551%). The same experiment on testing the SEAFDEC-USB diet is on-going in ponds at AQD's Dumangas Brackishwater Station.

Improvement of feed formulation for milkfish (Chanos chanos) culture in ponds and cages.

Results of experiments to test the performance of cowpea and mung bean-based diets for milkfish in brackishwater ponds at University of the Philippines Brackishwater Aquaculture Center after 84 days of culture showed that mean weight gain was higher (342g) in stocks fed mung bean-based diet than in stocks fed the cowpea-based diet (319g) and commercial diet (267g).

Comparative test on the performance of the same diets in marine floating net cages in AQD's Igang Marine Station is on-going.

Improvement of the nutritional value of locally available feed resources for practical aquafeeds by submerged fermentation and solid-substrate fermentation using milkfish gut bacteria and/or selected fungi.

Results of bacterial isolation and identification in the gut of milkfish fed lumot, lablab, or practical diet showed the presence of different kinds of gram-negative and gram-positive rods among others in the stomach, anterior intestine, and middle intestine, presumably *Bacillus sp.* and *Lactobacillus sp.* Presumptive *Pseudomonas sp.* were abundant and present only in sample fed practical diet reared in marine cages in Igang Station but not in those fed natural food, lumot, or lablab. Experiments have indicated that milkfish fed different natural food bases or practical diet have different microbiota composition which could be used for fermentation studies involving various feed ingredients for the improvement of milkfish diet formulations.

In a related experiment, lactic acid bacteria from abalone gut, *Pediococcus sp.* have been isolated, purified and characterized and may be used in the fermentation of ingredients.

Nutritional evaluation and growth experiments will be done on fish fed the fermented ingredients. Comparative evaluation will likewise be done on the fermentation characteristics of the bacteria isolated from the milkfish gut and the ones from abalone gut.

Evaluation of milkfish by-product hydrolysate as ingredient in juvenile grouper, Epinephelus coioides diets

Proximate composition of milkfish offals showed values of 38% CP. Currently, the ingredient is being hydrolyzed and will be considered to partially replace fish meal in grouper diet formulation. Feeding trials to test the performance of this milkfish by-product hydrolysate-based diet will be conducted as soon as formulated diets are ready.

Distillers dried grain with soluble (DDGS) evaluation as protein ingredient for milkfish, Chanos chanos diets

Proximate composition of DDGS showed CP of 30%. This ingredient has been considered to partially replace fishmeal as protein source in milkfish diet. Feeding trials to test the performance of the DDGS-based formulated diet are in process.

Improvement of feeds and management practices for mud crab grow-out culture: Pilot-scale production of pellets suitable for mud crab

Video footages of mud crab to show their feed shape preference on the different pellet shapes tested (a. spaghetti-like, short and long; b. tablet, thick or thin; c. spherical balls, small or big; and d. cubes, small or big) had the following observations: The spherical balls and the cube shapes were preferred by the mud crab compared to the spaghetti-like and the tablet shape. With the preferred shapes, the feed was easily grasped, held, handled and eaten by the animal using its chela or the walking leg.

Production characteristics of the giant freshwater prawn cultured in cages using different grow-out management strategies: Feed management strategies and periphyton-based production.

Experiments to test the different total effective substrate area showed no significant differences in length, weight, survival, condition factor of the juvenile *M. rosenbergii* on the various treatments (0, 40, 80, 120%). Different stocking densities for *M. rosenbergii* which can be supported solely by periphyton productivity in cage culture showed significantly higher mean weight, daily growth rate and specific growth rates at the lowest stocking density (5pcs/m²) compared to stocking densities of 10 and 15 pcs/m². No significant effects on survival and on the natural food biomass among the three stocking densities were observed. Shelter orientation had no significant influence on weight, daily growth rate and specific growth rates, but not on survival with lower stocking density and having higher growth values.

Major program activity	Duration	Remarks
Fish Health		
The Application and Mode of Action of Probiotic Bacillus Species in the Larviculture of <i>Penaeus</i>	2012-2015	Continuing until 2015; Ongoing experiment on the effects of Bacillus spp. on the expression of immuno-related genes in Artemia
Application and mode of action of polyhydroxybutyric acid (PHB) in the larviculture of <i>Penaeus</i> spp.	2012-2015	Continuing until 2015
Bacterial Diversity and Algal Community Structure in Biofilms of Settlement Plates for Abalone <i>Haliotis asinina</i> Larvae	2010-2013	Study will be completed this 2013
Quantitative and Qualitative Analyses of the Bacterial Microbiota of Tilapia (<i>Oreochromis niloticus</i>) Cultured in Earthen Ponds as Tool for Investigating Emerging and Reemerging Diseases of Tilapia in the Philippines	2013-2015	This study will continue until 2014; Taxonomic position of the dominant bacteria isolated will be determined.
Epidemiological Study and Elucidation on Spread Route of Shrimp Viral Diseases in Southeast Asian Countries	2012-2015	Activities not implemented (due to budget constraints) in 2013 to be continued in 2014
Surveillance of Emerging Diseases in Wild and Farmed Mud Crab: Application of Conventional and Molecular Approaches	2013-2014	Newly approved study.
Host Response and Defense Against <i>Amyloodinium ocellatum</i> Infestation in Marine Fish Species and Development of Control Methods	2010-2014	This study will continue in 2014.
Screening for Antimicrobial Activities of Crude Extracts from Philippine Red Seaweeds	2010-2013	This study will be discontinued in 2014
Novel strategies to reduce disease incidence in mudcrab hatchery and grow-out	2013-2014	Newly approved study.
Nutrition and Feeding		
<i>Objective 1</i> 1. Use of soybean meal and soy protein concentrate as alternative to fish meal in milkfish diets	2012-2014	The study is continuing until 2014
2. Improvement of feed formulation for milkfish (<i>Chanos chanos</i>) culture in ponds and cages.	2013-2015	DOST-UPV funded study

Major program activity	Duration	Remarks
3. Improvement of nutritional value of locally available feed resources for practical aquafeeds by submerged fermentation and solid-substrate fermentation using milkfish gut bacteria and/or selected fungi	2012 – 2014	The study is continuing until 2014
4. Evaluation of milkfish by-product hydrolysate as ingredient in juvenile grouper, <i>Epinephelus coioides</i> diets.	2013-2014	The study was approved March 2013.
5. Distillers dried grains with soluble (DDGS) evaluation as protein ingredient for milkfish diets	2013 – 2014	The study was approved March 2013. DOST-funded study
6. Improvement of Feeds and Management Practices for Mud-crab grow-out culture: Pilot Scale Production of Pellets Suitable for Mud Crab.	2013-2015	
7. Production characteristics of the giant freshwater prawn cultured in cages using different Grow-out management strategies and periphyton-based production.	2012 – 2014	To be completed by 2014
<i>Objective 2</i>		
1. Feed development for the golden pompano	2013 – 2014	To continue with amino acid requirement studies for pompano
2. Evaluation of existing feed formulations for mud crab grow-out.	2013-2015	DOST-funded study
<i>Objective 3</i>		
1. Demonstration of semi-intensive grow-out culture of pompano in brackishwater ponds using commercial diet.	2013	Completed; same experiment for testing with private collaborators
2. Demonstration of semi-intensive grow-out culture of grouper in brackishwater ponds using SEAFDEC/AQD phased diet.	2013	Completed; same field testing with private collaborators
3. Production of rabbitfish in semi-intensive grow-out culture using formulated diet in brackishwater pond.	2013	Same as above
4. Small-scale grow-out production in net cage culture of Nile Tilapia and freshwater prawn in freshwater dam/reservoir using SEAFDEC AQD formulated diet for rural development.	2013	Completed; for possible adoption of private entrepreneurs
5. Development of protocols for production of hatchery-reared mud crab juveniles for soft-shell crab farming.	2013-2015	DOST-funded study
6. Culture of seaweed in ponds and in intertidal area.	2013-2014	The study was approved April 2013.
7. Nursery and grow-out culture of pompano in floating net cages using formulated diets and different stocking densities, respectively.	2013-2014	Newly approved study

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Major program activity	Duration	Remarks
Establishment of the Philippine shrimp pathogen biobank and online bio-surveillance information resource	2014-2015	Proposal under review by DOST-PCARRD
Development and optimization of nested PCR protocols to be used as laboratory based universal standards for detection of shrimp pathogens	2014-2015	Proposal under review by DOST-PCARRD
Effect of immunostimulant-containing diets on growth, survival, non-specific immune parameters and resistance to stress and infection in milkfish	2014-2015	To be implemented pending approval of MOA (SEAFDEC/AQD-BMEG collaborative study)
All on-going studies as enumerated above will continue until 2014-2015 as specified.	2014-2015	
Other studies that will be undertaken are: (i) Refinement of abalone grow-out diet; (ii) Studies on Feed Management and Immunostimulants with B-Meg as Collaborating Agency	2014-2015	MOA is in preparation

4.2 Expected Outcomes

- Philippine shrimp pathogen database established
- Epidemiological information on shrimp diseases compiled
- Aquatic pathogen biobank established
- Protocol for PCR diagnosis of WSSV, IHNV, MBV, and *Vibrio* spp. developed
- Effect of immunostimulant on growth and survival of milkfish examined
- Disease resistance markers in milkfish identified
- Efficacy of immunostimulant in bacteria-challenged milkfish established
- Additional fish meal substitutes for various SEAFDEC AQD formulated diets identified with the corresponding % protein replacement.
- Effective feeding management schemes that may incorporate sound environmental management developed and improved for different species of fish
- Efficient grow-out diet for pompano developed
- Efficient grow-out diet for abalone refined and verified.
- Grow-out culture of grouper, pompano, rabbitfish in brackishwater ponds with practical feed demonstrated in private ponds of collaborators.
- Performance of hatchery reared crabs in soft-shell crab farming determined.
- Appropriate stocking densities, right protocols, cost of production for grow-out culture of pompano in cages developed
- Use of SEAFDEC/AQD formulated feeds for nursery rearing of pompano in cages verified
- Production schemes for *G. heteroclada* developed.

PROJECT DOCUMENT

Program Categories: Departmental Programs

Project Title: Maintaining Environmental Integrity through Responsible Aquaculture

Responsible Department: SEAFDEC Aquaculture Department (SEAFDEC/AQD)

Total Duration: 2012-2016

Funding Sources²: Philippine Government

Estimated Budget for 2014: USD 80,000

1. INTRODUCTION

The Program was developed to address issues on the negative impacts of aquaculture to the environment and how these impacts will be minimized. It has been known that the phenomenal growth of aquaculture has caused modification, destruction or complete loss of habitat; unregulated collection of wild broodstocks and seeds; translocation or introduction of exotic species; loss of biodiversity; introduction of antibiotics and chemicals to the environment; discharge of aquaculture wastewater, thus coastal pollution; salinization of soil and water; and dependence on fishmeal and fish oil as aquaculture feed ingredient, to name a few. Asia, the birthplace of aquaculture, has been and is still experiencing all these and more. Particulate organic waste from fecal materials and uneaten food in intensive aquaculture production has the greatest potential to generate waste. These wastes can enrich aquatic ecosystems and may bring about physical and chemical changes in the water and sediment which may result to anoxic condition in extreme cases. Pond, pen and cage culture systems of both finfish and crustaceans can generate huge amount of organic waste that may cause drastic change to the natural ecosystems adjacent to them.

SEAFDEC/AQD which has been developing aquaculture techniques for various species of finfish, crustaceans, mollusks and some new emerging species to boost fisheries production in the Philippines and the Southeast Asian region should also take the lead and be responsible in looking at the impacts of these aquaculture activities to the environment.

2. PROJECT

2.1 Goal /Overall Objectives

Goal: Develop environment-based aquaculture technology by integrating environmental factors in SEAFDEC/AQD research activities and to maintain environmental integrity by promoting responsible aquaculture practices.

Objectives:

- 1) Assess impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems;
- 2) Identify appropriate extractive species that may be used in Integrated Multi-Trophic Aquaculture (IMTA);
- 3) Develop and promote efficient and suitable environment-friendly culture systems; and
- 4) Conduct biological and ecological studies on species with potentials for resource enhancement.

2.2 Outcomes and Expected Outputs

- Changes in biodiversity, water and sediment qualities due to aquaculture and related activities known; recommendations to mitigate the impacts of aquaculture formulated
- Efficiency of different extractive species (seaweeds, sandfish, bivalve mollusk) in assimilating nutrients, sulfides and other aquaculture effluents assessed
- Production of selected commodities used in Integrated Multi-Trophic Aquaculture determined
- Appropriate culture protocols in ponds, pens in ponds and other systems for sandfish determined

² Supplemental funds are also provided by JIRCAS, ACIAR

- Models on carrying capacity of and decision support tools for selected inland water bodies in the Philippines available
- Improved production of sandfish, abalone, mud crab in stock enhancement sites identified for the program
- Efficient and suitable environment-friendly culture systems and practices promoted through training and information dissemination activities

2.3 Project Description/Framework

The program will generally focus on the impacts of aquaculture on the environment and how to minimize them. Aside from the goals that the program aims to achieve, it will also incorporate issues presented during the ASEAN-SEAFDEC Conference on Sustainable Fisheries such as the need for better management of the aquaculture sector; abuse in the use of feeds and fertilizer and poor feed utilization and feeding management; excessive use of antibiotics and chemicals; environmental imbalance due to the destruction of habitats which leads to depletion of fish population and loss of biodiversity; and the development of IMTA in a tropical environment.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

1) *Assess impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems*

- As a first step to accomplish this objective, the different stations of SEAFDEC/AQD are undergoing regular monitoring with the following accomplishments.
 - Igang Marine Station (IMS) and its surrounding area: The bathymetric profile of covering various stations has been conducted a bathymetric map of the area will be completed. A monitoring system for the water and substrate quality of this station has been established. The biodiversity of the various ecosystem types as well as near the cage set-up has been determined with 805 species in 292 families in 20 major taxa identified.
 - Tigbauan Main Station (TMS): Sampling of the shore areas around TMS is being conducted. Some 516 species in 199 families in 10 major taxa have been collected or photographed. Based on preliminary results TMS intertidal looks depauperate compared to IMS
 - Binangonan Freshwater Station (BFS): A comparison of phytoplankton, zooplankton and fish and other vertebrate diversity in two sites around the station, the East Cove (an aquaculture site) and the West Cove (non-aquaculture site) was started in March 2013. Although total phytoplankton density was higher in the West Cove, no significant differences in the diversity indices such as species richness (s), Shannon-Weiner Index (H') and evenness Evenness (J') were observed. Zooplankton density did not differ between the two sites, although H' and J' were both significantly higher in the West Cove. Based on the data from fish traps set-up in the two sites, much higher biomass of fish per day were caught in the East Cove compared to the West cove. Dominant species include invasive alien species such as the knifefish, *Chitala ornata* (Fig. 1) in the West Cove and janitor fish *Pterygoplichthys* sp. (Fig. 2) in the East Cove have been identified.
 - A project on the biodiversity in the milkfish and shrimp fry (semilya) fishery in the surf zones in southern and western Panay is also being implemented. Various fry collection sites in the Antique and Guimbal were samples. During the season, fry collection is done mostly during the flood tides (~2-4 h operation per day) of the 3 d around the new moon and the 3 d around the full moon, when 2,000 to 15,000 fry could be obtained in one day's operation. The fry collectors pointed to a decline in fry catch from previous years, and blamed ricefield pesticides, oil spills, and fishing for sabalo. More than 12 species of fish larvae and juveniles identified in catches from Guimbal and Antique.

2) *Identify appropriate extractive species that may be used in Integrated Multi-Trophic Aquaculture (IMTA)*

Various extractive species are being investigated. Among them the sandfish *Holothuria scabra*, the bivalve mollusk *Anodontia philippiana* and the seaweed *Gracillaria bailinae*. The co-culture of these extractive species with other commercially important commodities is being investigated.

- Studies on the sandfish, *Holothuria scabra*, in polyculture with other marine species are on-going. Production run with milkfish was started in IMS in May 2013. Due to disease, high mortality were

experienced in pens with both milkfish and sandfish and in pens with milkfish only. The run was terminated in August due to low survival of both fish and sandfish. A production run with milkfish at the Igang pond was started in June but similar disease problems as with IMS were experienced with high mortalities particularly with pens with only fish. Heavy rains in late July and August resulted in severe salinity fluctuations with complete mortality in sandfish stocks so it was decided to harvest surviving fish in August. The experiments with Pompano were started in August.

- The co-culture of seaweed *Gracilariopsis heteroclada* with seabass is also being investigated. After 150 days of culture the specific growth rate (SGR) of seabass in monoculture and co-culture with seaweed was 3.70 and 3.59%/day, respectively. FCR of seabass in mono and co-culture treatments was 2.4 and 2.2, respectively with survival rates ranging from 96 to 100%. The SGR of seaweeds ranged from 1.71-14.0%/day, with highest growth obtained in March. Among the water quality parameters monitored, Ammonia ranged from 0.009-4.55mg/l (co-culture) and 0.008-6.56mg/l (monoculture); Nitrite, 0.015-0.21 mg/l (co-culture); 0.015-0.08mg/l (monoculture) and; phosphate from 0.034-0.49 mg/l (co-culture); 0.034-0.43mg/l (monoculture)
- The bivalve mollusk *Anodontia philippiana* (I) locally known as “imbao” is known to assimilate sulfide. The potential of this bivalve together with the seaweed *Gracilariopsis heteroclada* (S) to improve culture conditions of milkfish (MF) was investigated. The treatments consisted MF only, MF+I, MF+S and MF+I+S. No significant differences in sulfide, phosphate, nitrate and nitrite levels among treatments were observed. Ammonia levels significantly increase over time and the MF+I treatment showed the lowest levels in all sampling times. No differences in dissolved oxygen were also observed. Sediment samples for organic matter analyses have been submitted. *A. philippiana* biomass will be determined at the end of the run. Mass mortalities in seaweed occurred due to sudden drop in salinity from heavy rains. No significant differences in growth in milkfish were observed among the different treatments.

3) *Develop and promote efficient and suitable environment-friendly culture systems*

- Experiments were also conducted to determine optimal conditions for the culture of the sandfish *Holothuria scabra*. In the previous year previous year substrate type, salinity, and stocking density experiments were done to assess growth and survival of sandfish juveniles. It was noted that the substrate preference is the sandy-muddy not silty-mud type. Laboratory experiments for 2013 were postponed due to broken bins but will be pursued before the end of the year. For the pond/pen culture, a survey of various pond sites has been done with Concepcion, San Dionisio and Ajuy showing potential. The DBS ponds were not suited due to thick anoxic mud. The Igang pond run failed due to high mortalities caused by factors such as improper positioning of net bags, water quality, and heavy rains. For the sea-ranching of this commodity, among the various sites surveyed Concepcion was selected to be the initial pilot site. The Panobolon also showed good results for sandfish growth. Community preparation for the project has been completed with Memorandum of Agreement between AQD, Concepcion LGU, MFARMC and fisherfolk being finalized for signing.
- Information on the carrying capacity of some freshwater systems in the country based on modeling through an ACIAR (Australian Centre for International Agriculture Research) has been completed. The model results and sensitivity analysis showed fish carrying capacity tonnages within the range of literature values for Asia and slightly higher than annual production recorded for some Philippine Lakes. The dominant parameters driving carrying capacity were initial nutrient loading then increasing lake surface area, mean lake depth and flushing rates. In general, polymictic lakes are more productive than monomictic ones with eutrophic systems being by far more productive than either oligotrophic or mesotrophic systems. Oligo and mesotrophic lakes showed little sensitivity to carrying capacity models □ suggests that either these systems are not suited to aquaculture without carefully managed feeding strategies (or else the model is not capturing important parameters that might influence productivity in these systems)

4) *Conduct biological and ecological studies on species with potentials for resource enhancement*

A number of species are being studied for resource enhancement activities. These are the giant clam *Tridacna gigas*, abalone *Haliotis asinina*, and three species of mud crabs *Scylla serrata*, *S. olivacea* and *S. tranquebarica*. The study on mudcrabs is also part of the GOJ-funded initiative under Sustainable Aquaculture Program and will not be presented here.

- The study on the stock enhancement of the giant clam *Tridacna gigas* in the marine protected areas (MPAs) in San Joaquin, Iloilo has been completed. On top of previous accomplishments already

reported last year for this study, the activity was able to elicit other positive results in promoting protection of wild clams. More wild clams are being discovered and those that were measured showed to have good growth and high survival. AQD's presence in the area also increased the awareness of local communities on environment protection and the benefits of MPAs.

Major program activity	Duration	Remarks
Objective: <i>Assess impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems</i>		
Hydrographic profiling of Igang Marine Station	2012-2013	On-going; To be completed end of 2013
Marine biodiversity around the SEAFDEC Aquaculture Department in Tigbauan, Iloilo	2013-2014	On-going
Impact of aquaculture in a freshwater environment: Biodiversity of aquatic fauna at the east and west cove of the Binangonan Freshwater Station	2013-2014	On-going
Biodiversity in the milkfish and shrimp fry (semilya) fishery in the surf zones in southern and western Panay	2013-2014	On-going
Objective: <i>Identify appropriate extractive species that may be used in Integrated Multi-Trophic Aquaculture (IMTA);</i>		
Polyculture of sea cucumber with selected marine fish species	2012-2014	On-going
Polyculture of seabass <i>Lates calcarifer</i> and seaweed <i>Gracilariopsis heteroclada</i> in brackishwater pond		To end April 2013
<i>Anodontia philippiana</i> and <i>Holothuria scabra</i> as bioremediators in an intensive cage culture system		To end 2013
Development and extension of integrated multi-trophic aquaculture techniques for improvement of livelihood, (Second of Five year Project)*		No copy of proposals and reports
Objective: <i>Develop and promote efficient and suitable environment-friendly culture systems</i>		
Determination of optimal conditions for sandfish <i>Holothuria scabra</i> culture	2012-2016	To continue; funded by ACIAR
Carrying capacity, decision support tools for freshwater systems in Australia and the Philippines	2010-2013	Completed, terminal report submitted to ACIAR
Objective: <i>Conduct biological and ecological studies on species with potentials for resource enhancement</i>		
Stock enhancement of giant clam <i>Tridacna</i> species in San Joaquin	2012	completed
Application of molecular markers in the conservation and management of marine genetic resources in Asia		No copy of 2013 proposal and no copy of reports submitted
Stock enhancement of mud crabs <i>Scylla</i> spp.**		Reported under GOJ-TF Stock Enhancement Program
Community managed sandfish (<i>Holothuria scabra</i>) sea ranching and stock release**		No copy of proposals and reports

* under JIRCAS; **under GOJ-TF; (not covered in this report)

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Major program activity	Duration	Remarks
Objective: <i>Assess impacts of aquaculture on biodiversity, and water and sediment qualities in the culture areas and adjacent ecosystems both in marine and freshwater systems</i>		
Marine biodiversity around the SEAFDEC Aquaculture Department in Tigbauan, Iloilo	2013-2014	On-going

Major program activity	Duration	Remarks
Impact of aquaculture in a freshwater environment: Biodiversity of aquatic fauna at the east and west cove of the Binangonan Freshwater Station	2013-2014	On-going
Biodiversity in the milkfish and shrimp fry (semilya) fishery in the surf zones in southern and western Panay	2013-2014	On-going
Objective: <i>Identify appropriate extractive species that may be used in Integrated Multi-Trophic Aquaculture (IMTA);</i>		
Development and extension of integrated multi-trophic aquaculture techniques for improvement of livelihood, (Second of Five year Project)*		No copy of proposals and reports
Culture of tilapia in hydroponics system		Possible new proposal for 2014
Objective: <i>Develop and promote efficient and suitable environment-friendly culture systems</i>		
Determination of optimal conditions for sandfish <i>Holothuria scabra</i> culture	2012-2016	To continue; funded by ACIAR
Objective: <i>Conduct biological and ecological studies on species with potentials for resource enhancement</i>		
Stock enhancement of abalone <i>Haliotis asinina</i> to increase production from natural habitats	2014-2017	New study; with DOST funding

4.2 Expected Outcomes/Outputs

- Documentation of marine biodiversity in the marine habitats adjoining TMS: gravel-pebble intertidal beaches, river mouths, nearshore fishing areas, offshore fishing areas; Documentation of species pumped in and killed at the sand filters and the species surviving in the seawater drain canals all around TMS; Reference collection of marine species off TMS deposited at FishWorld; AQD book on biodiversity in Tigbauan, Iloilo; Scientific paper on biodiversity loss due to engineering of hatchery facilities.
- Biodiversity of the East and West Coves of Tapao Point of the Binangonan Freshwater Station determined; Impact of aquaculture on biodiversity at the BFS lake-based facilities determined.
- Documentation of species biodiversity in the fry fishery in southern and western Panay; Information on the current status of the fry fishery in southern and western Panay; Reference collection of fish and shrimp larvae and juveniles caught by fry gears, deposited at FishWorld; Scientific paper on the waste of biodiversity due to the milkfish fry fishery; AQD book on biodiversity in the fry fishery in southern and western Panay.
- Intensive seabass-seaweed polyculture system established with the amount of dissolved nutrients (TN and TP) absorbed by *Gracilariopsis heteroclada* in seabass-seaweed polyculture system determined; Economic analyses of seabass monoculture vs. seabass-seaweed polyculture systems completed.
- Establish differences in sulfide, nutrient concentrations, DO levels, sediment characteristics and organic matter content in IMTA, particularly of milkfish, milkfish+*Anodontia philippiana*, milkfish + *Gracilariopsis heteroclada* and milkfish + *Anodontia philippiana* + *Gracilariopsis heteroclada*; establish differences in the growth and survival of milkfish, imbao and seaweed reared in the different experimental treatments

PROJECT DOCUMENT

Program Categories: Departmental Programs

Project Title: Meeting Social and Economic Challenges in Aquaculture

Responsible Department: Aquaculture Department

Total Duration: 2012-2016

Funding Sources¹: Philippine Government

Estimated Budget for 2014: USD 91,000

1. INTRODUCTION

Growth of aquaculture in the Southeast Asian region is driven by the scientific and technological breakthroughs developed and the adoption of culture technologies by receptive entrepreneurs. However, the development of aquaculture in the region has brought and caused a number of unintended problematic scenarios, such as: 1) inequitable distribution of opportunities and benefits across adopters of aquaculture; 2) technology and production cost dualism among aquaculturists; 3) social conflicts and economic losses due to competing uses of resources for aquaculture and other purposes; and 4) high cost of rehabilitation of habitats affected by misuse of natural resources for aquaculture.

This Program aims to develop and implement social and economic strategies in aquaculture and resource management to secure food and income through stakeholder collaboration.

2. PROJECT

2.1 Objectives

The main objective is to respond to the specific recommendations for meeting the social and economic challenges in aquaculture identified and adopted during the *ASEAN-SEAFDEC Fish for All Conference* in June 2011. These include:

- 1) Prioritizing collaborative R&D in aquaculture in the region to have a clear regional assessment and understanding of the role of aquaculture in poverty alleviation and provide basis for policy formulation;
- 2) Allocating R&D resources to address emerging issues on the impacts of climate change and global trade on aquaculture with emphasis on small-holder fish farmers; and
- 3) Enhancing multi-agency collaboration, sharing of information and resources between and among SEAFDEC and its Member Countries and other organizations in addressing the common problems of alleviating the socioeconomic conditions of the poor sector of region.

2.2 Outcomes and Expected Outputs

- Economically viable and sustainable aquaculture enterprises adopted
- Prototype aquaculture technology adoption model for securing food and livelihood for inland and coastal communities
- Enabled participation of rural communities in sustainable stock enhancement and aquaculture initiatives
- Policy and governance recommendations on resource management
- Improved multi-agency collaboration in addressing the common problem of alleviating the socioeconomic conditions of the rural communities and small-holder farmers
- Establishment of social science regional network initiated

¹ Supplemental funds are also provided by the Government of Japan Trust Fund, JIRCAS, NACA, WorldFish Center, RIHN (Japan)

2.3 Program Description/Framework

The R&D activities of the Program intend to address the four categories of social and economic problems in aquaculture discussed and adopted for development of action plans during the *ASEAN-SEAFDEC Fish for the People Conference*. These issues define the scope and coverage of the MSECAP as follows: (i) enhancing the role of aquaculture in addressing food, income and livelihood security through improved governance, multi-agency collaboration, and comprehensive and inter-disciplinary approaches; (ii) promoting sustainable aquaculture through enabling policies that support the management of natural and environmental resources; (iii) enabling mechanisms, institutions and infrastructure to encourage adoption of better aquaculture practices; (iv) understanding and improving linkages from production to marketing and trade of fishery products to support small and medium enterprise (SME) development; and (v) strengthening the capacity of aquaculture stakeholders by mainstreaming specific rural and peri-urban aquaculture programs and policies in local, national and international development programs.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2013

Prioritizing collaborative R&D in aquaculture in the region to have a clear regional assessment and understanding of the role of aquaculture in poverty alleviation and provide basis for policy formulation

The program is implementing three studies that engage different modalities of collaboration, demonstration and participation of small-scale aquaculture technology adopters in the Philippines. For freshwater aquaculture, two demo-runs under the 2-year study on the demonstration of grow-out culture of giant freshwater prawn, *Macrobrachium rosenbergii*, in net cages in Laguna Lake, with funds from AQD, were completed together with a fish farmer cooperative in Brgy Pipindan, Binangonan, Rizal in 2012. Both the monoculture (36% and 52% prawn survival rates for the two cooperators, respectively) and polyculture (43% prawn survival rate and 39% for tilapia) runs, however, did not meet target yield due to the increase in lake water level (2.2m) during southwest moonsoon, blue-green algae blooms and some technical limitations. The interest and motivation of small-scale fish farmer-collaborators needs improvement.

Meanwhile, the community-based stock enhancement of abalone, *Haliotis asinina*, in a demo-site in Barangay Molocaboc within the Sagay Marine Reserve (SMR) in Negros Occidental, which started in 2006 under the GOJ-TF4 and continued until GOJ-TF5, has been practicing the “stock-protect-partial harvest” protocol introduced in the project. This study involves the collaboration with the Barangay Molocaboc Fisheries and Aquatic Resources Management Council (BFARMC) representing the fishers, the SMR representing the local government of Sagay and the local abalone traders. Hatchery-bred abalone juveniles from AQD were released periodically in the demo-site beginning June 2011. After a year, abalones with shell length greater than 6cm following the catch size regulation recommended by this study in Sagay City may be harvested within and outside the demo-site. Some abalones believed to be spill-overs from the demo-site have been gleaned and sold by children and women in Brgy Molocaboc. Meanwhile, the proceeds from sale of abalones harvested by BFARMC members from the demo-site are allocated to fund the operating expenses of the demo-site, buy rice to compensate the fisherfolk-members who guard the demo-site, and savings in the BFARMC bank account. These financial management strategies are intended to sustain the demo-site and enable the BFARMC to be an independent enterprising organization of fishers when the AQD-GOJ support for this study ends in 2014. Community-managed stock enhancement of sea cucumbers is also being done in SMR, while baseline studies and seed production trials for stocking of sea horses are also on-going.

The lessons from the study in Sagay City are being applied in another study on developing area capability in coastal communities which started in 2012 with funds from the Research Institute for Humanity and Nature (RIHN-Japan). Aquaculture provides hatchery-bred shrimp, *P. monodon*, juveniles that go through intermediate culture in ponds prior to release in Batan Bay. The project engages its stakeholders and collaborators including a fisherfolks’ association, the local government of New Washington and a local fisheries university in various stakeholder information, education and communications (IEC) activities and in fisheries baseline data collection and monitoring systems. The intermediate culture of shrimp juveniles in July 2013 for release in September 2013 was, however, challenged by low survival rates. Its causes and potential remedial measures are being evaluated.

Allocating R&D resources to address emerging issues on the impacts of climate change and global trade on aquaculture with emphasis on small-holder fish farmers

Through the abovementioned collaborative studies with stakeholders described under Objective 1, the Program has initiated and allocated R&D resources for demo-sites to show potential commercially viable business using aquaculture technologies and stock enhancement protocols. In particular, the demo-site in Laguna Lake enabled a fish farmers' cooperative to harvest and sell freshwater prawns, although in limited quantities, in addition to the usual tilapia monocultured cultured in cages within the municipality of Binangonan, Rizal.

In Sagay City, the BFARMC comprised of fishers obtains monthly rice allowances bought using the proceeds from sale of partial harvests in the abalone stock enhancement demo-site. Gleaners also began to report catching some abalones in the shorelines of Molocaboc island. The gleaners sell live abalones to stockers in the island who sells to the trader in Brgy Vito in the mainland, who in turn transport the cooked chilled abalone meat to processor-exporters in Cebu City. Traditionally, abalones caught in Sagay are sold cooked and chilled without shells. This stock enhancement study has recommended buying of live abalones from fishers to complement the adoption of the 6cm shell length catch size regulation endorsed by this study. Buying of live abalones from fishers also ensures better quality and food safety of products from Sagay for domestic and export trade.

Enhancing multi-agency collaboration, sharing of information and resources between and among SEAFDEC and its Member Countries and other organizations in addressing the common problems of alleviating the socioeconomic conditions of the poor sector of the region

As of 2013, the Program has not yet engaged collaboration with Member Countries. Although, the forthcoming International Workshop on Resource Enhancement and Sustainable Aquaculture of AQD and GOJ is an opportunity to initiate the social science network in the Region. Some areas of collaboration could be on testing of community-based stock enhancement strategies in Member Countries with emphasis on developing country-specific techniques suited to MC conditions.

Major program activity	Duration	Remarks
Demonstrated grow-out culture of freshwater prawn, <i>M. rosenbergii</i> , in net cages in Laguna Lake involving a fish farmer cooperative	2012-2013	Conducted 2 demonstration runs but limited survival rates and harvest to meet commercial scale due to inclement weather, algal blooms and technical constraints; stakeholder participation needs improvement.
Demonstrated community-based stock enhancement of abalones, <i>Haliotis asinina</i> , in Sagay Marine Reserve that adopted the “stock-protect-partial harvest” protocol introduced by the study	2006-2014	Benefits from partial harvesting of 6cm shell length abalones per city ordinance in the demo-site; and gleaning of yet few abalones shorelines are appreciated by fisher association members, LGU, traders and gleaners in Molocaboc island.
Initiated a community-based stock enhancement through intermediate culture and release of shrimps, <i>Penaeus monodon</i> , in Batan Bay using hatchery-bred seeds	2012-2017	Baseline household data completed and fisheries monitoring data being collected. First intermediate culture of shrimp for release challenged by low survival rates.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Major program activity	Duration	Remarks
Conduct 3 rd demo-run in Nov 2013 to April 2014 in Brgy Pipindan and other sites to improve farm practice adoption strategies for grow-out culture freshwater prawn in net cages in Laguna Lake	Nov 2013- April 2014	To be implemented as proposed
Continue “stock-protect-partial harvest” protocol for abalones in Sagay until 2014; encourage more adopters to replicate demo-site; conduct survey on compliance and effectiveness of catch-size regulation; support resource governance (<i>e.g.</i> zoning, replicate catch size regulation for sea cucumber) in Sagay; promote seaweed planting and establish abalone hatchery and nursery in Sagay with funds from LGU and traders to ensure sustainable seed supply for stock enhancement and culture; sustain IEC especially on financial management and organizational sustainability	2014	To be implemented as proposed
Replicate first run activities in Batan Bay with improvements to develop shrimp stock enhancement protocol in collaboration with fishers’ association, LGU and local academe; institute community-initiated policies and ordinances (gear use and catch-size regulation) to support stock enhancement and secure stakeholder benefits	2014	To be implemented as proposed
Propose a side-meeting to initiate social science regional network during the International Workshop on Resource Enhancement and Sustainable Aquaculture that will be convened in March 2014	2014	Subject to approval and logistics support of AQD Management and GOJ-TF5 Co-Manager

4.2 Expected Outcomes

1. Strategies for enhancing adoption of freshwater prawn grow-out culture in net cages in Laguna Lake in Luzon.
2. Community-based abalone stock enhancement protocol, and socioeconomic and governance strategies for coastal communities in the Sagay, Negros Occidental.
3. Preliminary strategies for intermediate culture and release of shrimps to enhance stocks and contribute to area capability development in Batan Bay, Aklan province.

PROJECT DOCUMENT

Program Categories: Departmental Programs
Project Title: Quality Seed for Sustainable Aquaculture
Responsible Department: SEAFDEC/AQD
Total Duration: 2012-2016
Funding Sources¹: Philippine Government
Estimated Budget for 2014: USD 680,000

1. INTRODUCTION

Success in the sustainable production of aquatic species for human consumption depends primarily on the availability of good quality seedstock apart from the adoption of optimal husbandry techniques. With the intensification of aquaculture systems in most of the countries in Southeast Asia and the environmental challenges such as those resulting from climate change, both factors -- genetic quality and culture management should be considered as equally important in ensuring a steady yield of good quality seeds and later, marketable products from aquaculture. Hence through this program, activities that determine optimal conditions and methods in sufficient, quality seedstock production are being pursued.

2. PROJECT

a. Goal /Overall Objectives

Generate, verify and promote technologies to ensure the sustainable production of quality seed stock for aquaculture as well as for stock enhancement.

The specific objectives are to:

- 1) Develop good quality broodstock for both traditional and emerging species;
- 2) Improve quality and production of seedstock through the refinement of hatchery and nursery management methods;
- 3) Develop schemes for the production, management, maintenance and dissemination of genetically selected and improved stocks;
- 4) Produce sufficient seedstock through the adoption of economically viable seed production systems; and
- 5) Build the capability of fishfarmers and other industry stakeholders in appropriate breeding and larval rearing technologies through training, extension and information dissemination

b. Outcomes and Expected Outputs

- 1) Good quality broodstock for both traditional and emerging species developed
- 2) Quality and quantity of seedstock improved
- 3) Schemes for production, management, maintenance and dissemination of improved stocks established
- 4) Capacity of fish farmers and industry stakeholders in appropriate breeding and larval rearing technologies enhanced

c. Project Description/Framework

The program shall cover studies and activities that will determine optimal conditions and methods for the production of quality seedstock in sufficient quantities. The research activities entail the use of conventional methods of stock improvement such as domestication, broodstock management, strain evaluation and selective breeding or genetic improvement of traditional and emerging freshwater and marine species. The purpose for the genetic intervention is to enhance traits such as growth rate, survival, disease/ stress tolerance that ultimately leads to the production of good quality seedstock. Both broodstock and seedstock improvement by way of nutritional intervention is also considered. Suitable hatchery and

¹ Supplemental funds are also provided by other donors such as the Philippine's Department of Science and Technology, JIRCAS, GOJ-Trust Fund, ACIAR, etc.

nursery protocols shall be developed and refined depending on the level of technology for each species. These technologies shall be verified and once mature, shall be packaged into the most viable or cost-effective method for broodstock and seed production. Finally, industry stakeholders or primarily the fish farmers shall be informed of the advances in seed production methods, through training, and the availability of seeds especially of the improved stocks through information dissemination and extension work.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

1) *Development of good quality broodstock and implementation of proper stock management protocols*

Good quality spawners/breeders are important both for foodfish production and for production of seeds for stock release and conservation. Stocks for both purposes must both be genetically diverse to ensure fitness when farmed/released in specific environments. For stock release, the seeds produced by quality spawners will have to be genetically similar to the stocks in the receiving area to maintain the genetic integrity of the population in the enhancement site. Supportive breeding, or the use of broodstock from the enhancement site is often suggested to prevent further deterioration of the stocks in the release area. The following are the accomplishments for all the R&D activities which address objective A.

Commercial species

Shrimps (8-14g juveniles and 20-30g sub-adults) are currently being grown as potential broodstock as part of the study on the development of techniques for the sustainable production of good quality captive *P. monodon* breeders. These F₂ generation stocks shall be used to produce “high health” F₃ postlarvae.

Molecular markers that will identify stocks and consequently aid in determining genetic quality are currently being developed for several commercial aquaculture species. For seaweeds, molecular markers for *Kappaphycus* and *Eucheuma* species are being developed. Seaweed samples (n=171) belonging to different *Kappaphycus* and *Eucheuma* variants were collected from major farming regions in the Philippines, namely Bohol, Cebu, Cuyo, Cagayancillo in Palawan and mainland Palawan, Sulu, Tawi-Tawi and Zamboanga. DNA extraction and PCR amplification protocols for mtDNA *cox1*, *cox 2-3*, nuclear ITS 1-2 and chloroplast *rbc* target region in both species have been optimized. However preliminary trials showed that not all red seaweed variants can be amplified with the *cox 1* gene primers. Restriction enzyme digestion will be conducted as soon as successful PCR amplification of all seaweed samples at the aforementioned target regions is achieved. Sequencing of *cox 1* gene and other target regions were conducted on 8 seaweed samples. Preliminary results revealed that the Giant green variant was similar with published *cox 1* sequences of other *K alvarezii* isolates while the spinosum variant and Sacol green variant of *E denticulatum* also showed sequence similarity to published information of other *E denticulatum* isolates. Another giant brown variant and *Kappaphycus* species isolate “Sur” was found to be closest to *E denticulatum*. Additional sequences for the rest of the samples are necessary using the *cox1* gene to enable the construction of a more robust and reliable phylogenetic tree that will show the genetic relationships among the different samples. Another study which ultimately aims to improve existing seaweed strains deals with the isolation and culture of protoplasts from red seaweeds with potentially superior genetic traits.

Through the Philippine Department of Science and Technology and SEAFDEC/AQD, collaborative studies with the University of the Philippines (in the Visayas and in Quezon City) on the development of quality milkfish broodstock through conventional stock monitoring and management protocols are underway. Local hatcheries have been surveyed and a molecular marker-based broodstock management method on the Philippine milkfish *Chanos chanos* stocks is on-going. Samples (n=50/stock) were obtained from ten populations of wild and/or hatchery bred broodstock (including stock from Indonesia where some seedstock used in commercial grow-out operations are used). Initially genome sequence information determined through next generation sequencing was done to identify potential microsatellite markers that can be used to genetically characterize the aforementioned stocks. After optimizing DNA extraction and PCR amplification protocols, about 55 screened from 70 potential microsatellite markers were noted to be polymorphic. Twenty microsatellite marker loci shall then be finally used to delineated stocks. Once this work is completed, genetic differences among these stocks shall be determined and information on the best possible sources of milkfish broodstock shall have been known.

Apart from genetic intervention, nutritional methods to improve egg production and quality have been done by way of the inclusion of pigments in the diet. A maturation diet for grouper (*E. fuscoguttatus*) has been formulated and feeding trials on its effect on seed quality and production will be conducted.

To improve reproduction in the donkey's ear abalone, maturation diets are currently being assessed. The nutrient composition of eggs from wild-sourced abalone and those from hatchery-bred stocks have been identified. Dietary formulations with varying levels of protein/energy have been done and their effects on abalone reproductive performance have been tested using wild and hatchery conditioned broodstock. The nutrient composition of the natural diet in comparison with formulated diets has also been identified.

Efficient low-pollution diets for use in rearing potential freshwater prawn broodstock are being developed and tested. Grow-out diets were prepared to be isonitrogenous (35% crude protein) and isocaloric (346-350 kcal/100 g diet). These diets were used for the tank and lake-based grow-out culture of *M. rosenbergii* postlarvae (PL). Broodstock diets were also formulated to be isonitrogenous (38%) and isocaloric (378 kcal/100 g diet). Sardine fishmeal was replaced with cowpea meal at varying levels (Diet 1 = 0, Diet 2 = 15, Diet 3 = 30, Diet 4 = 45, and Diet 5 = 60%) in grow-out and broodstock diets (Diet 1 = 0, Diet 2 = 10, Diet 3 = 20, and Diet 4 = 30%). Feeding trials in lake-based cages showed that specific growth rate (4.52–5.00%/day) and survival rate were not affected by the replacement of cowpea meal protein level in the test diets. Prawns fed commercial prawn diet had survival rate (64%), mean body weight (13.98 g) and specific growth rate (4.73%/day) comparable to the performance of the test diets.

Meanwhile, giant freshwater prawn spawners stocked in tanks at 1 M: 4 F sex and fed treatment broodstock diets showed that after 72 days, prawns fed Diet 1 (0% replacement) had the lowest survival (75%), which was significantly different from the prawns fed Diets 2-4 (~92%). The percentage of berried females was highest in Diet 3 and 4 (92%), followed by Diet 1 (75%), and lowest in Diet 2 (50%). Fecundity increased with increasing levels of cowpea meal in the diet. The females produced on average from 1,462 to 3,147 larvae per hatching event. The average number of newly-hatched larvae varied from 135 larvae g⁻¹ female in prawns fed Diet 1 to 331 larvae g⁻¹ female in prawns fed Diet 4. However larval rearing trials resulted in complete mortality after two weeks.

Emerging species

Efforts are being undertaken to develop broodstock conditioning methods for the sandfish *Holothuria scabra* since it has been observed that old spawners decrease in body size and exhibit reduced reproductive performance. Some sandfish stocks were placed in wider broodstock holding pens in the Igang Marine Station to allow them to be reconditioned for three months. Once reconditioned, their sizes and spawning performance were recorded. Apart from conditioning techniques, sandfish reproductive performance is being improved through refinements in the spawning protocols. Cold temperature shock, introduction of water current/movement and simulation of rising tide within tank enclosures have been tested with the view of increasing spawning frequency and production output. Thermal shock trials had comparable results regardless of temperature. Of four spawning trials, warm method yielded an average spawning success of 32% for males and 12% for females. Cold water method induced 31% of the males and 13% of female breeders to spawn. Meanwhile, larval rearing trials wherein the ideal egg stocking density is being determined showed that the highest hatching rate was observed in the treatment with the lowest stocking density of 125/L. Verification runs have yet to be conducted to confirm this result. Finally, stocking density experiments (150, 250, 500 and 700 individuals/hapa) for nursery production are ongoing. Growth was noted to be satisfactory during the first month of culture but declined in the succeeding months. This indicates that the natural biofilm in hapa nets can only optimally support sandfish growth in cages for only up to one month.

Species for stock enhancement

The Napoleon wrasse *Cheilinus undulatus* is a subject of research at AQD primarily to understand its reproductive biology and consequently enable the production of seedstock for use in stock enhancement activities. Efforts are being made to develop broodstock of Napoleon wrasse as permits for broodstock collection have been filed in areas where potential stocks are to be collected. While waiting for the approval of permits and clearances, a preliminary survey was conducted in the Igang Marine Station where

sightings of small Napoleon wrasse juveniles were noted in the corals near the seagrass area. Fin clips of some of the specimens collected were sent to the Hokkaido University for genetic characterization. More samples are to be collected once available.

2) Refinement of hatchery and nursery management methods to improve seedstock quality and production

Commercial aquaculture species

A study on the refinement of mass production techniques for copepods (*Acartia tsuensis* and *Pseudodiaptomus annandalei*) is being conducted with the view of supporting intensive marine fish larviculture. Zooplankton samples were collected from a river mouth in Anini-y, Antique, and the target copepod species (*Pseudodiaptomus annandalei* and *Acartia tsuensis*) were isolated. Life history parameters including life span, age at first maturity, fecundity, and sex ratio were investigated. Individual culture experiments showed that *P. annandalei* cultured at $29\pm 1^{\circ}\text{C}$, 30ppt and fed *Tetraselmis tetrahele* produced 30-106 offspring in a life span of 12-42 days, while *A. tsuensis* $29\pm 1^{\circ}\text{C}$, 30ppt and fed *Chaetoceros sp.* produced 60-124 offspring and life span ranging from 6-20 days.

Mass culture of *P. annandalei* was undertaken in a 250-li tank at initial stocking density of 200 ind/li (mix stages). Copepods were cultured in a 30-li tank with a bottom replaced with a net to automatically sieve the nauplii, and installed inside the 250-li tank. Daily nauplii production ranged from 18 to 350/li, which peaked on the first one week of culture. On the third week of culture, copepods ceased to produce offspring even though they are still alive up to more than one month of culture. New batch of copepods were taken from the pond every month to start a new culture. Refinement in the procedure is on-going. The same procedure is applied to copepod *A. tsuensis*.

In addition, in search for potential natural food as an alternative to *Artemia* in intensive production of marine fish, life history parameters, as well as mass culture technique of the euryhaline cladoceran *Diaphanosoma celebensis* was undertaken. Produced *D. celebensis* were fed to seabass *Lates calcarifer* larvae. The highest fecundity of *D. celebensis* (89 nauplii) was obtained in *Tetraselmis tetrahele*-fed treatment at 10-15ppt, but the average fecundity is not significantly higher in *Chaetoceros calcitrans*-fed group. Results of the feeding experiments showed that seabass larvae fed *D. celebensis* were significantly bigger than *Artemia*-fed larvae. Nutritional (proximate and amino acid) components of *D. celebensis* fed different microalgae as well as of *Artemia* and seabass larvae will be determined.

To improve the production of marine fish larvae, nutritional intervention by way of tryptophan supplementation in the diets were used to minimize cannibalism. Preliminary trials using grouper larvae which involved weaning fish to a formulated diet were started but proved to be difficult as the larvae were very sensitive to experimental activities that require routine tank maintenance. Seabass larvae were then tried and the larval rearing trial proceeded well. Samples of larval seabass have been collected possibly for serotonin level analysis and for correlation with aggressive behavior.

In the pompano *Trachinotus blochii* (Lacepede), optimum conditions for breeding and seed production were determined. The potential use of copepods as larval diet was tried as alternative to *Artemia*. Feeding treatments were either *Artemia* and/or copepod fed singly or in combination to 15-day old pompano larvae. Results showed best survival (96%) in the treatment fed copepod while highest weight and length increment were noted in *Artemia*-fed larvae (94.4 mg and 12.68mm, respectively). Early metamorphosis was observed in copepod-fed larvae compared to the other treatments. On the other hand, larvae fed the *Artemia*-copepod combination showed better tolerance to hypoxic and high saline conditions.

A verification study on the brackishwater nursery pond culture of pompano that shall assess the optimal stocking density, feeding frequency and effect of in-pond sorters on the yield of seabass juveniles is on-going. Preliminary results indicated that after 30 days of culture, fish stocked at lowest density ($500/\text{m}^3$) in cages with sorters had better survival and were bigger than those stocked at higher densities. Meanwhile, another verification study on the nursery culture of pompano in floating netcages compared the use of pompano diet with a siganid diet. It was noted that pompano fry grew better when fed pompano feeds than the siganid diet. A confirmatory run is underway to verify the observation.

For milkfish, initial feeding trials involving a comparison in the growth and reproductive traits of broodstock fed fortified vs non-fortified (control) diets were conducted. Fortified diets meant inclusion of phospholipids, carotenoids, vitamin C, beta carotene and arachidonic acid. It was noted that more spawning episodes were observed in young milkfish broodstock fed fortified diets compared to the old stocks (17-29 year old). On the other hand, older stocks fed fortified diets produced more eggs. Fertilization and hatching rate of eggs produced by the aging stocks was comparable to the newly acquired breeders. Finally when milkfish larvae were on-grown to test the effect of stocking density on growth and survival of milkfish fry, those stocked at high densities of 50 larvae/liter survived poorly compared to those at the lowest density of 15 larvae/liter or 9.14% in contrast to 55.88%.

To improve the seed yield of selected high value marine fish species such as grouper, red snapper, seabass, rabbitfish and pompano, sodium-iodide enriched rotifers and *Artemia* were used as feed for larvae. Metamorphosis and survival of the same high value species were noted. It was observed that improved survival rate both for red snapper and pompano when fed sodium iodide enriched rotifer and *Artemia*. The duration of sodium iodide enrichment (short vs. long) was found to affect the survival of red snapper but not of pompano.

A strain of thraustochytrid *Schizochytrium* sp. (LEY7) was used to enrich feeds for fish larvae and abalone. Mass production of the aforementioned thraustochytrid strain is on-going. Different methods of thraustochytrid processing, namely: (a) freeze dried then preserved in biofreezer, (b) fresh/moist concentrate-preserved in biofreezer and (c) fresh/moist concentrate, unpreserved have been tried and results showed that all three methods were acceptable for enriching rotifer. Feeding trials using pompano larvae revealed that larvae fed rotifer enriched with hatchery prepared emulsion and larvae fed rotifer enriched with freshly harvested thraustochytrids had high body weight increase than the other preparations. The feeding trial using abalone diet containing thraustochytrid as source of lipi (4-8%) is on-going.

Cocconeis sp, *Nitzschia* sp and *Diploneis* sp have been used as alternative benthic diatom feed species for the hatchery rearing of abalone. Preliminary runs for food preference and digestion efficiency determination are on-going. Meanwhile in a related study, results of feeding continuously with (a) *Nitzschia* or (b) *Nitzschia* and then *Cocconeis* or (c) *Nitzschia*, *Cocconeis* then *Diploneis* /or (d) combination of *Amphora* and *Navicula* throughout or (e) the combination then *Cocconeis* showed that *Nitzschia* and *Cocconeis* are promising diets in the hatchery rearing of the abalone based on final survival rates. Feeding with *Nitzschia* also showed high settlement rate in abalone larvae.

Another nutritional intervention to improve abalone hatchery production is the administration of microparticulate diets as alternative feed. An agar-bound microparticulate diet has been formulated based on the nutrient profile of post larval abalone. Some parameters pertaining to the use of this kind of diet e.g. effects of agar concentrations and feeding frequencies have been tested in a small scale experiment. Results showed that feeding this kind of diet to abalone when bound with 7.5 mg/ml agar solution on a daily feeding frequency may improve post-larval settlement and survival. Experiments on other parameters such as investigation of optimal culture condition using this kind of diet are being done. Feeding trials in large scale tank systems are underway.

The influence of stocking density and tryptophan diets on the survival and growth of mudcrab *Scylla serrata* in the nursery phase shall be determined. Based on stocking density, crabs reared for 4 weeks at 30/m² had higher survival (59.7% vs. 47.6%) than those stocked at 50/m². On the other hand, crabs fed mussel and basal artificial diet survived better (57.7%) than those fed mussel alone or mussel and artificial diet with 0.5 to 0.75% tryptophan. In another experiment, crabs stocked at 5/m² and 10/m² and subjected to the same feeding regimes, survived better in diet 1 or in the mussel and basal artificial diet combination. Survival on the other hand was better in a lower stocking density of 5/m² than at 10/m². It was noted that tryptophan did little to reduce incidence of cannibalism. In this regard, modifications to further reduce the risk of competition and cannibalism are being tried and these are: a) reduction of culture duration from four weeks to three weeks per phase and b) use of a more complex substrate design or more substrates to maximize surface area and interstitial spaces. Refinements such as determination of the optimal natural food and artificial diet ratio and feeding rate are also being conducted. Other approaches to improve hatchery and larval rearing protocols also include: a) the evaluation of commercially available

shrimp formulated diets that can be used for mudcrabs and b) use of immunostimulants, prophylactics and disinfectants.

Emerging species for aquaculture

Silver perch *Leiopotherapon plumbeus* is a promising species for commercial inland aquaculture particularly because it is an indigenous species and it commands a good market price. Studies on the type of fertilizer and the optimum stocking density for therapon larval rearing are being conducted. Different fertilizer types namely: organic fertilizer, OF (chicken manure); inorganic fertilizer, IF (16-20-0); and no fertilizer, NF on larval rearing were tried and results showed that larvae stocked in tanks with OF had the highest specific growth rates ($7.20\% \text{ d}^{-1}$), compared with those in the IF ($5.98\% \text{ d}^{-1}$) and NF ($6.34\% \text{ d}^{-1}$) treatments. As for the stocking density, growth was found to be significantly higher at 750 larvae per tank than when stocked at 1250 larvae per tank.

To improve sandfish juvenile survival, a stocking density experiment was conducted using 2 x 1 x 1m floating hapas at the Igang Marine Station with treatments (150, 250, 500 and 700 individuals/hapa). Growth during the first month was at 0.1g/day for treatments 150 and 250 while treatments 500 and 700 had slower growth at 0.06g/d and 0.04g/d, respectively. However growth slowed and dropped considerably in the subsequent month at 0.01g/d for the lowest stocking density. This indicates that the natural biofilm in the hapa nets can only optimally support sandfish growth up to one month.

Species for stock enhancement

The seahorses, *Hippocampus barbouri* and *H. comes* are continuously being propagated in the SEAFDEC/AQD hatchery for possible stock release. Meanwhile, monthly on-site assessment at Molocaboc Island, Sagay City was conducted to monitor baseline population of wild seahorses. The seahorses were collected from fringing coral reefs during night time at low tide. Most of the animals were found coiling their tails among coral reefs, while only a few were found on the seaweed *Sargassum* sp. Collection of wild seahorses was assisted by local divers who are also residents in the island. After an hour of diving, the collected seahorses are weighed, measured and graded based on the gonad development stage. Sampling is being done continuously except for some months in the year when strong waves were noted in the sampling site. To determine good sources of wild seahorses, DNA analysis of samples from several collection sites shall be done.

3) *Development of schemes for the production, management, maintenance and dissemination of genetically selected and improved stocks*

Commercial species

Selective breeding programs have commenced for selected crustaceans with support from the Government of Japan Trust Fund (for mudcrab, shrimps and freshwater prawns), SEAFDEC/AQD and the Philippine Department of Science and Technology (for shrimp and the mudcrab). For the mudcrab, stress tests (particularly formalin tolerance and disease challenge response tests) were done to determine strain level differences in the effort of identifying stocks with better fitness attributes. Details on the shrimp and mudcrab studies are not included here but are covered in the GOJ-TF report.

For the giant freshwater prawn, the approach for genetic improvement is to assess and determine the effective broodstock management scheme to enhance growth and/or reproductive performance. This year, potential broodstocks from two sources, Calumpit, Bulacan and Pampanga River are being on-grown for growth and reproductive performance comparison. Broodstock management methods (crossbreeding and optimal sex ratio) already tried as effective for the AQD hatchery stocks from Calumpit are being assessed using these different stocks.

Hybridization is currently being done on the local commercial abalone species (*Haliotis asinina*) by crossing this with other Philippine abalone species, *Haliotis planata* and *Haliotis glabra*, to enable the production of stocks/species with improved traits. A new trial was done using *H. asinina* female and male *H. planata* (Palawan strain). The larvae (1,875,000 pcs.) were stocked in two rearing tanks located in demo abalone hatchery. The settlement rate (day5: 0.66%) and post settlement rate (day10:0.42%) were

recorded. The larvae stocked are now 1.4–1.5 cm SL abalone juveniles (approximately 4,949). The juveniles will be reared until 2.5 to 3.0 cm for grow-out rearing in sea-based cages (for growth and maturation studies).

Meanwhile, in an earlier growth comparison trial, in terms of body weight (BW) and shell length (SL) pure *H. asinina* attained optimum growth at a shorter period of time (BW at 180 days of culture or DOC – 26.13g; SL: 210 DOC – 4.91cm) compared to hybrid HAFPM (or hybrids of *H. asinina* female parent and *H. planata* male parent). After 300 days of culture, the survival of hybrid HAFPM was higher (73.3%) compared to pure *H. asinina* (66.4%).

In a related study, after 180 days of culture, the third hybrid HAFVM (cross of female *H. asinina* and male *H. varia*) attained optimum growth similar with pure *H. asinina*. The new hybrid (HAFVM) is bigger (SL: 4.43cm; BW 21.63g) compared to pure *H. asinina*. The survival of both strains is also similar (100%).

Efforts to produce triploid abalones are also underway using caffeine and 6DMAP. Higher % of normal trocophore larvae was observed in caffeine treated eggs (10min: 82%; 5min: 85%) compared to 6DMAP treated eggs (10 and 5 min: 75%). Both samples of hybrid stocks and triploid abalones were sent to Hokkaido University for genetic analysis and confirmation of success in hybrid and triploid induction,

Ice-ice disease in seaweeds is a problem. Methods to develop resistant strains of the seaweed *Kappaphycus* and reduce epiphytes are being studied. Bacteria were collected from ice-ice infected *Kappaphycus* from various local farm sites. Crude bacteria did not cause ice-ice to two variants of *Kappaphycus* (plantlets). Older branches will be tested. Meanwhile, epiphytes were collected from infested seaweeds but failed to induce settlement of spores on *Kappaphycus* plantlets. Older thalli will be tested for induction of epiphyte.

Another study involves the evaluation of the performance of haploid and diploid *Kappaphycus*. Preliminary results showed that growth rates of sporophytes and gametophytes are significantly different in the land-based nursery. Growth rates of gametophytes and sporophytes are not significantly different when grown in lines. Finally, tissue cultured *Kappaphycus* were grown in the land-based nursery and transferred to net cages. There were no epiphytes and ice-ice disease observed when *Kappaphycus* were cultured in net cages and culture lines.

Adoption of economically viable systems to produce sufficient seedstock

Several fish/shellfish production projects are being implemented at SEAFDEC to demonstrate the viability of small-scale and/or large-scale seed production systems. Mass production of sex-reversed and mixed-sex Nile/red tilapia fingerlings as well as large-scale production of abalone juveniles, are continuously being done. In the small-scale Nile tilapia hatchery, New female spawners were used for spawning starting this year. A total of 160 females and 40 males were distributed into 4 cages (3 x 4 x 1 meter) and 4 units of rectangular tanks (3 x 5 x 1 meter). Approximately 300,000 swim-up fry were collected from January to June 2013. Eggs collected from spawning cages were distributed in hatching jars for hatching. At present, 70,000 tilapia fry/fingerlings with size range from swim-up fry to 0.5 inches are ready for disposal.

For the abalone, juvenile production is on-going from two hatchery facilities (large scale and backyard type demo-scale) at AQD. From April to June 2013, a total of 52,498 abalone juveniles (SL: 5mm-8mm) were produced from 10 12-ton outdoor tanks and 5 1.5-ton indoor tanks of the abalone hatchery facility. Survival rate from veliger larvae to 90 day-old juveniles ranged from 0.01% – 0.67% with average of 0.26%. While in the demo hatchery facility, a total of 15,536 abalone juveniles were produced with survival rate ranged from 0.13%-0.48% with an average of 0.31%. Harvested abalone juveniles were reared further in the nursery tanks until they reach 1.1 – 1.5 cm or bigger which is the size ideal for disposal

4) Capacity-building of fishfarmers and other industry stakeholders on appropriate breeding and larval rearing technologies

Several specialized training courses were offered to local government representatives, private sector investors and fisherfolk. These were on sandfish, abalone, tilapia and the giant freshwater prawn. Apart from these customized courses, on-the job trainees were also accommodated in the AQD hatcheries during this period. Moreover, technical assistance was also provided to local international private sector clients

through the Agree Build Operate and Transfer Aqua Negosyo Program. Notable among these is the technical support extended to the ACDI-VOCA project in Timor Leste.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Major program activity	Duration	Remarks
CRUSTACEANS		
SHRIMPS		
Selective breeding of shrimps (i) <i>Penaeus indicus</i> : disease resistance in juveniles from captive spawners; (ii) <i>P. monodon</i>	2013 – 2014	
Methods for sustainable production of good quality broodstock, spawners; high health fry in <i>P monodon</i>	2013-2014	
GIANT FRESHWATER PRAWN		
Broodstock management schemes for improved growth, reproduction in <i>Macrobrachium rosenbergii</i>	2013-2014	
Efficient low pollution feeds for giant freshwater prawn during grow-out and broodstock stages	2013-2014	
MUDCRABS/ BLUE SWIMMING CRABS		
Improvement of mudcrab <i>Scylla serrata</i> larval rearing protocol/hatchery technology	2013-2015	
Strategies to reduce cannibalism in mudcrab nursery	2013-2015	
Selective breeding of mudcrab	2013-2014	
Effect of stocking density, tryptophan diets on mudcrab growth and survival in the nursery	2013-2014	
Development of techniques for sustainable production of marine annelids as feed for broodstock mudcrab	2013-2015	
Verification of feeding, water management methods in mudcrab seed production	2013-2015	
National R&D Program on blue swimming crab: optimization of hatchery and nursery protocols	2013-2015	
MARINE FISHES		
Improvement of fry quality through refinement of milkfish broodstock management	2013-2014	
Application of molecular markers in milkfish broodstock management	until mid 2015	
Optimization of seed production of milkfish through feeding fortified diets	2013-2014	
Tryptophan supplementation to reduce larval cannibalism	2014	
Refinement of seed production methods for grouper, red snapper, sea bass, rabbitfish, pompano	2014	
Refinement of rearing methods for grouper fingerling production in cages in ponds	2014	
Development of hatchery techniques for emerging species, e.g. pompano, scat	2013-2014	
Stock enhancement of Napoleon wrasse <i>Cheilinus undulates</i>	2013-2014	
Copepod production in ponds using different fertilization schemes	2013-2014	
Studies on refinement of techniques for seed production, larval and nursery rearing of high value marine species	2013-2015	
Production of seahorse juveniles for stock enhancement	2013-2014	
Screening of herbivores (mullet, acanthurids) for aquaculture potential	2013-2016	
FRESHWATER FISHES		
Mass production of sex-reversed and mixed sex Nile and red hybrid tilapias	2013-2016	
Determination of genetic status of bighead carp hatchery stocks in the Philippines using DNA markers	2014-2015	

Major program activity	Duration	Remarks
Improvement of larval rearing techniques for climbing perch <i>Anabas testudineus</i> and <i>Leiopotherapon plumbeus</i>	2013-2015	Studies on climbing perch and therapon have been merged
Larval rearing protocol for <i>Leiopotherapon plumbeus</i> in outdoor tanks	2013-2015	
Catfish seed production	2013-2015	To support requirements for catfish grow-out study
SHELLFISHES		
Experimental hybridization between Philippine native abalone species	2013- 2014	
Use of thraustochytrid as live feed enrichment for fish larvae and component in abalone formulated diets	2013-2014	2012 – completed work on abalone 2013-2014 – work on fish
Cultivation of <i>Cocconeis</i> for settlement, growth and post larval abalone survival	2013- 2014	
Refinement of hatchery techniques for abalone	2013-2015	
Experimental hybridization of Philippine native abalone species	2013-2014	
Maturation diet for abalone: effect of P:E on reproduction; Microparticulate diet as alternative feed in abalone hatchery (small vs. large-scale tanks)	2013-2014	
Production of abalone juveniles (demonstration hatchery)	2013-2015	
Large-scale production of abalone juveniles	2014	
OTHER INVERTEBRATES		
Enhancement of sandfish hatchery and nursery techniques	2013-2016	
SEAWEEDS		
Development of ice-ice resistant strains of <i>Kappaphycus</i> and technology for reduction of epiphytes	2013-2015	
Development of molecular markers for <i>Kappaphycus</i> , <i>Eucheuma</i>	2013-2015	
Purification and characterization of agarases and carageenases from polysaccharide-lysing bacterial isolates of seaweeds and herbivorous species	2013-2014	
Nursery rearing methods for production of <i>Kappaphycus</i> seedlings	2013-2015	
Culture of <i>Gracilariopsis heteroclada</i> in pond and in intertidal area	2013-2014	
GENERAL		
Publication of manuals on genetics and broodstock management (especially for marine fish species); updating of manuals on milkfish, seabass, rabbitfish, tiger shrimps, etc.	2013-2016	
Training of Bureau of Fisheries and Aquatic Resources (BFAR) Regional Fisheries Training Centers (RFTCs) to further strengthen their capability to provide assistance to farmers via their demonstration farms	2013-2016	
Regular, internship and customized training for national participants from SEAFDEC Member Countries, private sector and farmers on finfish/crustacean/mollusk breeding and hatchery operations	2012-2016	Continuing activity

4.2 Expected Outputs in 2014

Shrimps:

- Improved growth, breeding performance; healthy broodstock produced; inbreeding minimized
- Protocols (sex ratio, stocking density from market size to broodstock) established



Freshwater prawns:

- Optimal broodstock management method defined;
- Improved efficient low pollution prawn broodstock diet developed;
- Stocks surveyed and domesticated, larval rearing and grow-out culture requirements established

Mudcrab/blue swimming crab:

- Larval rearing protocol improved;
- Mass production method of annelids established and tested as feed for mudcrab;
- Reduced cannibalism;
- Improved growth, breeding performance;
- Healthy broodstock produced; inbreeding minimized;
- Nursery production improved;
- Reduced seed production cost and increased survival;
- Optimal hatchery and nursery protocol available;
- Mass production method of annelids established and tested as feed for mudcrab

Marine fishes:

- Fry quality improved through broodstock management;
- Genetic stocks screened; information used for broodstock management;
- Improved maturation diet for milkfish available;
- Methods to reduce cannibalism determined; schemes to improve survival determined;
- Improved survival from 70% to >80%; lower FCR
- Optimal conditions for larval rearing established; established protocols for seed production;
- Nursery rearing of marine fishes improved;
- Target production achieved;
- Potential aquaculture species identified.

Freshwater fishes:

- Best saline tolerant stocks identified;
- Tilapia fingerlings produced; income generated; production target attained;
- Breeding and seed production protocol defined for emerging species;
- Larval rearing methods optimized for emerging species.

Shellfishes:

- Better stocks produced through hybridization
- Conditions for mass production established; traustochytrid strain tested as enrichment for larval live feed;
- Optimal culture method for *Cocconeis* production determined;
- Improved hatchery methods;
- Best genetic stock of abalone identified and used in selective breeding
- Better abalone stocks produced through hybridization
- Effect of dietary P:E levels on abalone breeding known; effective diet for abalone broodstock developed
- Production technology demonstrated and disseminated (monthly production: 16 thousand of 1.1-1.5cm)
- Abalone juveniles produced (24.3 thousand/month of 1.1-1.5cm abalone)

Other invertebrates:

- Consistent method for broodstock conditioning for spawning established

Seaweeds:

- Disease-resistant strains developed
- Cox I sequence determined; PFLP PCR protocol available
- Protoplast isolation protocol using new enzymes developed
- Recombinant carageenase and agarase available

- Nursery rearing protocol optimized
- Culture method defined; production target achieved

For all species:

- Training courses on fish/crustacean/mollusk breeding and hatchery operations conducted
- Institutional Capacity Building for Sustainable Aquaculture for several local government technology recipients conducted
- Clients under the Agree Build Operate and Transfer AquaNegosyo supported in terms of technical assistance in hatchery/nursery operations
- New manuals and updated manuals on breeding and hatchery operations for selected species published
- Information disseminated through publications and participation in fairs and exhibits.

SEAFDEC Departmental Program of Activities for the Year 2013-2014: TRAINING DEPARTMENT

Overall Review

In 2013, TD conducted three projects under Departmental program. The project of Promotion and Dissemination Fisheries Information was implemented to strengthen and encourage TD and SEAFDEC visibility to public. Imparting knowledge of fisheries information through SEAFDEC role to public is main output by conducted exhibition, AFT magazines. Moreover, TD network groups were maintained. The electronic files of AFT magazine and other information were sent and distributed to TD network by this channel. In 2014, the project name will be changed to “Promotion on Strengthening of SEAFDEC Visibility and Image”. Understanding on SEAFDEC/Departments role and activities, delivery of fisheries information to stakeholders and the public, tools and database of TD information system, and to be hub of fishery information in the region are expected output of this project implementation.

The project of Tailor-made Training Program was organized ten tailors-made training courses and study tour programs, based on the need and requirement from the partners to develop of human capacity building of partner and also Member Countries. According to this, the tailor-made training courses and study tour programs will be continued to conduct, designed and planned out by the consultation and agreement of TD and training partners. This includes the choice of subjects, duration, location, and the target participant. Courses/programs can be conducted by combining existing training programs or a totally new topics and programs. The organization or course fee will be estimated base on the cost recovery and actual expenses

Moreover, the project of Improvement of Fisheries Technology and Reduction of the Impact from Fishing was conducted. The main activities are promotion of appropriate technologies and practices of fishing marine engineering, fisheries research, and database for deep-sea fisheries resource survey. The outcomes and expected outputs is technology transfer and development through enhancement of strengthening on coordination and collaboration with other relevant agencies on the issues related to fishing technology, marine engineering, fisheries information and database. In 2014, eight sub-activities under main activities will be continued as follows; Reduction of manpower onboard fishing vessels: purse seine, and otter-board trawler, Improvement of post-harvest fish handling, Review on impact of dredging on coastal seafloor ecosystem, Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC-trawl), Manual for fishing gear survey, Research on bottom sediment around set-net area in Ban Phae – Rayong Province, Collaborative research survey on fisheries resources and marine environment in the Central Gulf of Thailand, and Population structure of fish inhabit in the Gulf of Thailand and South China Sea respectively.

Projects in 2013

1) Promotion and Dissemination Fisheries Information

The fishing information through SEAFDEC role and TD implementation activities was imparted to public via two national exhibitions. More than 69,000 audiences visited TD booths in totally. Two issues of Advance Fisheries Technology (AFT) Magazine in the theme of “Fishing Light Technology” and “Technology to reduce bycatch from fishing activities” was produced respectively and disseminated to TD network by hard and soft copy. Moreover, third issue in the theme of “Development of Fishery Technology for Coastal” is preparing and will be printed and disseminated in the end of this year. Development on human capacity building of information staff was conducted such as co-organized the 14th SEAFDEC Information Staff Program meeting to develop knowledge, skill and enhance experience of SEAFDEC information staff with SEAFDEC Secretariat and *etc.*

2) Tailor-made Training Programs

More than 180 participants were attended in ten tailors-made training courses and study tour programs, based on the need and requirement from the partners. The programs were designed and planned out by the

consultation and agreement of TD and training partners. This includes the choice of subjects, duration, location, and the target participant to build up human capacity on the fisheries related.

3) Improvement of Fisheries Technology and Reduction of the Impact from Fishing

Nine sub-activities from three main activities as promotion of appropriate technologies and practices of fishing marine engineering, fisheries research, and database for deep-sea fisheries resource survey were conducted to transfer appropriate technologies and practices to support sustainable utilization of coastal and marine fisheries resources, including capture fishery, marine engineering, and fishery information, and strengthen collaboration with relevant agencies at national and regional level

Projects in 2014

- 1) Promotion on Strengthening of SEAFDEC Visibility and Image
- 2) Tailor-made Training Programs
- 3) Improvement of Fisheries Technology and Reduction of the Impact from Fishing

PROJECT DOCUMENT

Program Categories: Departmental Programs
Project Title: Promotion on Strengthening of SEAFDEC Visibility and Image
Responsible Department: Training Department
Total Duration: 2014
Funding Sources: Training Department
Estimated Budget for 2014: 50,000 USD

1. INTRODUCTION

The Information Strategies for Enhancing SEAFDEC Visibility and Communication which was endorsed by the SEAFDEC Council in 2006 are used as a common policy framework for information-related activities of the organization. In 2009, the strategies were revised and simplified. However, they still emphasize raising SEAFDEC image at international, regional, national levels and enhancing communication and information sharing both within SEAFDEC and with Member and non-Member Countries, other international/regional organizations, and the public.

Moreover, the Plan of Action on Sustainable Fisheries for Food Security Towards 2020 which was adopted in ASEAN-SEAFDEC Conference, “Fish for the People 2020: Adaptation to a Changing Environment” in Bangkok, Thailand during 13-17 June 2011 emphasizes the enhancement of regional fishery information systems and mechanisms to facilitate sharing, exchange and compilation of information.

Following the information strategy of SEAFDEC and the Plan of Action on Sustainable Fisheries for Food Security Towards 2020 through promotion of SEAFDEC role, implementation activities, visibility and image to Member Countries, other international institutions and the public, TD will propose and implement the project of “Promotion on Strengthening of SEAFDEC Visibility and Image” under Departmental Program.

2. PROJECT

a. Goal /Overall Objectives

SEAFDEC role, visibility and image are promoted and enhanced among Member Countries, others international institutions and the public

b. Outcomes and Expected Outputs

Outcomes

- Strengthening of SEAFDEC and Departments visibility and image

Expected Outputs

- Understanding on role and SEAFDEC/Departments activities
- Delivery of fisheries information to stakeholders and the public
- Tools and database of TD information system
- Hub of fishery information in the region

c. Project Description/Framework

Activity 1: Promotion and Enhancement of SEAFDEC Visibility and Image

SEAFDEC role and implementing activities as knowledge on fisheries information in collaboration with other SEAFDEC Departments will be promoted and enhanced among others international institutions and the public via national and international exhibitions as required and other suitable channels.

Activity 2: Production of Information Materials

Hard and soft copies such as Advance Fisheries Technology (AFT) magazine, electronic multimedia, fisheries information packages and *etc.* on fisheries information knowledge and also implementation activities will be produced. These information materials will be promoted and delivered to the public to enhance SEAFDEC visibility and image through fisheries information knowledge.

Activity 3: Management Information System

The management information system of the Training Department will be initiated and developed as information data warehouse to meet internal and external requirement. Strengthening of TD information network such as an electronic mail group and integration of relevant website and *etc.* has been maintained as sub-activity.

Activity 4: Human capacity building for SEAFDEC information staffs

The knowledge, skill and experience of information staff will be enhanced and developed by relevant ICT training program with outside institutions such as strategy of Public Relation, website design and *etc.*

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

Project Activity Title	Duration
1) Promotion and enhancement of fisheries knowledge - Exhibition on Fishery Resource Conservation and promotion SEAFDEC and TD activities for Children Day at Agriculture Museum and Pomprachunlajomklao Navy was organized. More than 6,000 audience visited TD booth.	12 Jan 13
- Exhibition at the annual national fair "Pramong Nomklao" was organized in collaboration with the Thai Department of Fisheries. TD presented fisheries activities such as crab bank, artificial reef, artificial sea grass and raft-rope culture of green mussel under the theme of "Coastal resource enhancement and rehabilitation for food security". With the distribution of various technical publications, brochures, VCDs and fishery-related souvenirs to the audience, the SEAFDEC visibility was promoted. More than 63,000 audience visited TD booth.	28 Jun- 7 Jul 13
2) Production of Advance Fisheries Technology magazine - 2,000 copies of Advance Fisheries Technology Volume 5 issue 1 in theme of "Fishing Light Technology" was produced and distributed to TD networks and the public by mail and e-mail to enhance fisheries knowledge and public relation of TD and implementation activities	Apr 13
- 2,000 copies of Advance Fisheries Technology Volume 5 issue 2 in theme of "Technology to reduce bycatch from fishing activities" was produced and distributed to TD networks and the public by mail and e-mail to enhance fisheries knowledge and public relation of TD and implementation activities	Aug 13
- Advance Fisheries Technology Volume 5 issue 3 in theme of "Development of fishery technology for coastal" is preparing and will be produced and distributed at the end of the year	Dec 13
3) Human capacity building for SEAFDEC information staff TD in collaboration with Secretariat organized the 14 th SEAFDEC Information Staff Program meeting for the development of knowledge, skill and experience of SEAFDEC information staff including strengthening of strategy of SEAFDEC visibility worldwide.	30 Oct- 1 Nov 13
4) Establishment of fishery information network Ten external and eleven internal e-mail group networks are maintained to circulate fishery information on the topics of combating IUU fishing, fishing gear technology and <i>etc.</i> Moreover, information and public relation of TD activities and implementation are promoted via these networks.	Jan-Dec 13



4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Project/Activity Title	Duration
Activity 1: Promotion and Enhancement of SEAFDEC Visibility and Image National and international exhibitions as required will be organized to promote and enhance SEAFDEC role, visibility and image through present knowledge on fisheries information in collaboration with other SEAFDEC Departments	Jan-Dec
Activity 2: Production of Information Materials - Three issues of Advance Fisheries Technology (AFT) - Three electronic books (E-book) on promotion of resources conservation and safety at sea will be developed and produced in the form of CD-Rom - Fisheries information package to promote awareness understanding on “Responsible Fisheries” will be produced. The package will include books, brochures, CD-ROM and <i>etc.</i> that are relevant to responsible fisheries issues. - VCD introducing SEAFDEC’s role and activities in Member Countries’ language	Jan-Dec
Activity 3: Management Information System The information system on TD training course will be initiated and developed as program for data warehouse management. The program capability consists of online registration, online evaluation, list of participant database, certificate print out and download of training documents. This activity will be implemented by TD as pilot project and may expand to other Departments in next step.	Jan-Dec
Activity 4: Human capacity building for SEAFDEC information staff The knowledge, skill and experience of information staff will be enhanced and developed by participating in relevant ICT training program with outside institution such as strategy of Public Relation, website design and <i>etc.</i>	Jan-Dec

4.2 Expected Outcomes/Outputs

- Strengthening of SEAFDEC and Departments visibility and image
- Understanding on role and SEAFDEC/Departments activities
- Delivery of fisheries information to stakeholder and public
- Tools and database of TD information system
- Pilot activity to be hub of fishery information in the region

PROJECT DOCUMENT

Program Categories: Departmental Program

Project Title: Tailor-made Training programs

Responsible Department: Training Department

Total Duration: 1 yrs (2014)

Funding Sources: Department of Fisheries Thailand, Fish Marketing Organization

Estimated Budget for 2014: -

1. INTRODUCTION/BACKGROUND

Each year, TD has conducted several regional training courses, that are a channel to transfer activities outputs and technology which are found out or developed by SEAFDEC to its Member Countries, therefore the participants will come home with knowledge about “how they learn and how they do in SEAFDEC/TD, Thailand”. However, every year SEAFDEC/TD is requested to conduct some tailor made courses and study tour programs that are a direct follow-up of its advisory activities with and for, organizations in this region. Such courses/programs are referred to as tailor-made courses/programs because they are set up at the request and need of the organizations, with this they can be enormous benefit in developing the capabilities of the workforce, training doesn't come cheaply. Training needs to be for the right people, it needs to be the right type/design of training and it needs to be at the right time. Due to this the participants background, work responsibilities, objectives and expectation to be able to do at the end of the training course/program will be used for the course designing, it is tailored to the specific training needs of the requesting organization's staff. The tailor-made training courses and study tour programs which are conducted by TD emphasize learning by doing, observing. This is an approach that relies heavily on the participants' active involvement. An important part of learning by doing and seeing are that lecturers act more often as facilitators than as teachers in the traditional sense. The course will not focus on the theory but more dealing with practical application.

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

This project goal is to continue in giving support to the interest of SEAFDEC Member Countries and others for strengthening the capability of the training participants which will be directly meet to their own specific need and requirement of the technical areas related to the fisheries. Moreover, the specific objectives of the project are as following:

- 1) Wide range of tailor-made training courses in the field of fisheries and other relevance aspects will be continued to support by TD.
- 2) Training facilities of TD will be fully utilized and made use for Member Countries and the region.

2.2 Expected Outcomes and Outputs:

TD will continuously be a part to support Member Countries or other organizations/institutes to build up human capacity on the fisheries-related issues especially base on the need and requirement aspects of the training partners/donors.

2.3 Project Description/Framework

The tailor-made training courses and study tour programs will be conducted based on the need and requirement from the partners. The programs will be designed and planned out by the consultation and agreement of TD and training partners. This includes the choice of subjects, duration, location, and the target participants. Courses/programs can be conducted by combining existing training programs or a totally new topics and programs. The organization or course fee will be estimated base on the cost recovery and actual expenses.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration
1. A long-term training course on fishing operation for Tinsulanonda Fisheries College. This training course is conducted under the collaboration between TD and the Office of Vocational Education Commission. The training is a part to support the country in producing seamen and navigators for fisheries industrials of Thailand. There were 12 students attending on this training course for this batch.	4 months, from 3 Oct 2012 to 24 Feb. 2013.
2. A study visit program to sectors concern on fishery in Thailand, this tailor-made training course was conducted under the collaboration with Kagoshima University. There were 20 of the students and 3 resource persons participated in this program.	14-23 Feb. 2013
3. Short-term training Course for University Students on Friendly Fishing Gears for Sustainable Fisheries Management (Batch-55). Twelve days of the short term training course was conducted at SEAFDEC/TD, there were 39 students from nine Universities attended in the training course.	22 Apr. to 2 May 2013
4. Tailor-made of Shipboard and Simulators Training Program on Navigation and Marine Engineering for NATC, Malaysia, there were 3 participants participated in this training course, the course was composed of two main parts: 1) M.V. SEAFDEC shipboard training; and 2) Workshop and simulator practiced at SEAFDEC/TD.	28 May – 2 June: shipboard training and 3-9 May: Practiced sessions at SEAFDEC/ TD
5. Tailor-made Program on Overseas Training on the Implementation of Port State Measure in Thailand from Indonesia. There were 7 participants participated in the program.	4-8 June 2013
6. Evolutionary of sustainable fisheries management in Thailand. The program was conducted under collaboration with AIT, there were 20 students from Shanghai University attended in the program.	17-19 July 2013
7. Short-term training program in strengthening fisheries officers on sustainable fisheries management, there were 20 fisheries officers participated in this training program.	23-27 Sep. 2013
8. The short-term training for University students on Coastal Ecosystem and the sustainable utilization of fisheries resources (B-56). The twelve days of the short term training course was conducted at SEAFDEC/TD, there were 40 students from seven difference Universities of Thailand and Japan attended in the training course.	21-30 Oct. 2013
9. Assistant in the Seminar on Global Advances in Seafood Processing Marketing and Promotion for BFAR Post Harvest and Marketing Focal Persons. The seminar will be conducted at Cebu City, the Philippines. TD assisted BFAR in coordination with speakers and facilitator in giving support to the seminar.	4-8 Nov. 2013
10. The Training and Study Tour Program on Fishing Industry in Thailand, the training and study tour program will be conducted at SEAFDEC/TD, there will be 20 officers from BFAR participate in this coming program.	1-7 Dec. 2013

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

At least five tailor-made training programs will be conducted in the year 2014. (The course titles, programs and activities will be designed base on the requirements/needs from the training partners).

4.1 Expected Outcomes/Outputs of the Year 2014

TD will continuously be a part to support Member Countries or other organizations/institutes to build up human capacity on the fisheries-related issues especially base on the need and requirement aspects of the training partners/donors.
--

PROJECT DOCUMENT

Program Categories: Departmental Program

Project Title: Improvement of Fisheries Technology and Reduction of the Impact from Fishing

Responsible Department: Training Department

Total Duration: 2013, and 2014 ~

Funding Sources: Department of Fisheries Thailand, Fish Marketing Organization

Estimated Budget for 2014: -

1. INTRODUCTION

Over the years, TD has initiated several projects/programs aiming to promote responsible fishing technology and practices, including reduction of the impact from fishing through improvement of onboard current fishing practice; develop deck machineries; and conduct practical research on fishing technology and fisheries marine engineering. This program covers a wide range of activities, implemented in collaboration with Department of Fisheries Thailand and other government agencies (*e.g.* Fish Marketing Organization of Thailand, National Agricultural Training Council – Malaysia, and Research Institute of Humanity and Nature – RINH), including technical assistant, research and development, sea trial, and demonstration.

Activities implementing under this program include:

- 1) Promotion of appropriate technologies and practices of fishing and marine engineering
 - Reduction of manpower onboard fishing vessels: purse seiners, otter-board trawler
 - Improvement of post-harvest fish handling
 - Improvement of catch quality for small-scale fishing vessels in Songkhla Lake
 - Review on impact of dredging on coastal seafloor ecosystem
 - Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC Trawl)
 - Manual for fishing gears survey
- 2) Fisheries research
 - Research on bottom sediment around set net area in Ban Phae, Rayong Province
 - Collaborative research survey on fisheries resources and marine environment in the Central Gulf of Thailand
 - Population structure of fish inhabit in the Gulf of Thailand and South China Sea
- 3) Database for deep-sea fisheries resource survey
 - Development of database for research cruise survey

2. PROJECT

2.1 Goal/Overall Objectives

Overall objectives of this program include:

- 1) To transfer appropriate technologies and practices to support sustainable utilization of coastal and marine fisheries resources, including capture fishery, marine engineering, and fishery information; and
- 2) To strengthen collaboration with relevant agencies at national and regional level.

2.2 Outcomes and Expected Outputs

Through the technology transfer and development, it is envisaged that fishing capture process will be improved. In addition, coordination and collaboration with other relevant agencies on the issues related to fishing technology, marine engineering, fisheries information and database will also be strengthen.

2.3 Project description

Reduction of manpower onboard fishing vessels: purse seine, and otter-board trawler

Due to the current condition of difficulty in finding skilled crew fishers to work onboard fishing vessels, and to provide an option to skippers to work more smoothly by installing an appropriate deck machinery (s). This activity has been implemented in collaboration with Department of Fisheries Thailand since 2012, by starting up with the installation of net hauling device – power block using hydraulic system onboard purse seiners. The participating skippers and technical staff of TD and DOF Thailand paid their visit to Lumut and Pangkor Island – Perak in September 2013 through in-country coordination by National Agriculture Training Council of Malaysia and DOF Malaysia. They observed the purse seine fishing operation at sea using power block. Subsequently, appropriate design and installation of the power-block system onboard Thai purse seiners will be made. With regard to the trawlers, TD in collaboration with DOF Thailand will jointly develop a stern deck net drum for trawlers. After installation, it is planned that demonstration on the use of net drum to reduce the number of manpower onboard trawlers will be carried out in late 2014.

Improvement of post-harvest fish handling

With the aim to promote improvement of post-harvest fish handling, TD with the financially supported by Fish Marketing Organization of Thailand (FMO-Thailand) installed a slurry ice system onboard commercial gillnet fishing vessel in Chumphon Province. This system is used as the pilot study for data collection on effectiveness of this system to improve fish quality onboard fishing vessel. TD and FMO will jointly monitor the usefulness of this system in order to come up with the evaluation report on application of slurry ice system onboard for future necessary follow-up actions.

Improvement of catch quality for small-scale fishing vessels in Songkhla Lake

TD in collaboration with the Fisheries Provincial Office of Songkhla and Pathalung jointly initiated program entitled “One Community One Freezer” (OCOF) by providing a freezer for each to the fishing community cooperatives of Khunkanun and Chong-fuan of Songkhla and Pathalung, respectively. These two communities use Songkhla Lake as the fishing areas mainly for catching shrimp, crab, and fish. During the previous days, only chilling the catch by using ice were used and resulted in low quality of the catch with low price of their fresh products. One-day training program to the members of the cooperatives were conducted to enhance their knowledge on post-harvest fish handling techniques in order to keep better freshness to their catch.

Review on impact of dredging on coastal seafloor ecosystem

Dredging can change physical and biological structure considering potentially a wide range of effects to seabed ecosystem. It can reduce benthic habitat complexity by removing/damaging the physical structure of the seabed, and consequently causes changes in species composition of the living organisms on that habitat. In this connection, the activity under this category includes reviewing of data and information based on research works/studies conducted in some dredged areas in the Gulf of Thailand. It is envisaged that the review would come up with a set of suggestion for reduction of the impact from dredging to seabed.

Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC-trawl)

The first sea trial was made in August 2013 to test the modified trawl net for lower fuel consumption during its fishing operation. The LEC-trawl net was designed to have only 2/3 of its original weight. Preliminary finding was that RPM of the engine can be reduced due the reduction of the dragging force of the net. However, the catch efficiency of the LEC-trawl will be evaluated with a more sea trials which are scheduled in late 2013.

Manual for fishing gear survey

TD is now finalizing a manual for fishing gear survey (English version). The end-user of this manual includes fishing gear technologists of the Member Countries. It is envisaged that the manual can be disseminated in early 2014.

Research on bottom sediment around set-net area in Ban Phae – Rayong Province

This research was jointly initiated by TD, Eastern Marine Research and Development Center (EMDEC), Research Institute of Humanity and Nature (RINH), and Department of Marine Technology of Burapa

University with the aim to monitor the change of bottom sediment around the set-net area in Ban Phae of Rayong Province, comparing inside and its surrounding area. After the survey planning meeting in October 2013, the oceanographic and environmental survey will be carried out in late 2013.

Collaborative research survey on fisheries resources and marine environment in the Central Gulf of Thailand

TD facilitated the development of a research proposal in collaboration with researchers of the universities in Thailand on fisheries resources and marine environment survey in the Central Gulf of Thailand. With the approved financial arrangement of the Thai PTT Exploration and Production Plc, Co., this collaborative research work has started with the survey planning among the researchers and scientists in March 2013. Consequently, the cruise survey using M.V. SEAFDEC was conducted in the area of Central Gulf of Thailand during March to April 2013. The cruise survey aimed to investigate status of fisheries resources and marine environment in the Central Gulf of Thailand; and provide on-the-job training for researchers of the universities related to marine science. It is planned that a national technical meeting will be organized in December 2013 to disseminate the results/findings from the cruise survey of M.V. SEAFDEC.

Population structure of fish inhabit in the Gulf of Thailand and South China Sea

This study was developed with the aim to understand fish inhabit and their population structure in the studies sites (including area of the Gulf of Thailand and, South China Sea in area of Philippines). Biological data has been collected by TD, members of RINH, and EMDEC, including: catch sampling from local market, landing site, and catch from set-net in Rayong Province; morphological identifications of the samples; and DNA analysis of the samples.

Development of fisheries database for research survey in Southeast Asia

With the aim to harmonize data collection for the research cruise survey on fisheries resources between Deep-sea Fishery Technology Research and Development Institute (DFTRD) of Thai Department of Fisheries and TD. A series of workshop to develop a manual for data collection of the fisheries resources survey onboard research vessels (R/V Chulabhorn, R/V Mahidol, M.V. SEAFDEC, and M.V. SEAFDEC2). This manual will be used for both parties where all data can be efficiently managed and shared. TD also assisted DFTRD to develop a national database for data collection from the cruise survey of their national research vessels for future data compilation and reporting.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2013

Project/Activity Title	Duration	Remarks
Reduction of manpower onboard fishing vessels: purse seine, and otter-board trawler	Sept	Study visit to Malaysia (completed)
Improvement of post-harvest fish handling	Sept	Installation and training on the use of the slurry ice system onboard fishing vessel (gillnetters) completed.
Improvement of catch quality for small-scale fishing vessels in Songkhla Lake	Sept	Installation and training on the reduction of the post-harvest losses for fishing communities in Pathalung and Songkhla Provinces, Songkhla Lake, completed.
Review on impact of dredging on coastal seafloor ecosystem	Jan ~	Drafting of the review is ongoing. It is envisaged that the final draft of the review can be made available in the first quarter of 2014.
Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC-trawl)	July ~	The 1 st sea trial for LEC-trawl was conducted using M.V. Plalung 1 of TD. Based on the result from the 1 st trial, modification of the net was made and ready for the 2 nd sea trial in October.
Research on bottom sediment around set-net area in Ban Phae – Rayong Province	Oct ~ Dec	Planning meeting for the research activities was organized. The survey at sea will be conducted November to December 2013.
Collaborative research survey on fisheries resources and marine environment in the Central Gulf of Thailand	March ~	Survey in the central of the Gulf of Thailand was carried out from 14 March to 12 April. All preliminary results of the survey were presented at TD on 29 July 2013. The technical consultation meeting for planning of the national technical seminar was organized on 22 October 2013 at TD.

Project/Activity Title	Duration	Remarks
Population structure of fish inhabit in the Gulf of Thailand and South China Sea	June ~	Sampling and preservation of the samples (fish) and other aquatic organisms from landing site were carried out from 16 to 19 June 2013. The sampling for the samples inside and surrounding areas of the set-net will be carried out in December 2013.
Development of fisheries database for research survey in Southeast Asia	July ~	Technical workshop to harmonize the data input and its procedure was organized from 30-31 July 2013. Subsequently, the training for data input and query, and mapping survey station using Google map was organized from 23 to 24 September 2013.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Reduction of manpower onboard fishing vessels: purse seine, and otter-board trawler		TD will assist DOF Thailand to develop an appropriate system of power-block onboard purse seiners. Regarding the system of net drum for otter-board trawlers, TD plans to finalize the design with the technical staff of DOF Thailand. Consequently, the system will be installed onboard RV Pramong 9. Its real sea trial will be made during the fisheries resources survey starting from 2014.
Improvement of post-harvest fish handling		TD is now developing a new proposal, to be submitted to FMO for co-financial support, to follow-up with the previous initiatives on improvement of onboard post-harvest fish handling. The new proposal will include cost effective study after installation of that slurry ice system; and further improvement of the installation based on result from the evaluation of that system onboard by the boat owner.
Improvement of catch quality for small-scale fishing vessels in Songkhla Lake		No activity in 2014.
Review on impact of dredging on coastal seafloor ecosystem		Dissemination of the result of the review will be made to key stakeholders (e.g. DOF, members of the fishing communities in the dredged area).
Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC-trawl)		Summary of the results from the sea trial will be made. It will then be disseminated to Member Countries and relevant agencies.
Manual for fishing gear survey		Dissemination of this publication will be made to Member Countries and other relevant agencies.
Research on bottom sediment around set-net area in Ban Phae – Rayong Province		Results of the research will be jointly reported by TD, EMDEC, and RINH in according to the planning of activities under RINH program.
Collaborative research survey on fisheries resources and marine environment in the Central Gulf of Thailand		It was planned that the national technical seminar to present the results from the cruise survey conducted in 2013 will be organized in December 2013. In order to be able to know status of the marine fisheries resources in the surveyed area, it was also suggested that the cruise survey should cover pre- and post-monsoon period. This matter will be discussed during the planning meeting held in late 2013.
Population structure of fish inhabit in the Gulf of Thailand and South China Sea		It has been planned that a series of survey and data collection will be continued in 2014 until 2016 under the arrangement of the budget mainly from RINH program.
Development of fisheries database for research survey in Southeast Asia		No activity in 2014.

4.2 Expected outcomes/outputs

Due to the fact that some activities may be not continued in 2014, the followings are therefore the highlights of the expected outcomes only for those on-going activities.

Reduction of manpower onboard fishing vessels: purse seine, and otter-board trawler

A prototype of the hydraulic power-block system installed completely onboard a commercial purse seiner. Sea trial (s) will be carried out to test the system using the real fishing operation.

Improvement of post-harvest fish handling

Continuation of the works for improving post-harvest for other type of fishing vessels or different place of installation onboard gillnetter is included in the proposal for FMO. It is envisaged that the joint effort of SEAFDEC and FMO will be continued for another three more years.

Review on impact of dredging on coastal seafloor ecosystem

It is envisaged that fisheries managers and resources users in the dredged areas will take appropriate action considering the suggestions based on the results from the review.

Sea trial on reduction of energy use in trawlers – Low Energy Consumption trawl net (LEC-trawl)

It is planned that preliminary study on how to have less seabed contact and to achieve greater fuel efficiency will be conducted through the review works from the existing technology (*e.g.* new shrimp trawl design by the Fisheries and Marine Institute of Memorial University of Newfoundland's Centre for Sustainable Aquatic Resources).

PROJECT DOCUMENT

Project id: 011210			
Program Categories:	Other Programs		
Project Title:	Coastal Area Capability Enhancements in Southeast Asia (SEAFDEC-RIHN Collaborative Project)		
Program Thrust:	-	Total Duration:	5 years (April 2012- March 2017)
Lead Department:	Training Department	Lead Country:	Thailand
Project Sponsor:	Research Institute for Humanity and Nature (RIHN), Japan	Project Partner:	Japanese Institutes; Faculty of Fisheries, Kasetsart University; and DOF Thailand
Proposed Budget:	USD 80,300	This year budget:	[2013] USD 80,300
Prepared by	Taweekiet A., Fisheries Resource Enhancement Section Head	Project Leader	Taweekiet A., Project Coordinator

1. INTRODUCTION/BACKGROUND

The coastal areas of Southeast Asia contain great biodiversity, where livelihoods of the people of Southeast Asia directly and indirectly depend on this biodiversity. However, there are some difficulty to achieve harmonization between sustainable development of fishery community and coastal conservation, as their complex linkage between natural resources and ecosystem services and utilizations. Hereby the Research Institute for Humanity and Nature (RIHN) and some Japanese Universities and research institutes would like to start a cooperative research project named “Coastal capability enhancement in Southeast Asia” in corporation with the Southeast Asian Fisheries Development Center (SEAFDEC), Eastern Marine Fisheries Research and Development Center (EMDEC) of Department of Fisheries, Thailand, Faculty of Fisheries of Kasetsart University, Thailand, the University of Philippines Visayas, Aklan State University and other related institutions/organizations. In this project “holistic approach” will be adopted to obtain a full understanding on how people utilizes the coastal resources, for the purpose to establish the rational and practical measures both for social and ecological sustainability. Based on the holistic data and information, we try to create new development concept named “Area Capability” that can show us how the ecosystem health can be harmonized with the welfare of the people. Through this project, we expect several inventories of ecosystem services and livelihoods of coastal area to complete the guideline of new research approach using the concept on Area Capability.

Target Sites

Three (3) Main Sites:

- 1) Panay Island, the Philippines
- 2) Rayong and Prachuab Kiri Khan Provinces, Thailand
- 3) Ishigaki Island, Japan

Three (3) Sub Sites:

- 1) Guimaras Island, the Philippines
- 2) Trang and Surat Thani Provinces, Thailand
- 3) Mikawa Bay-Japan

Participating Organizations/Institutions:

- 1) *Regional Institute*
 - Southeast Asian Fisheries Development Center (SEAFDEC/Training Department, Samut Prakan, Thailand; and Aquaculture Department, the Philippines)
- 2) *Japanese Institutes*
 - Research Institute for Humanity and Nature (RIHN)



- The University of Tokyo (Graduate School of Agricultural and Life Sciences, Atmosphere and Ocean Research Institute, Institute for Advanced Studies on Asia)
- Tokyo Univ. Marine Science and Technology (TUMSAT)
- School of Marine Science and Technology, Tokai University
- School of Contemporary Sociology, Chukyo University
- Kyoto University (Center of Southeast Asian Studies, Graduate School of Science, Kyoto University, Graduate School of Agriculture)
- National Fisheries University
- Kagoshima University (Faculty of Fisheries, The Kagoshima University Museum)
- National Research Institute of Fisheries Science, Fisheries Research Agency of Japan

3) Thailand Institutes

- Faculty of Fisheries, Kasetsart University, Bangkok
- Eastern Marine Fisheries Research and Development Center-EMDEC, Department of Fisheries of Thailand, Rayong Prov.

4) Philippines' Institutes

- University of Philippines of Visayas
- Aklan State University

2. PROJECT

2.1 Goal/Overall Objectives and Performance Indicators:

The coastal area, consisting of the eco-tone between land and the sea, naturally provides a wide range of habitat for flora and fauna. It has one of the richest biodiversity and the highest primary productivity on the earth. Its ecosystem is also characterized with the complexity and vulnerability. Fluctuation of water flows such as river water discharge, tidal flow and sea current easily affects the food chains and material flows of the ecosystem, causing irreversible shift of ecosystem in some cases. In Southeast Asia, coastal areas are characterized by the close linkage between ecosystem and local people. The coastal area is the basis of the livelihood of local people, and human intervention is deeply embedded in ecosystem. This linkage enhances the complexity and affects the vulnerability of the ecosystem in the region.

2.2 Expected Outcomes and Outputs:

- 1) Inventory database and reference books on coastal fishery in Southeast Asia
- 2) Inventory database and taxonomic field guide books of coastal resources in Southeast Asia and Population structure map of major marine fisheries target species in Southeast Asia
- 3) Research protocol guideline and reference books on ecosystem health for coastal area
- 4) Research protocol guideline and reference books on social aspects for coastal area
- 5) Acoustic survey methodology and analysis system for coastal area
- 6) Guideline of community based set-net fishery installation and utilization for coastal management
- 7) Guideline of community based restocking activities for co-managements of coastal resources
- 8) Establishment of "Area Capability Approach" and its guidelines, through the human networks among SEAFDEC Member Countries

2.3 Project Description/Framework

The Project composes of 8 Components and their activities are described as follows;

Component 1: Capture Capability survey for coastal fisheries

Activity 1: Standardization of Capture Capability survey and compilation of data

Share the experiences for Capture Capability survey for standardizing the data format and analysis methods. And assemble existing data and information of Capture Capability.

Activity 2: Fishing gear/boat and target species survey

Data and information on Capture Capability including fishing gears and boats including size, materials,

structure, operation, fishing ground, initial and operational cost, average daily catch amount and species compositions etc., are collected through observation and interview survey at fishing sites. Data and information are installed into database which can be accessed through web site. The field survey of Capture Capability will be conducted at target sites.

Activity 3: Publication of the field guides of Capture Capability of coastal fisheries

Inventory books of fishing gears/boat and operations of Southeast Asian coastal area will be published with photos and illustrations.

Component 2: Biological resource survey

Activity 1: Standardization of Taxonomic and DNA analyses

Several participating researchers will be invited to Japan for several weeks to exchange ideas and experiences and standardize methodologies of taxonomy and DNA studies. And the visiting researchers discuss about joint research activities and publications of outcomes among members.

Activity 2: Specimen collection for biological resource analysis

Biological Specimen will be collected in target sites. Size, Location, Species name of specimens will be recorded and tissue specimen for DNA analyses will be preserved (the tissue specimen will be also used for Material and Stable Isotope analyses). Specimens will be stored in accordance with the standardized methods. Taxonomic and DNA analyses will be conducted at RIHN and collaborative institutes. All data and analyses results will be installed into the database.

Activity 3: Publication of the field guidebooks of biological resources

Inventory database and reference books on biological resources in Southeast Asian Coastal area will be published with photos and illustration.

Component 3: Environment assessments and ecosystem health survey

Activity 1: Standardization of environment assessments and ecosystem health analyses

Several participating researchers will be invited to Japan for several weeks to exchange ideas and experiences and standardize methodologies of material flow analyses including stable isotope analyses and biomass surveys. And the visiting researchers discuss about joint research activities and publications of outcomes among members.

Activity 2: Specimen collection for material flow analyses and biomass surveys

Specimen for material flow analysis and biomass survey will be collected in target sites. Specimens will be preserved in accordance with the standardized methods. Data and information of specimen will be installed into the database. Material flow analyses and biomass estimation analyses will be conducted at RIHN and collaborative institutes.

Activity 3: Publication of the Research Protocol guideline on ecosystem health

Research Protocol guideline on ecosystem health of coastal area will be published including material flow, chemical and stable isotope analyses and biomass evaluations.

Component 4: Human capability survey for Coastal Area

Activity 1: Standardization of Human capability survey for Coastal Area

Several participating researchers will be invited to Japan for several weeks to exchange ideas and experiences and standardize methodologies of social and human capability surveys. And the visiting researchers discuss about joint research activities and publications of outcomes among members.

Activity 2: Household and Social survey

Household data including member list, job history, sex, age, education, incomes, properties, health conditions, hopes, and participation to social activities, experiences of migration, religion and ethno-linguistic groups are collected through interview and questioner scurvies. Inter-industrial structures are examined based on the data and survey. Regulation, registration and other official administrative affairs are



examined. All data and information will be installed into database. Approximate 100 households' data will be collected at each area.

Activity 3: Publication of the research protocol guideline on social aspects and inventory books on coastal livelihood and society

Research Protocol guideline on social aspects of coastal area including interview and questioner surveys and analyses will be published. And inventory books of social and livelihoods in Southeast Asian Coastal area will be published with photos and illustration.

Component 5: Development of acoustic survey equipments and systems for shallow waters

Activity 1: Developing the new data collection equipments and analysis systems of acoustic survey at coastal area.

Acoustic data collection system including equipment modification will be conducted for coastal area survey. And analysis methodology is also developed.

Activity 2: Field test of the developed equipments and system

Newly developed equipments and systems will be tested at field.

Activity 3: On-site-Training of new acoustic survey equipments and systems

The operation of the new acoustic survey equipments and systems will be demonstrated around set-net area. And the analysis of the data is also shown to expected users.

Activity 4: Publication of the research protocol guideline of acoustic survey for coastal area

Operation manual and guidebooks of acoustic survey in coastal area will be published.

Component 6: Community-based Set-net introduction for coastal management and HRD

Activity 1: Support of the set-net installation and operation

Technical support of installation of set-net at coastal area will be provided from experts.

Activity 2: Impact evaluation of set-net fishery on environment and livelihood

Species and size compositions of the fish catch of set-net and other fishery are examined based on the log book, statistics and observation data. And the biodiversity aspects of target species will be examined by DNA and material analyses. Water quality and material flow condition around set-net will be examined. Information of fishing grounds and operation time of the fishery conducted around set-net will be collected for impact evaluation. Income and time allocation data and information of villagers who live around set-net are analysed to clarify the linkage among set-net installation and livelihood changes.

Activity 3: Publication of the Set-net installation manual and management guidebook

Set-net installation manual and management guidebooks will be published.

Component 7: Community-based fishery resource rehabilitation for coastal management and rural development (Based and implemented in the Philippines*)

Activity 1: Technical support of the hatchery works

Technical supports to establish and to manage local hatchery activities will be conducted from experts.

Activity 2: Conduct stock enhancement works with local institutions

Release works of larvae and/or fly of important species in Batan Bay in the Phillipines

Activity 3: Impact evaluation of rehabilitation on environment and livelihood

Environment of coastal area around rehabilitation sites including water and material flows, species diversity and biomass will be examined using the scientific analyses. And data and information of fishy catch, incomes of the fishermen, social capital, linkages among sectors, job opportunity, time allocation, food safety and health condition of fishermen will be gathered to evaluate impact from rehabilitation activity

Activity 4: Publication of the local hatchery management and rehabilitation activities for local development

Manual and guidebooks of the small scale community based hatchery activities and its management are published.

Component 8: Database construction, Workshops and Wrap-up Activities

Activity 1: Developing the new database system

Integrated database will be established. Main server is installed at RIHN. Mirror servers will be installed at local areas.

Activity 2: Workshops and Seminar of Area Capability Approach

Workshops and Seminar will be held for exchange data, information, experiences, ideas, and results of this study.

Activity 3: International Symposium of Area Capability Approach

International symposium for Area Capability Approach for coastal development will be held.

Activity 4: Area Capability Guidebook Publication

Area Capability Approach guidebook will be published based on the collaborative research results.

3. PROGRESS/ACHIEVEMENTS OF ACTIVITIES IN THE YEAR 2013

3.1 Activities Achievements in the Year 2013

Achievements based on Activities	Duration (2013)	Remarks
- Standardization of methods and existing data collection on the present status of the set-net sites and other related activities (fishing activities around, community, livelihoods, resource conditions, environments etc.) have been well clarified and repeated data collection is in progress - Field tests, repeated experiment, trials on developing the equipments (hydro-acoustic) are being carried out and are in progress - Impact evaluation on the environment (wind, current) are being made and repeated data collection is in progress - Preparation for the 1 st RIHN Project Seminar is in progress (Proposed to be convened during 11-13 November 2013)	Apr.-Oct.	

3.2 Evaluation of the Project Outcomes till the Year 2013

3.2.1 Theme/Program Thrust and Issues:

(1) Theme/Program Thrust: Other Program
(2) Issues in the region at the beginning of the study:

3.2.2 Expected Final Goal of the Project:

The present study focuses on Southeast Asian coastal ecosystem, and aims at investigating its complexity and consequent vulnerability, particularly from the human-related viewpoints, and examining how to cultivate the biodiversity and productivity to achieve constructive linkage between local society and ecosystem. The existing resource management and “optimal” production approach such as the maximum sustainable yield will be reconsidered, and, proposing “area capability” as new criteria of the ecosystem-livelihood linkage, synthesis of the resilience of ecosystem and livelihood in the coastal area under uncertain and complex environments will be investigated.
--

3.2.3 “Steps” Toward Achieving Final Goal:

Step 1: - Standardization of Methods and existing data collection/Equipment and System Development
Step 2: - Filed survey/Field Test - On-site Training
Step 3: - Meeting, Workshop Seminar, Study tour, International Symposium - Compilation and Publication

3.2.4 Activities in the Current Project:

(1) Current position of the project: (Step 1)		
(2) Program duration: (2012-2017)		
(3) Main activities:		
Activities	Duration (2013)	Remarks
Component 1: Capture Capability survey for coastal fisheries Field surveys around the set-net sites 1) Collect fishing operation data through fishing log books 2) Collect catch result fishing activities operated in the adjacent area of set net 3) Observe present situation of fishing activities around the adjacent area of set net sites	25-30 Aug./Nov. in Rayong Province	
Component 2: Biological resource survey - Standardization of Taxonomic and DNA analyses - Specimen collection for biological resource analysis	7-10 November in Rayong Province	
Component 3: Environment assessments and ecosystem health survey Field survey on water and bottom sediment properties - Temperature, salinity and DO - Transparency - Suspended solid, Ignition loss, Total Nitrogen/nutrients - Acid volatile sulfide (Hydrogen Sulfide) - Grain size distribution - Water content - Composition of benthos	22-25 Oct. and Nov. in Rayong Province	
Component 4: Human capability survey for Coastal Area Social survey to Samut Songkhram, Prachuab Kiri Khan and Rayong Prov. - To discuss and get more information on situation of coastal small-scale fisheries - To study on establish fisher group and fisheries management activity - To interview fishers household at coastal small-scale fisheries - To pre-test fish distribution questionnaire by middleman	10-14 Jun. in Rayong; 24-28 Jun. in Prachuab Kiri Khan; 13-16 Aug. in Samut Songkhram; 19-23 Aug. in Prachuab Kiri Khan; 16-20 Sep. in Rayong; 10-13 Oct. in Chumporn	
Component 5: Development of acoustic survey equipments and systems for shallow waters - 1 st Underwater-Acoustic Seminar on “Introduction to basic of underwater acoustics and the principle of fish-finder” - Hydro-acoustic experiments - Developing new data collection equipments and analysis system of acoustic survey in the coastal areas	18 Mar. at Kasetsart University, Bangkok 30 Sep. to 4 Oct. in Rayong Province	

<p>Component 6: Community-based Set-net introduction for coastal management and HRD Field surveys to Set-net sites and adjacent areas</p> <ul style="list-style-type: none"> - Observation on Set-net daily operation, onboard fish handling and catch sorting - Cost-Profit analysis for income simulation - Fish accumulation performance of chamber net - Unit price analysis with size frequency data - Long-term trend of catch composition with trophic level analysis, as stomach contents and radio-isotope analysis - Catch competition with other coastal and commercial fishing gear - Monitoring of extension phase to other region - Technical and management manual of Set-net Technology Transfer - Daily catch/Sales recording/Distribution of Set-net catch - Size frequency of fish (mainly responsible by EMDEC) - Weather condition data collection (obtained from the local meteorological station in Rayong) - Water current logger (to detect water current speed and direction directly influence fish migratory route, for gear shape evaluation) - Depth logger for gear shape evaluation - Wind logger for wind inspection, criteria to decide to do hauling operation or not by the fisher group - Interval Video Recorder: to observe fishing activities around the set-net sites - Marketing surveys to Chiangmai and Surattani Prov. 	25-26 Apr. 3-5/6-9/11-12 May/ 3-6 Oct./7-10 Nov./Dec. in Rayong Province	
<p>Component 8: Database construction, Workshops and Wrap-Up Activities</p> <ul style="list-style-type: none"> - Preparation for the 1st RIHN Project Seminar on Activities Report and Progress 	11-13 Nov.-Kasetsart University, Bangkok and Rayong Province, Thailand	

3.2.5 Progress and Achievements of the Current Project:

<p>(1) Main activities conducted in the current project</p> <ul style="list-style-type: none"> - Standardization of Methods and existing data collection - Filed survey - Equipment and System Development - Field Test - On-site Training - Support of Set-net Installation - Impact Evaluation - Meeting, Workshop Seminar, Study tour 	
<p>(2) Main achievements till the end of 2013 (tentative)</p> <ul style="list-style-type: none"> - Standardization of methods and existing data collection on the present status of the set-net sites and other related activities (fishing activities around, community, livelihoods, resource conditions, environments etc.) have been well clarified and repeated data collection is in progress - Field tests, repeated experiment, trials on developing the equipments (hydro-acoustic) are being carried out and are in progress - Investigation and evaluation on the environment factors (<i>e.g.</i> wind, current, water, sediment) and their impacts on set-net and other fishing gears are being made and repeated data collections are in progress - Preparation for the 1st RIHN Project Seminar is in progress (proposed to be convened in November 2013) 	
<p>(3) Outcomes/Outputs during the project period and expected achievement rate till the end of 2013 (tentative)</p>	
<p>Expected outcomes/outputs</p>	<p>Achievement rate (%)</p>
<ul style="list-style-type: none"> - Standardization of Methods and existing data collection 	20
<ul style="list-style-type: none"> - Filed survey 	20
<ul style="list-style-type: none"> - Equipment and System Development 	20

- Field Test	20
- On-site Training	10
- Support of Set-net Installation	0
- Impact Evaluation	20
- Meeting, Workshop Seminar, Study tour	20
- Compilation and Publication	0

3.2.6 Evaluation of Project Activities in 2013:

The over-all activities of standardization of methods on existing data collection, monthly field surveys and tests, equipments and system development and all data collection on environment are in progress at the present.

The first year of the project implementation emphasized on the preliminary surveys to examine the present status of the resources, biology, livelihoods, social activities, environment that would contribute to the future evaluation of the area capability in the coastal areas which uses the set-net as a core of the project activity.

Physical conditions such as wind, current and oceanographic parameters are key factors for catch-ability and performance of the set-net and other fishing activities. Preliminary surveys would be repeated, monitored and followed-up periodically. However, since the fishing season for set net is limited for only 7 months (Oct-April), therefore, periodical monitor and follow up surveys on the fishing activities and oceanography are considered incomplete for the whole year. While for the land surveys (social, livelihoods, fish sampling) are in progress.

Summary of all activities and findings would be reported in the 1st RIHN Project Seminar in November 2013

4. PROPOSED ACTIVITIES FOR THE YEAR 2014

4.1 Planning of the Project Activities for 2014

	Activity/inputs	Duration	Remarks
Component 1 <i>Capture Capability</i>	1-1, Standardization of Methods and existing data collection		
	1-2, Filed survey	×	
	1-3, Compilation and Publication		
Component 2 <i>Biology</i>	2-1, Standardization of Methods		
	2-2, Filed survey	×	
	2-3, Compilation and Publication		
Component 3 <i>Environment</i>	3-1, Standardization of Methods		
	3-2, Filed survey	×	
	3-3, Compilation and Publication		
Component 4 <i>Social</i>	4-1, Standardization of Methods		
	4-2, Filed survey	×	
	4-3, Compilation and Publication		
Component 5 <i>Acoustic</i>	5-1, Equipment and System Development		
	5-2, Field Test	×	
	5-3, On-site Training	×	
	5-4, Compilation and Publication		
Component 6 <i>Set-net</i>	6-1, Support of Set-net Installation		
	6-2, Impact Evaluation	×	
	6-3, Compilation and Publication		
Component 8 <i>Database Workshop</i>	8-1, Database Development	×	
	8-2, Meeting, Workshop Seminar, Study tour	×	
	8-3, International Symposium		
	8-4, Compilation and Publication	×	

4.2 Expected Outcomes/Outputs of the Year 2014

Ditto

PROJECT CONCEPT FOR CONSERVATION AND MANAGEMENT OF EEL RESOURCES IN SOUTHEAST ASIA

1. Objective

Sustainable utilization of eel resources in the Southeast Asia

2. Project Duration

2014-2016

3. Project Component

Activity 1: Compiling basic information on eel species in the Southeast Asia Implementation Year: 2014

- 1) Collecting information on (a) distribution and biology of eel species and (b) current status of eel fisheries and aquaculture in SEAFDEC Member Countries. This activity will be conducted by the Secretariat, MFRDMD or AQD.
- 2) Organizing a workshop to exchange information on eels in the Southeast Asia (including its biology and current status of fisheries/aquaculture). This workshop is aimed at identifying SEAFDEC's future activities for promoting sustainable eel fisheries and aquaculture in the region (Biological Study, Development of fishery management methods, Development of aquaculture management methods, etc.)

*This activity (holding the workshop) will be conducted if the budget allows.

Activity 2: Research on eel biology Implementation Year: 2015

Conducting biological research on eels, focusing on *Anguilla bicolor*.

This activity will be conducted by MFRDMD or TD using a research vessel if necessary. A sampling will be conducted at sea to know the early life stage of eels as well as possible spawning grounds. This activity will be conducted when a research vessel will be dispatched for other research activities.

Activity 3: Development of eel fishery management measures Implementation Year: 2015

Organizing a workshop to (a) exchange information on what kind of management measures of eel fisheries are in place in other countries; and (b) examine possibility of introducing eel management measures (including trade restriction measures) which could be implemented in the Southeast Asia.

This activity will be conducted by the Secretariat or IFRDMD if possible.

Activity 4: Promotion of sustainable aquaculture of eels Implementation Year: 2016

In order to promote sustainable eel aquaculture based on current status of eel resources, a workshop and a field trip to eel aquaculture farms will be organized.

This activity will be conducted by the Secretariat or AQD.

**IDENTIFIED ISSUES BASED ON THE THIRD SEAFDEC REVIEW RECOMMENDATIONS
AND REGIONAL PRIORITY INPUTS FROM ASEAN MEMBER STATES***

(For consideration and discussion at 36PCM)

Item No.	Component/Issues	Analysis 01**	
		AVG score	Regional Priority
I. Fisheries Management			
1	<u>Conservation and Management of fishery resources</u> , taking into consideration tropical specificity of fisheries and applying precautionary approach.	1.67	1
2	Providing recommendations for <u>management of shared stocks</u> , and resolving conflicts among countries in fisheries outside their respective EEZ	4.22	4
3	Management of fishing capacity, including shifting from open-access to limited-access	3.00	3
4	Combating IUU fishing, including encouraging cooperation <u>in the implementation of MCS among countries</u>	2.33	2
5	<u>Enhancing good management practices</u> , e.g. responsible fisheries, EAF; and development of guidelines for fisheries management	2.33	2
6	<u>Promoting community - based fisheries management, co- management and empowering of fishers in fisheries management</u>	4.22	4
7	Harmonization of vessel registration and fishery licensing	4.44	5
II. Fishing Technology and Practices			
1	Promotion and <u>awareness buliding</u> on responsible fishing	1.22	1
2	Improving fish quality through <u>on-board fish handling</u> technologies and good practices for small-scale fisheries	2.00	2
3	Developing and enhancing the <u>use of automated and mechanized fishing gears and energy saving technologies</u>	2.22	3
III. Post-harvest Technology and Trade-related Issues			
1	Improving post-harvest technologies and <u>safety/quality of products</u> for export	2.00	1
2	Addressing emerging requirements for <u>traceability/ certification</u> of fishery products for export	2.11	2
3	Preventing trade of <u>IUU fishing products</u>	2.11	2
4	Developing new technologies for fishery post-harvest, including <u>value-added products and reduction of wastes</u>	2.56	3
5	Enhancing market access of products from small-scale fishers	3.00	4
IV. Sustainable Aquaculture			
1	Advancing aquaculture technologies	3.00	4
2	Promoting best management practices in aquaculture	2.00	1
3	Minimizing impacts of aquaculture on the environment/ biodiversity	2.89	3
4	Implementing regional guidelines for good aquaculture practices	3.22	5
5	Development of feeds to reduce dependence on fish meal and fish-based products	2.44	2
6	Undertaking R&D on aquaculture that are required for different objectives, e.g. for economic development, food security, livelihood improvement, resources enhancement, etc.	3.67	6
7	Giving more emphasis on the roles of aquaculture for food security and poverty alleviation, especially using indigenous species, as well as technology verification and extention activities	4.00	7
V. Fisheries Information and Statistics			
1	Improving the harmonization and collect/compilation of fishery statistics and information	1.78	1
2	Enhancing the analysis, interpretation and analysis of available data and information to provide information status and trends of fisheries and aquaculture, and support science-based policy planning and management of fisheries	1.78	1

Item No.	Component/Issues	Analysis 01**	
		AVG score	Regional Priority
3	Improving database of fishery information and statistics to facilitate sharing/dissemination of data an information	1.78	1
VI. Human Resources Development			
1	Assessing human resources requirements of the Member Countries, and providing human resources development program, particularly in the areas where shortage could be envisaged in the future	1.00	1
VII. Others*			
	Inland fisheries and aquaculture	1.17	2
	Food security, poverty alleviation and well-being of small-scale fishers and farmers	1.00	1

Remark

* 9 Countries inputs namely Brunei Darussalm, Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore, Thailand and Vietnam. Additional Issues raised by Member Countries are appeaaered in *Appendix 1*

** Analysis based on *Appendix 2*

Additional Issues Raised by ASEAN Member States

Item No.	Component/Issues
I. Fisheries Management	
1	<u>Conservation and management of fishery resources</u> , taking into consideration tropical specificity of fisheries and applying precautionary approach
2	Providing recommendations for <u>management of shared stocks</u> , and <u>resolving conflicts</u> among countries in fisheries outside their respective EEZ
3	<u>Management of fishing capacity</u> , including shifting from open-access to limited-access
4	Combating IUU fishing, including encouraging <u>cooperation in the implementation of MCS</u> among countries
5	<u>Enhancing good management practices</u> , e.g. responsible fisheries, EAF; and development of guidelines for fisheries management
6	Promoting <u>community-based fisheries management</u> , <u>co-management</u> and empowering of fishers in fisheries management
II. Fishing Technology and Practices	
1	Promotion and <u>awareness building</u> on responsible fishing
2	Improving fish quality through <u>on-board fish handling</u> technologies and good practices for small-scale fisheries
3	Developing and enhancing the <u>use of automated and mechanized fishing gears and energy saving</u> technologies
III. Post-harvest Technology and Trade-related Issues	
IV. Sustainable Aquaculture	
1	Advancing aquaculture technologies
2	Promoting best management practices in aquaculture
3	Minimizing impacts of aquaculture on the environment/biodiversity
4	Implementing regional guidelines for good aquaculture practices
5	Development of feeds to reduce dependence on fish meal and fish-based products
6	Undertaking R&D on aquaculture that are required for different objectives, e.g. for economic development, food security, livelihood improvement, resources enhancement, etc.
7	Giving more emphasis on the roles of aquaculture for food security and poverty alleviation, especially using indigenous species, as well as technology verification and extension activities
V. Fisheries Information and Statistics *(1-3)	
1	Improving the harmonization and collection/compilation of fishery statistics and information
2	Enhancing the analysis, interpretation and analysis of available data and information to provide information on status and trends of fisheries and aquaculture, and support science-based policy planning and management of fisheries
3	Improving database of fishery information and statistics to facilitate sharing/dissemination of data and information
VI. Human Resources Development	
1	Assessing human resources requirements of the Member Countries, and providing human resources development program, particularly in the areas where shortage could be envisaged in the future
VII. Others	
1	Inland fisheries and aquaculture
2	Food security, poverty alleviation and well-being of small-scale fishers and farmers
3	Climate Change impact on Aqua fisheries
4	Small scale fisheries/aquaculture role in production

Identified Issues based on the 3rd SEAFDEC Reviews Recommendations and Regional Priority Inputs from ASEAN Member States

RAW data

Item No.	Component/Issues	BN	CAM	IND	LAO	MAL	PH	TH	SG	VN	AVG
I. Fisheries Management											
1	<u>Conservation and Management of fishery resources</u> , taking into consideration tropical specificity of fisheries and applying precautionary approach.	2	1	3	1	1	1	1		1	
2	Providing recommendations for <u>management of shared stocks</u> , and resolving conflicts among countries in fisheries outside their respective EEZ	6	3	6	4	6	3	3		2	
3	Management of fishing capacity, including shifting from open-access to limited-access	4	3	4	3	2	2	2		1	
4	Combating IUU fishing, including encouraging <u>cooperation in the implementation of MCS among countries</u>	3	2	1	4	3	1	5		1	
5	<u>Enhancing good management practices</u> , e.g. responsible fisheries, EAF; and development of guidelines for fisheries management	1	1	2	2	4	4	4		1	
6	<u>Promoting community - based fisheries management, co- management</u> and empowering of fishers in fisheries management	7	1	5	3	5	3	6		1	
7	Harmonization of vessel registration and fishery licensing	5	2	3	3	7	4	7		2	
8 add	Ecosystem Approach to Aquaculture (EAA)						2				
9 add	Land and Water Resource in Use Management in Aquaculture						2				
10 add	Ecosystem Approach in Inland Fisheries Management						3				
11 add	Promotion of Organic Aquaculture						3				
12 add	Small scale fisheries management and development							8			
13 add	Review the effects of climate change on aquaculture in the region and advice MCs on strategic planning for adaptation and mitigation measures.							9			
II. Fishing Technology and Practices											
1	<u>Promotion and awareness buliding on responsible fishing</u>	1	1			2	1	2		1	
2	Improving fish quality through <u>on-board fish handling</u> technologies and good practices for small-scale fisheries	2	2			1	2	3		1	
3	Developing and enhancing the <u>use of automated and mechanized fishing gears and energy saving technologies</u>	3	3			3	3	1		2	

Item No.	Component/Issues	BN	CAM	IND	LAO	MAL	PH	TH	SG	VN	AVG
4 add	Capacity building and Human resource development							4			
5 add	Labour reduction on board							5			
6 add	Promotion of deep sea fishing	4									
III. Post-harvest Technology and Trade-related Issues											
1	Improving <u>post-harvest technologies</u> and <u>safety/quality</u> of products for export	1	1			2	3	1		1	
2	Addressing emerging requirements for <u>traceability/ certification</u> of fishery products for export	3	1			3	1	5		1	
3	Preventing trade of <u>IUU fishing products</u>	4	3			2	4	2		1	
4	Developing new technologies for fishery post-harvest, including <u>value-added products</u> and reduction of wastes	2	2			4	3	2		1	
5	Enhancing market access of products from small-scale fishers	5	1			5	2	3		1	
IV. Sustainable Aquaculture											
1	Advancing aquaculture technologies	6	1			2	5	2		1	
2	Promoting best management practices in aquaculture	1	2			3	1	3		1	
3	Minimizing impacts of aquaculture on the environment/ biodiversity	2	2			5	1	4		1	
4	Implementing regional guidelines for good aquaculture practices	3	1			8	3	3		2	
5	Development of feeds to reduce dependence on fish meal and fish-based products	4	2			4	4	2		1	
6	Undertaking R&D on aquaculture that are required for different objectives, <i>e.g.</i> for economic development, food security, livelihood improvement, resources enhancement, etc.	5	2			6	3	6		2	
7	Giving more emphasis on the roles of aquaculture for food security and poverty alleviation, especially using indigenous species, as well as technology verification and extension activities	7	1			7	3	7		2	
8 add	Review the effects of climate change on aquaculture in the region and advice MCs on strategic planning for adaptation and mitigation measures.										
9 add	SPF seeds for aquaculture species					2					
V. Fisheries Information and Statistics											
1	Improving the harmonization and collect/compilation of fishery statistics and information	1	1			4	2	2		1	
2	Enhancing the analysis, interpretation and analysis of available data and information to provide information status and trends of fisheries and aquaculture, and support science-based policy planning and management of fisheries	3	1			3	1	3		1	

Item No.	Component/Issues	BN	CAM	IND	LAO	MAL	PH	TH	SG	VN	AVG
3	Improving database of fishery information and statistics to facilitate sharing/dissemination of data and information	2	2			1	3	1		1	
4 add	Bottom up approach data collection through autonomous community based					2					
5 add	Promotion of regional database and exchange information and statistics	4									
VI. Human Resources Development											
1	Assessing human resources requirements of the Member Countries, and providing human resources development program, particularly in the areas where shortage could be envisaged in the future	1	1			1	1			1	
2 add	Assessing human resources requirements of the Member Countries, and providing skilled level crews and aquaculture workers					2					
3 add	Outsourcing the expertise within the region in assisting the development of fisheries industry and research	2									
VII. Others											
1	Inland fisheries and aquaculture	1	1			1	1				
2	Food security, poverty alleviation and well-being of small-scale fishers and farmers	2	1			2	2			1	
3	Climate Change impact on Aquaculture fisheries						4				
4	Small scale fisheries/aquaculture role in production						3				

Remarks: Countries were requested to rank the priority of issues under similar component (1 = highest priority)

Annex 9

SUGGESTED WAY FORWARD FOR IMPROVING SEAFDEC'S WORK EFFICIENCY

Japan proposed the “Suggested Way Forward for Improving SEAFDEC’s work efficiency” at the Special Meeting of the Council (3-4 October 2013, Bangkok).

Various comments from the Member Countries were expressed regarding the proposal and Japan considered them carefully.

The attached is more concrete proposal on: 1) Method for formulation of SEAFDEC programs; and 2) Mechanism for periodical review of SEAFDEC programs.

Japan intends to make necessary revisions on the attached draft reflecting further comments from Member Countries and to submit the brushed-up draft to the next Council Meeting for its consideration.



Proposal of tasks to improve work efficiency of the SEAFDEC

1. Rationale

- (1) SEAFDEC actually faces budget limitations and human resources limitations in its activities. In order for the SEAFDEC to respond to the needs of Member Countries and the region, it is necessary to make the most of the available resources.
- (2) The resolution and Plan of Action adopted by the Ministers of ASEAN-SEAFDEC Member Countries in 2011 is a guiding principle for the SEAFDEC. But it should be noted that the resolution/plan of action is very holistic and diverse. From a realistic point of view, SEAFDEC is required to make a concrete decision on its priority areas thereby facilitating strategic formulation and implementation of the programs.
- (3) Considering these circumstances, introduction of the following measures are recommended.
 - 1) Formulation of SEAFDEC programs according to the priority and urgency, which will be decided by the council.
 - 2) Periodical Review of SEAFDEC programs from cost/benefit viewpoint.
- (4) The Council is therefore requested to consider approving:
 - 1) Method for formulation of SEAFDEC programs.
 - 2) Mechanism for periodical review of SEAFDEC programs.

2. Method for formulation of SEAFDEC programs

(1) Objective

By identifying prioritized activities by the Council, concentrate SEAFDEC's budget to such activities. This is to introduce a concrete "system" to reflect the needs of Member Countries in SEAFDEC's program formulation.

(2) Frequency

Every year

(3) Implementation Method

- 1) Dividing activities of the SEAFDEC into the following two categories.

Category 1:

Response to the urgent issues including: a) requirements of international markets; and b) issues which has fundamental impacts on the fisheries/aquaculture production of the Member Countries

Category 2:

Support for the sustainable development of the regional/domestic fisheries/aquaculture

- 2) The Council will identify "prioritized activities" in each category.
- 3) The Secretariat and Departments will review the existing programs and formulate program proposals to implement prioritized activities identified by the Council.
- 4) The program proposals will be discussed at the Program Committee and then be considered and approved by the Council.

Ideas for division of Category 1/Category 2 and “prioritized activities” in each category

Category 1: Response to the urgent issues including: a) requirements of the international markets; and b) issues which has fundamental impacts on the fisheries/aquaculture production of the Member Countries

- In order to maintain access of the fish and fishery products from the Southeast Asia to the international market, timely response to the market requirements including “Sustainable certification” is required.
- As for issues, which have fundamental impacts on the fisheries/aquaculture production of the Member Countries (e.g. Elimination of IUU fisheries, Countermeasures to disease outbreak in aquaculture species), urgent and stressed measures are required.
- By reviewing SEAFDEC programs, necessary budget will be reallocated to the activities, which need urgent actions.

- Prioritized Activities in Category 1 are as follows:

- Enhancing accountability on the sustainability/safety of the fish and fishery products from Southeast Asia (e.g. Certificate of sustainability, Certificate of safety of aquaculture products and Certificate of non IUU catch)

Responding to: Para 18, 19 of the resolution. Para 68 and 73 of the plan of action (POA).

- Urgent and preventive actions in response to international trade restrictions (response to CITES listing, such as eels, sharks and tunas)

Responding to: Para 69 of the POA.

- Enhancement of common understanding to cope with international issues regarding fisheries in the Southeast Asia.

Responding to: Para 69 and 76 of the POA.

- Enhancement of Member Countries’ concerted actions for Elimination of IUU fisheries.

Responding to: Para 8 of the resolution. Para 21, 22, 23 and 24 of the POA.

- Countermeasures to disease outbreak in aquaculture.

Responding to: Para 17 of the resolution. Para 50, 51 and 52 of the POA.

Category 2: Support for the sustainable development of the regional/domestic fisheries/aquaculture

- Continuous and long-term support measures are required for this category in order to achieve sustainable development of domestic/regional fisheries.
- Under the circumstances of budget/human resource limitations, gradual streamlining of the projects will be implemented, thereby maximizing real benefit brought to the Member Countries.
- Opinions of the Member Countries will be coordinated in light of the *criteria for activity selection*, and *prioritized activities* will be identified.
- *Criteria for activity selection* and *prioritized activities* in the Category 2 are as follows.

(Criteria for activity selection)

- Real benefits of the activities are fairly shared by the Member Countries.
- Practical solutions are provided for the issues in achieving sustainable development of the fisheries in the region.

(Prioritized Activities)

<<Fisheries>>

- Enhancing national capacity for the fisheries management.

Responding to: Para 4, 5, 6, 7 and 10 of the resolution. Para 9 and 17 of the POA.

- Promotion of co-management of fishery resources as a partnership between government and relevant stakeholders.

Responding to: Para 6 of the resolution. Para 13 of the POA.

- Strengthening measures for safety of fishing vessels.

Responding to: Para 13 of the resolution. Para 30 of the POA.

- Enhancing national capacity in the collection and sharing of fisheries data.

Responding to: Para 10 of the resolution.

- Fisheries resources survey with SEAFDEC research and training vessels.

Responding to: Para 10 of the resolution. Para 18 of the POA.

<<Aquaculture>>

- Promotion of environment friendly and responsible aquaculture.

Responding to: Para 17 of the resolution. Para 40 of the POA.

<<Distribution and processing>>

- Improvement of on board/post-harvest quality control of fish.

Responding to: Para 20 of the resolution. Para 58 of the POA.

- Improvement of processing techniques for fish produced by small-scale fisheries.

Responding to: Para 21 of the resolution. Para 58 of the POA.

Note: The ideas mentioned above shows Japan's current thoughts. *Prioritized activities* and *Criteria for activity selection* will be brushed-up by reflecting comments from the Member Countries and be decided by the Council.

3. Mechanism for periodical review of SEAFDEC programs

(1) Objective

After reforming methods for formulation of SEAFDEC programs, conduct periodical evaluation of the cost/benefit performance of the programs, thereby scrap and build the programs to maintain effectiveness of the SEAFDEC programs.

(2) Frequency

Every five years starting 2015 (beginning year of SEAFDEC programs with the new formulation method), mid-term review will be conducted if necessary.

(3) Implementation Method

1) The secretariat and departments will submit the following materials to the Program Committee.

- a) Details of the SEAFDEC programs for the last 5 years
- b) Evaluation of the achievement level of each program compared to its objective.

2) Based on the above materials, the Program Committee will evaluate the benefits brought to the Member Countries and submit a report to the Council. The Program Committee will also scrutinize programs for the next year and make necessary revisions.

3) The Council will consider and approve the report of the Program Committee as well as programs for the next year.

4. Schedule for formulation of 2015 programs/periodical review of SEAFDEC programs

(1) 36th Meeting of the Program Committee (November 2013)

- Discussion of the draft of *Method for formulation of SEAFDEC programs*.
- Discussion of the draft of *Mechanism for periodical review of SEAFDEC programs*.

(From December 2013 to March 2014)

- Compilation of the revised draft by Japan.
- Circulation of the revised draft and receiving comments from Member Countries

(2) 46th Meeting of the Council (April 2014)

- Decision of the *Method for formulation of SEAFDEC programs (including prioritized activities in Category 1 and Category 2)*.
- Decision of the *Mechanism for periodical review of SEAFDEC programs*.

(From April 2014 to October 2014)

- The Secretariat and departments will draw up program proposals for 2015.

(In order to reflect opinions of the Member Countries, the Secretariat will call for comments of Member Countries on the draft of the program proposals)

(3) 37th Meeting of the Program Committee (November 2014)

- Formulation of the Programs for 2015
- Drawing up details of the Mechanism for periodical review of SEAFDEC programs

(4) 47th Meeting of the Council (April 2015)

- Approval of 2015 programs (Start of the program with the new formulation method)
- Approval of the details of the Mechanism for periodical review of SEAFDEC programs

(Mid-term Review)

If required, review the progress of the programs and instruct ways for improvement at the 49th Council meeting (April 2017) or 50th Council meeting (April 2018).

(5) 42th Meeting of the Program Committee (November 2019)

- a) Evaluation of the performance of the program for the last 5 years (2015-2019)
- b) Scrutinizing 2020 program proposals and make necessary revisions

(6) 47th Meeting of the Council (April 2020)

Approval of 2020 programs (Start of SEAFDEC programs brushed up with the periodical review mechanism)

INTRODUCTION OF 2014 JTF PROJECTS AND NEW JTF-VI PROJECTS FOR 2015

Japanese Trust Fund VI: Promotion of Sustainable Fisheries in Southeast Asian

This Trust Fund will start from 2013 to follow almost Trust Fund-II activities, and from 2014, Trust Fund-V will be combined into Trust Fund-VI.

This TF is composed of 4 sub-components, 18 independent projects.

(Sub component 1)

“Enhancing the capability of Member Countries for sustainable utilization of fisheries resources”

This component projects focus on

- Capacity Building to Address International Trade-related Issues,
- Enhancing improvement of fishery statistics and information,
- Promotion of Counter Measure to IUU fisheries activities,
- Improvement of Catch Certification for International Trade

(Sub component 2)

“Strengthening the promotion of Sustainable Fisheries”

This component projects focus on

- Offshore fisheries resources exploration
- Improving post harvest technology
- Comparative Studies for Management of Purse Seine Fisheries
- Human Resource Development
- Optimizing energy use and improving safety
- Strengthening SEAFDEC Network

(Sub component 3)

“Promotion of sustainable aquaculture”

This component projects focus on

- Promotion of Sustainable and Region-Oriented Aquaculture
- Food Safety of Aquaculture Products
- Traceability Systems for Aquaculture Products in the ASEAN Region
- Accelerating Awareness and Capacity-Building in Fish Health Management in Southeast Asia

(Sub component 4)

“Promotion of resource enhancement”

This component projects focus on

- Promotion of Environment-friendly Resource Enhancement
- Preservation of Critical Fishing Ground
- Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters
- Research and Management of Sharks and Rays in the Southeast Asian Waters

Component / Project /Activity	Responsible Departments	2014
		Budget (USD)
Enhancing the capability of Member Countries for sustainable utilization of fisheries resources		192,500
1. Assistance for Capacity Building in the Region to Address International Trade-related Issues	SEC	44,000
1.1 Monitoring & Enhancing the Capacity on International Fisheries Related Issues		11,000
1.2 Developing the Regional Policy Recommendations, Common/Coordinated Position		32,000
1.3 Information and Dissemination of the Results		1,000

Component / Project /Activity	Responsible Departments	2014
		Budget (USD)
2. Enhancing compilation and utilization of fishery statistics and information for sustainable development and management of fisheries in Southeast Asian region		93,600
2.1 Improving the data collection of the commercially-exploited aquatic species and threaten species	TD, CFTD	32,800
2.2 Facilitating Fisheries activities information gathering through introduction of Community base management	TD,CSFD	57,400
2.3 Harmonization of Fishery statistics in SEA region	SEC	3,400
3. Promotion of Counter Measure to IUU fisheries activities	TD, ITRDH	36,900
3.1 Promotion and development of the regional fishing vessels (RFVRs) record and improvement of national fishing vessels records (NFVRs) and fisheries licensing system in the region		17,000
3.2 Strengthening of Port State Measures activities and other surveillance measures in the region		19,400
3.3 Production of information materials		500
4. Combating IUU Fishing in the Southeast Asian Region through Application of Catch Certification for International Trade in Fish and Fishery Products	MFRDMD	18,000
2. To study existing fishing and trading practices in small-scale fishery & Problems in compliance with the EC Regulation 1005/2008 in large-scale fishery		18,000
Strengthening the promotion of Sustainable Fisheries		286,260
1. Offshore fisheries resources exploration in Southeast Asia	TD, CFTD	52,500
1.1 Organization of the regional training course on offshore fisheries resources exploration		33,500
1.2 Modification of the offshore sampling gears and their handbook		1,000
1.3 Technical supports of TD to the cruise survey		18,000
2. Improving post harvest technology	MFRD	28,700
2.1 Chemical and Drug Residues in Fish and Fish products in Southeast Asia; Biotoxins Monitoring in ASEAN (MFRD); ASP, AZA, BTX		28,700
3. Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region	MFRDMD	58,260
3.1 Comparative Studies for CPUE and TAC		10,000
3.2 Genetic Data Collection and Analysis		17,866
3.3 Meetings for Effective Program Implementation		30,394
4. Human Resource Development for Sustainable Fisheries	TD,ITRDH	53,300
4.1 HRD Programs on Fisheries Management Approaches for Sustainable Fisheries		53,300
5. Optimizing energy use and improving safety in fishing activities	TD, CFTD	37,000
5.1 Regional training workshop on optimizing energy and safety at sea for small-scale fishing		36,000
5.3 Information dissemination		1,000
6. Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing related Countermeasures	SEC	56,500
6.1 Enhancing Regional Coordination and Collaboration Mechanism		33,000
6.2 Monitoring and Evaluation of the SEAFDEC-JTF Programs		16,000
6.3 Information and Dissemination of SEAFDEC-JTF Project Results		7,500
Promotion of sustainable aquaculture		153,200
1. Promotion of Sustainable and Region-Oriented Aquaculture Practices	AQD	70,100
1.1 Genetic improvement of commercially important species and development of hatchery technology		17,200
1.2 Development of environment-friendly feeds using regionally available ingredients		4,300
1.3 Establishment of managing technology of aquaculture environment		4,300
1.5 Technology extension and demonstration		33,600
1.6 Publication		3,300

Component / Project /Activity	Responsible Departments	2014
		Budget (USD)
1.7 Annual progress meeting and international workshop		5,000
1.8 Coordination by project leader		2,400
2. Traceability Systems for Aquaculture Products in the ASEAN Region	MFRD	24,500
4. Documentation and publication of Technical Compilation		4,500
5. End –Of- Project (EOP) Workshop.		20,000
3. Accelerating Awareness and Capacity-Building in Fish Health Management in Southeast Asia	AQD	42,300
1. Accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building		13,300
2. Innovative research to guarantee food safety and sustainable production		21,500
4. Annual progress meeting and international workshop		5,000
5. Coordination by Project Leader		2,500
4. Food Safety of Aquaculture Products in Southeast Asia	AQD (MFRD)	16,300
1. Withdrawal periods of antibiotics in some fish species cultured in the tropics		4,300
2. Surveillance of chemical contaminants in aquaculture products and feeds		4,300
3. Guidelines on appropriate administration and regulation of antibiotics/other chemicals		1,500
5. Annual progress meeting and international workshop		4,200
6. Coordination by Project Leader		2,000
Promote of resource enhancement		135,556
1. Resource Enhancement of Internationally Threatened and Over-Exploited Species in Southeast Asia through Stock Release	AQD	36,700
1. Stock enhancement of internationally threatened species		11,000
2. Stock enhancement of regionally over-exploited species		12,900
3. Establishment of adaptive measures for a changing environment		4,300
6. Annual progress meeting and international workshop		5,000
7. Coordination by Project Leader		3,500
2. Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters	MFRDMD	11,500
6. Publication		11,500
3. Research and Management of Sharks and Rays in the Southeast Asian Waters	MFRDMD	33,646
1.2 Regional Core Expert Meeting		28,126
2.2 Genetic study and information compilation		2,500
2.3 Publication of biological information on sharks and rays in the region		3,020
4. Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds for Resources Enhancement	TD	53,710
2.1 Technical assistance in a pilot site for suitable designs of resource enhancement practices		7,500
2.2 Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fisheries ecosystem management		25,000
3.1 Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness		1,000
3.2 Regional seminar for end of the project		20,210

PROGRESS REPORT TEMPLATE FOR THE ASEAN-SEAFDEC COLLABORATIVE PROGRAMS (STARTING 2014)

SEAFDEC Secretariat

Background

Due to the course of project activities, during the past decade have been set up in various specific subjects to support the implementation of the ASEAN-SEAFDEC Resolution and Plan of Action. These setup make a bit difficulty to conclude the real achievement of the Center even though they were. In addition, some project activities are look similar or having the same goal but implementing separately by each Departments induce the misunderstanding on duplication efforts to Member Countries. These issues recently have been raised at several SEAFDEC Meetings by Member Countries, for instance, at the 35PCM where the committee asked SEAFDEC to consider avoiding the duplication effort on the same/similar activities by SEAFDEC departments particular between TD and MFRDMD. In addition, at the 45CM these issues were raised again where the Council from Japan pointed out that “*lack of overall strategy for activities conducted by SEAFDEC since several projects appear to have inter-related activities which could instead complement with each other. In addition, duplication of efforts should be minimized, while linkages among the SEAFDEC programs should also be clarified, so that the programs could be implemented in a more coherent and strategic manner*”.

Secretariat as a coordinating agency among all SEAFDEC Department, have attempted to improve the management of overall SEAFDEC programs, therefore would like to request for all Department’s cooperation in order to solve the problem within organization and responding to the advise from the Council and Program Committee. In connection to this, We have worked on this since last year by grouping all implementing projects under the SEAFDEC Program Thrusts in order to harmonize the similar activities goes on the same line to meet the final goal of each program thrust. In addition, Secretariat will continue working on the conclusion of the overall achievements implemented by Department and Secretariat by improving the format of progress implementation report in line with the program thrust using the project based management scheme. These have been consulted with all Department once at the Inter-departmental Meeting on Revision of the Plan of Operations of SEAFDEC Departments on 2 March 2013, Bangkok, where the Meeting agreed that the progress implementation of the SEAFDEC programs should be reported to the Secretariat twice a year in mid July for the activities cover the period from January to June and mid January of the following year for the annual activities. In this regard, the Departments are requested to prepare the *Progress Report* taking into consideration the following points:

- Progress of project implementation of which mainly includes the outputs, events and activities completed during the first half of the year will be reported under the program thrusts endorsed by SEAFDEC Program Committee. Each event, activity and output must signify to achieve corresponding objective(s) of the project.
- Projects implemented in collaboration with other Departments should be reported by the lead Department only. In this regard, coordination among the concerned Departments and Lead Country should be considered prior to the preparation of the report (s).

Please be noted that Secretariat attempt to reduce the burden occurred by this change/improvement process. To do so, some part of the project proposal such as the annual plan and achievement for the PCM are slightly changed taking into account use of the Result Based Management Concept.

The following list of activities and projects under the SEAFDEC program thrust for the 2013 (*Appendix 1*¹) is finalized for the exercise starting from 2013 where the Progress Report Template of the ASEAN-SEAFDEC Collaborative Programs are appeared in the *Appendix 2*.

¹ The report excludes the project under ASEAN-USAID Market and SEAFDEC-Sida Projects due to project scope could not fit to single program thrust.

List of Activities/Projects under the SEAFDEC Program Thrust for 2014

Program Thrust/ Project Title	Lead Department
Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security	
Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement	TD
Human Resource Development for Sustainable Fisheries	TD
Optimizing Energy Use/ Improving Safety Onboard in Fishing Activities	TD
Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD
Promotion of Sustainable and Region-oriented Aquaculture	AQD
Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade	
Chemical and Drug Residues in Fish and Fish Products in Southeast Asia “Biotoxin Monitoring in ASEAN” Extension work to: ASP, AZA and BTX	MFRD
Traceability Systems for Aquaculture Products in Southeast Asian Region	MFRD
Utilization of Freshwater Fish for Value Added Products	MFRD
Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD
Food Safety of Aquaculture Products in Southeast Asia	AQD
Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries	
Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)	TD
Promotion of Counter Measures to Reduce IUU fishing activities	TD
Combating IUU Fishing in the Southeast Asian Region through Application of EU Catch Certification for Trading of Fish and Fishery Products	MFRDMD
Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries	
Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2	TD
Off shore Fisheries Resources Exploration in the Southeast Asia	TD
Research and Management of Sea turtles in Foraging Habitats in the Southeast Asian Waters	MFRDMD and TD
Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in the Southeast Asian	TD and SEC
Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region	MFRDMD
Research and Management of Sharks and Rays in the Southeast Asian Waters	MFRDMD
Thrust V: Addressing International Fisheries Related Issues from a Regional Perspective	
Assistance of Capacity Building in the Region to Address International Trade Related Issues	SEC
Strengthening SEAFDEC Network for Sustainable Fisheries	SEC

MIDYEAR/ANNUAL PROGRESS REPORT

Projects under SEAFDEC Program Thrusts

Period: Midyear report (January - June 2014) or end year report (January-December 2014)

Program Thrust I: Developing and Promoting Responsible Fisheries for Poverty Alleviation and Food Security					
Goal: XXXXXX					
Objective (s)	Year start - end	Performance Indicator	Project implementation	Achievement	Major impacts/Issues
<i>Objective 1</i> Off shore Fisheries Resources Exploration in the Southeast Asia		Indicator 1: Indicate what is the indicator(s) that use to reveal the achievement of the project objective	Briefly explain the progress of project implementation, which could include events, activities, and outputs completed during the midyear. Each event, activity and output must signify to achieve corresponding indicator/objective.	Indicate the overall progress of the project objective which has been achieved in percentage compare with the total period of the project implementation	Major impacts, problem areas and adjustment of project implementation should be identified.
<i>Objective 2</i> Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through Resources Enhancement					
<i>Objective 3</i> Human Resource Development for Sustainable Fisheries					
<i>Objective 4</i> Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release					
<i>Objective 5</i> Promotion of Sustainable and Region-oriented Aquaculture					
<i>Objective 6</i> Optimizing Energy Use/ Improving Safety Onboard in Fishing Activities					
Summary:	Explain briefly the overall progress of activities undertaken according to targets and plan (e.g. physical procurement, staff training, extension and relevant inputs etc.) and monitor whether the objectives are being achieved. Are there opportunities to improve? Are benefits being realized cost-effectively?				

Program Thrust II: Enhancing Capacity and Competitiveness to Facilitate International and Intra-regional Trade					
Goal: XXXXXX					
Objective (s)	Year start Year end	Performance Indicator	Project implementation	Achievement	Major impacts/Issues
<i>Objective 1</i> Chemical and Drug Residues in Fish and Fish Products in Southeast Asia “Biotoxin Monitoring in ASEAN” Extension work to: ASP, AZA and BTX >		Indicator 1: Indicate what is the indicator(s) that use to reveal the achievement of the project objective	Briefly explain the progress of project implementation, which could include events, activities, and outputs completed during the midyear. Each event, activity and output must signify to achieve corresponding indicator/objective.	Indicate the overall progress of the project objective which has been achieved in percentage compare with the total period of the project implementation.	Major impacts, problem areas and adjustment of project implementation should be identified.
<i>Objective 2</i> Traceability Systems for Aquaculture Products in Southeast Asian Region					
<i>Objective 3</i> Utilization of Freshwater Fish for Value Added Products					
<i>Objective 4</i> Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia					
<i>Objective 5</i> Food Safety of Aquaculture Products in Southeast Asia >					
Summary:	Explain briefly the overall progress of activities undertaken according to targets and plan (e.g. physical procurement, staff training, extension and relevant inputs etc.) and monitor whether the objectives are being achieved. Are there opportunities to improve? Are benefits being realized cost-effectively?				

Program Thrust III: Improving Management Concepts and Approaches for Sustainable Fisheries					
Goal: XXXXXX					
Objective(s)	Year start Year end	Performance Indicator	Project implementation	Achievement	Major impacts/Issues
<i>Objective 1</i> Strategies for Trawl Fisheries By-catch Management (FAO-GEF/REBYC-II CTI)		Indicator 1: Indicate what is the indicator(s) that use to reveal the achievement of the project objective	Briefly explain the progress of project implementation, which could include events, activities, and outputs completed during the midyear. Each event, activity and output must signify to achieve corresponding indicator/objective.	Indicate the overall progress of the project objective which has been achieved in percentage compare with the total period of the project implementation.	Major impacts, problem areas and adjustment of project implementation should be identified.
<i>Objective 2</i> Promotion of Counter Measures to Reduce IUU fishing activities					
<i>Objective 3</i> Combating IUU Fishing in the Southeast Asian Region through Application of EU Catch Certification for Trading of Fish and Fishery Products					
Summary:	Explain briefly the overall progress of activities undertaken according to targets and plan (e.g. physical procurement, staff training, extension and relevant inputs etc.) and monitor whether the objectives are being achieved. Are there opportunities to improve? Are benefits being realized cost-effectively?				

Program Thrust IV: Providing Policy and Advisory Services for Planning and Executing Management of Fisheries					
Goal: XXXXXX					
Objective (s)	Year start Year end	Performance Indicator	Project implementation	Achievement	Major impacts/Issues
<i>Objective 1</i> Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2		Indicator 1: Indicate what is the indicator(s) that use to reveal the achievement of the project objective	Briefly explain the progress of project implementation, which could include events, activities, and outputs completed during the midyear. Each event, activity and output must signify to achieve corresponding indicator/objective.	Indicate the overall progress of the project objective which has been achieved in percentage compare with the total period of the project implementation.	Major impacts, problem areas and adjustment of project implementation should be identified.
<i>Objective 2</i> Research and Management of Sea turtles in Foraging Habitats in the Southeast Asian Waters					
<i>Objective 3</i> Enhancing the Compilation and Utilization of Fishery Statistics and Information for Sustainable Development and Management of Fisheries in the Southeast Asian					
<i>Objective 4</i> Comparative Studies for Management of Purse Seine Fisheries in the Southeast Asian Region					
<i>Objective 5</i> Research and Management of Sharks and Rays in the Southeast Asian Waters					
Summary:	Explain briefly the overall progress of activities undertaken according to targets and plan (e.g. physical procurement, staff training, extension and relevant inputs etc.) and monitor whether the objectives are being achieved. Are there opportunities to improve? Are benefits being realized cost-effectively?				

Program Thrust V: Addressing International Fisheries Related Issues from a Regional Perspective					
Goal: XXXXXX					
Objective(s)	Year start Year end	Performance Indicator	Project implementation	Achievement	Major impacts/Issues
<i>Objective 1</i> Assistance of Capacity Building in the Region to Address International Trade Related Issues >		Indicator 1: Indicate what is the indicator(s) that use to reveal the achievement of the project objective	Briefly explain the progress of project implementation, which could include events, activities, and outputs completed during the midyear. Each event, activity and output must signify to achieve corresponding indicator/objective.	Indicate the overall progress of the project objective which has been achieved in percentage compare with the total period of the project implementation.	Major impacts, problem areas and adjustment of project implementation should be identified.
<i>Objective 2</i> Strengthening SEAFDEC Network for Sustainable Fisheries >					
Summary:	Explain briefly the overall progress of activities undertaken according to targets and plan (e.g. physical procurement, staff training, extension and relevant inputs etc.) and monitor whether the objectives are being achieved. Are there opportunities to improve? Are benefits being realized cost-effectively?				

**CONCEPT PROPOSAL:
PROPOSED COLLABORATIVE PROGRAM ON FISHERIES RESOURCES AND
ENVIRONMENTAL SURVEY IN THE GULF OF THAILAND USING THE M.V. SEAFDEC**

I. Background:

SEAFDEC conducted the Collaborative Research Program on Fisheries Resources and Environmental Survey in the South China Sea (SCS) and Gulf of Thailand (GOT) covering the EEZ of Thailand, Malaysia, Brunei Darussalam, the Philippines, Vietnam except for Cambodia by MV SEAFDEC during 1995 to 2000. For Cambodia, Training Department supported by the SEAFDEC conducted the 1st Fisheries Resources Survey in the EEZ by M.V. SEAFDEC 2 during 14-25 November 2004, The results was published separately from the Collaborative Research program in the SCS and GOT. In 2013 SEAFDEC/Training Department in cooperation with scientists from 18 Research Institutions/Universities and the Department of Fisheries has conducted the fisheries resources and environmental survey in the Gulf of Thailand within the EEZ waters using M.V. SEAFDEC with the support from PTT Exploration and Production Public Company Limited (PTTEP). The M.V. SEAFDEC survey cruise in 2103 included 4 main topics: 1) physical oceanography and atmosphere; 2) chemical oceanography and environment; 3) fisheries resources; and 4) marine biology. The results from the survey will be discussed at the Seminar of which is scheduled from 11-12 December 2013.

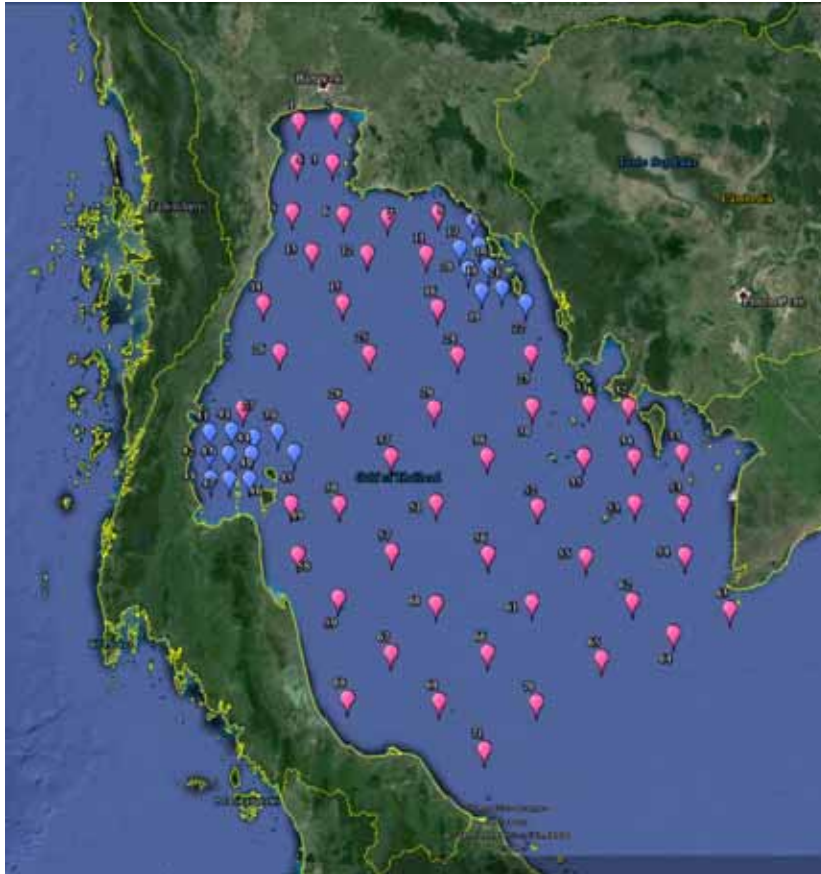
Taking into accounts the GOT area that covering the coastal areas not only Thailand but also Cambodia and Vietnam. In order to know the whole present situation of the GOT, scientists suggested that the research program in the next phase should cover all of the GOT by including Cambodia, and Vietnam in the program. Therefore SEAFDEC would like to propose this concept proposal as a part of SEAFDEC Regional Program (2014-2015) with the supports from the PTTEP and other donors for consideration at the 36th PCM.

II. Collaborative Program in the GOT by M.V. SEAFDEC:

1. **Objectives:** is to understand the stock/population of some economically small pelagic fisheries resources and marine environment in the Gulf of Thailand
2. **Research Program:** there are 4 main program as follows:
 - 2.1 Physical oceanography and atmosphere; (Research topics will be identified)
 - 2.2 Chemical oceanography and environment; (Research topics will be identified)
 - 2.3 Fisheries resources focusing mackerel; (Research topics will be identified) and
 - 2.4 Marine biology (Research topics will be identified).
3. **Survey Period:**

The survey is designed for two periods:

 - 1) Pre-Monsoon from October-November, and
 - 2) Post-Monsoon from April-May
4. **Program Period:** 2014-2015
5. **Proposed Participating Country:** Cambodia, Thailand, and Vietnam
6. **Coverage Area and Survey Station:** (see Map)
7. **Proposed Sponsorship:**
 - 7.1 PTTEP: for fuel cost of M.V. SEAFDEC
 - 7.2 SEAFDEC (such as JTF, SEAFDEC-Sida Project, etc.): for other expenditures such as others operation cost of M.V. SEAFDEC, research program, meeting cost, etc.
 - 7.3 Other donors: (to be identified later)



Map: Coverage Area and Survey Station in the Gulf of Thailand (Tentative)

III. Expected Outputs

- Proceedings of the Collaborative Program on Fisheries Resources and Marine Environmental Survey in the Gulf of Thailand by MV SEAFDEC during 2014-2015
- Distribution of larval fishes in the Gulf of Thailand during 2014-15
- Known oceanographic characteristics of the Gulf of Thailand during 2014-15
- Known distribution/migration of mackerel in the Gulf of Thailand
- Relationship between Mackerel resources and change of marine environment in the Gulf of Thailand

IV. Expected Outcomes:

- Science-based fishery management policy at national and sub-regional levels
- Enhanced cooperation of scientists/research institutes within and among participating countries

COLLABORATIVE PROGRAM FRAMEWORK FOR THE OCEANIC TUNA RESOURCES IN THE SULU-SULAWESI SEAS SUB-REGION¹

I. BACKGROUND

The Sulu-Sulawesi Sea (SSS), which is one of the most important large marine ecosystems in the tropical seas of Southeast Asia in terms of biological diversity, is bounded by three countries, namely: Indonesia, Malaysia and the Philippines. Covering an area of about 900,000 km², the SSS is at the heart of the most bio-diverse marine area in the world and thus, considered an eco-region, which is physically subdivided into the Sulu Sea and the Sulawesi Sea. The SSS also embraces very rich fishing grounds for large and small pelagic fishes (*e.g.* oceanic and neritic tunas) as well as coastal and coral reef fishes, providing livelihoods and food for coastal communities in the entire region and beyond. Being part of the Coral Triangle, there is existing evidence that the SSS is an important spawning and nursery ground, and migratory route for the bigeye, yellowfin, skipjack, and neritic tunas.

Based on the national statistics in 2006, tuna production in the SSS was estimated to be around 370,000 mt. However, the increasing demand, competition, bycatch of juveniles, particularly of oceanic and neritic tunas, and lack of regional collaborative research program for sustainable management and development of marine and coastal resources in the SSS have resulted in overexploitation and decline of tuna resources in the SSS. In addition, the impacts of thousands of Fish Aggregating Devices (FADs) deployed in the area (particularly in the Sulawesi Sea) where tuna-resources have not been assessed, have not been determined, thus, the status of the resources still remains unknown.

During the 44th Meeting of SEAFDEC Council in April 2012 in Myanmar, the Council Directors for the Philippines, Malaysia, Indonesia, and Vietnam agreed in principle to collaborate in the conduct of a joint research on the maximum sustainable yield of tuna catch in the Sulu-Sulawesi Sea. In this connection, the Council requested the SEAFDEC Secretariat to develop a collaborative mechanism under the SEAFDEC framework to facilitate the conduct of the collaborative activities in this area in the future. As for the involvement of Vietnam in the proposed mechanism, its expertise could be tapped for the successful implementation of the mechanism considering that the country is not connected to the Sulu-Sulawesi Sea. Thus, the involvement of Vietnam in the proposed mechanism is considered voluntary. The SEAFDEC Secretariat has therefore developed this proposed framework for Joint Research Program on Tuna Resources in Sulu-Sulawesi Sea, for the consideration of the Council.

This framework for **Joint Research Program on Tuna Resources in Sulu-Sulawesi Sea** was finalized at the **Sub-regional Technical Meeting** held on 20 to 21 August 2013 in Kuala Lumpur, Malaysia. Supported by the JTF program on “Offshore fisheries resources exploration in the Southeast Asian Region”, the Meeting was attended by representatives from Indonesia, Malaysia, the Philippines as well as the representatives from SEAFDEC Training Department and Secretariat. As agreed by the three participating countries, the focus of this program will be on the key target species, namely: yellowfin, bigeye, and skipjack tunas.

II. GOAL AND OBJECTIVES

The overall goal of the program is to provide updated scientific findings on the status and trends of yellowfin, bigeye, and skipjack tunas in the Sulu-Sulawesi Sea.

Specific Objectives:

1. Strengthen collaborative research among the three countries surrounding the Sulu-Sulawesi Sea, through the conduct of:
 - Study on the use of FADs in the SSS areas;

¹ The program framework is agreed from the Sub-regional Meeting held by SEAFDEC Secretariat in cooperation with Department of Fisheries/ Malaysia on 20-21 August 2013 in Kuala Lumpur, Malaysia

- Assessment of the status and trends of tuna stocks and the estimated maximum sustainable yield; and
2. Increase awareness of stakeholders on sustainable exploitation and management of tuna.

III. PROGRAM ACTIVITIES

In order to achieve the objectives, technical working groups on tuna stock assessment in SSS areas will be set-up. Subsequently, the TOR of the technical working groups includes the following activities:

Activity 1 Review of the catch and efforts, biological data/information on tuna harvested in the Sulu and Sulawesi Seas

Participating countries will compile and review the catch and biological data and information on tuna harvested in the SSS. The following activities are proposed for implementation at country level:

- Identification of landing sites of tuna caught in the SSS;
- Review of periodical tuna production from the respective national fisheries statistics;
- Determining the total catch from the SSS including species composition, and identifying the needs for data collection;
- Sharing of information on at-sea-observation/on-board observer program for the identification of tuna fishing grounds and species composition; and
- Compilation of data for common use on regional stock assessment

Activity 2 Actual data collection

Participating countries will collect actual data and information on tuna harvested in the SSS. The following activities are proposed for implementation at country level:

- 1) Fisheries data collection from identified landing sites to include:
 - Tissue samples for genetic analysis of major tuna as required by interested countries
 - Catch and effort data and biological data (following the agreed SOP for data collection)

- 2) Fishing ground profiling using the M.V. SEAFDEC 2

The M.V. SEAFDEC 2 is proposed to be utilized for the conduct of the collaborative tuna resources and oceanographic surveys within the jurisdiction of Malaysia, Philippines and Indonesia in the Sulu-Sulawesi Sea. The scope of the survey activities shall include the following:

- Research on tuna early life history using fish larvae sampling net and Bongo net in the near shore and off shore of the SSS, in order to determine the relative abundance and species composition of the fish larvae;
- Oceanographic survey using the Integrated Conductivity-Temperature and Depth (ICTD) attached with other sensors, namely: pH, DO, Fluorescence, among others;
- Use of scientific hydro-acoustic during the track survey; and
- Scanning sonar survey on the FADs, and fish sampling by specific sampling gears for echo verification (if appropriate, *e.g.* data collection by hook and line/hand lines and longlines).

The tentative Cruise Plan for one season appears in *Appendix 1*. Moreover, it was also agreed that the survey could be conducted in two seasons to cover the pre- and post-monsoon seasons.

Activity 3 Tuna Stock Assessment

Participating countries will take responsibility in the assessment of tuna stocks as described in Item VII. In order to assess the tuna stock and population in the SSS regional area, collaboration among the countries concerned is necessary. In this regard, the following activities are proposed:

- Identifying the peer reviewers/experts on tuna stock assessment in the respective concerned countries and from in-outside the region;
- Establishment of the experts working group for regional tuna stock assessment;
- Standardization of the methodology for stock assessment and other related activities; and

- Estimation of the MSY of selected target tuna (if possible).

Activity 4 Determination of tuna spawning grounds

In order to identify the tuna larvae and spawning grounds, the following activities will be conducted by the participating countries at national level:

- Identifying the peer reviewers/experts on tuna larvae identification in the respective concerned countries and from in-outside the region;
- Establishment of the experts working group for tuna larvae identification;
- Making use of the SEAFDEC standardized methodology for tuna larvae sampling and identification; and
- Determination of tuna spawning grounds.

Activity 5 Assessment of the use of FADs on tuna fisheries in SSS

- Determining the relative concentration of FADs in the SSS through ocular observation and radar recordings during the collaborative survey using the M.V. SEAFDEC 2; and
- Determining the species compositions and size of fish caught at FADs using appropriate fishing gear, *e.g.* trolling, longline or from the national observer program.

Activity 6 Organization of Scientific Committee Meeting

SEAFDEC will organize a Scientific Committee Meeting for discussing the scientific findings in order to craft the technical recommendations for consideration by Regional Advisory Committee (RAC) on development of conservation and management measures for tuna in the study area. In this regard, key experts involved in the assessment under the two working groups will be invited to update on the progress/findings and technical recommendations from the collaborative works. Specifically, using the existing SEAFDEC framework under the RAC, the technical recommendations would be considered by RAC to form as basis for the national stakeholders' consultation.

IV. AREAS OF COOPERATION

The "Joint Research Program on Tuna Resources in Sulu-Sulawesi Sea" will be operated mainly through the following three mechanisms. Mutual agreements for concrete research program will be designed in accordance with the specific requirements identified during the cooperation.

(1) Research Cooperation

With the aim of understanding the stock status of oceanic and neritic tunas, and to provide technical advice for sustainable conservation and management of tuna fisheries in SSS, a series of research activities as mentioned above will be implemented through the regional collaboration. The participating countries under this joint research program are: Indonesia, Malaysia, and Philippines.

(2) Information Sharing and Exchange

For long-term sustainable development and management of tuna fisheries in SSS, an effective mechanism for information sharing/exchange should be established under this framework.

(3) Technical Transfer and Training

Technical and technology transfer will be conducted during the course of the program implementation through on-the-job training sessions, which could include enhancing specific knowledge and skills in tuna data collection (*i.e.* onboard, at landing site, and canneries), data analysis, database development, and so on. Materials, tools, and coverage of the training programs will be developed by relevant experts, whereas the training locations will be identified by the participating countries and main partners. SEAFDEC/TD is responsible for supporting the expertise and facilities of the training in collaboration with SEAFDEC/MFRDMD.

V. WORKING MECHANISM

The working mechanism including the responsibilities and budgetary allocations by participating countries and SEAFDEC is summarized below:

1) *Responsibilities of Participating Countries and SEAFDEC*

Participating Countries:

- Identify and nominate the Country Expert(s) responsible for Regional Tuna Stock Assessment in the SSS
- Identify and nominate the Country Expert(s) responsible for Regional Larval Fish Identification in the SSS
- Collect catch and effort data and information from landing sites and/or through respective Observers Program, and undertake the first level data analysis
- Share information/data on the findings from the survey for regional analysis through the Working Group Meeting
- Co-finance the use of the M.V. SEAFDEC 2 under the Cost-Sharing Policy of SEAFDEC
- Shoulder all travel costs of country experts joining the Working Group meetings
- Designate technical staff to participate in relevant cruise of the M.V. SEAFDEC 2 from, and undertake the first level data analysis
- Participate in the sub-regional working group in analyzing the specific issues such as stock assessment, determination of the spawning grounds, among others

SEAFDEC (including Secretariat, TD and MFRDMD):

- Develop the overall work plan in consultation with participating countries
- Provide platform for the sub-regional Scientific Committee Meeting to discuss the findings from the Collaborative Research Program
- Invite regional expert (s) to support the sub-regional analysis of the program
- Develop and disseminate information and educational campaign (IEC) materials

2) *Invited Expert(s)*

SEAFDEC shall invite expert(s) from international/regional institution(s), to support the regional analysis as well as provide capacity building on fish (tuna) stock assessment, larval fish identification, and on biomass estimation.

3) *Period and Work Plan (2013~2015)*

Year 1:

- 1st Working Group Meeting to finalize the Collaborative Research Work Plan: set standardized methodology for the collaborative program
- Finalize the Collaborative Research Work Plan
- Secure financial support from the respective national governments

Year 2:

- Working Group Meetings: for preparatory work and sub-regional analysis
- Review/collect data/information from landing sites and/or observers program
- 1st Collaborative Survey using the M.V. SEAFDEC 2 (Mid October until November) post SW monsoon
- First data analysis at country level

Year 3:

- 2nd Collaborative Survey using the M.V. SEAFDEC 2 (March to May) pre- SW monsoon.
- Working Group Meetings: for preparatory work and sub-regional analysis
- Develop working papers
- Sub-regional Scientific Committee Meeting on Findings from the Collaborative Research Program in the SSS

4) Working Mechanism (Mechanism is modified after Special Council Meeting in October 2013)



VI. COST SHARING POLICY FOR USAGE OF MV SEAFDEC2

The cost sharing policy of SEAFDEC for utilizing the M.V. SEAFDEC 2 appears in *Appendix 2*. This policy would be applied for this framework during the actual joint research survey using the M.V. SEAFDEC2. Furthermore, the participating countries also agreed to share equally the cost of the M.V. SEAFDEC 2 for traveling from and to SEAFDEC/TD, while Indonesia and Malaysia suggested that the cost of the 1st leg will be the sole responsibility of the Philippines, 1/3 of the cost of the 2nd leg will be borne by Malaysia and 2/3 by the Philippines, and Indonesia will be responsible for the cost of the last leg. Therefore, Based on the tentative Cruise Plan (*Appendix 1*), the estimated cost to be shared by the three participating countries for one cruise is as follows.

Leg	Fuel	Main Engine (110 litre/hr)		Generator(25 liter/hr)		Sub total consumption (liter)	Estimated USD (liter - 1.2 USD)	Sub total of fuel cost	Estimated cost (USD)	
		Time spent	Consumption (liter)	Time spent	liter/hr				Fresh water 30 ton	Ship Agency and Port Transportation
	Sailing from TID(5 d)	120	13200	120	3000	16200	19440	19440	0	0
	Port of call at puerto princesa(3d)			72	1800	1800	2160		400	5000
	Working at Sea(8 d) 75%	192	15840	192	4800	20640	24768			
Leg 1	2 nd Port of call at Zamboanga(3 d)	216	17820	72	1800	1800	2160	29088	400	5000
	Working at Sea(9 d) 75%			216	5400	23220	27864			
	3 rd Port of call at Sandakan(3 d)			72	1800	1800	2160		400	5000
Leg 2	Sail to Bitung(2 d)	50	5500	50	1250	6750	8100	38124		
	4 th Port of call at Bitung(3 d)			72	1800	1800	2160		400	5000
	Working at Sea(6 d) 75%	144	11880	144	3600	15480	18576			
Leg 3	5 th Port of call at Bitung(3 d)			72	1800	1800	2160	22896	400	5000
	Sailing to TID(7 d)	168	18480	168	4200	22680	27216	27216	0	0

Country	Estimated fuel cost (USD)				Estimated cost of fresh water, ship agent and transportation (USD)				Estimated expenditure of each country (USD)
	Fuel cost from/to TD	Leg1	Leg2	Leg3	Puerto P.	Zamboanga	Sandaiakan	Bitung	
Philippine	15552	29088	25416	0	5800	5800	0	0	81656
Malaysia	15552	0	12708	0	0	0	5800	0	34060
Indonesia	15552	0	0	22896	0	0	0	5800	50048
Sub-total	46656	29088	38124	22896	5800	5800	5800	5800	165764
Total expenditure of participating countries									

VII. SUB-REGIONAL WORKING GROUPS AND LEAD COUNTRIES

SR-Working Group	Lead Country/ Chief Scientist	SRWG Members/Country	Remarks
1) Stock Assessment			
Bigeye Tuna	Philippines: <Mr. Noel Barut>	1. Mudjekeewis Santos (P) 2. Ronnie Romero (P) 3. Ellaine Garvilles (P) 4. Sallehuddin Jamon (M) 5. Anung Widodo (I)	
Yellowfin Tuna	Indonesia < Dr. Fayakun Satria>	1. Richard Rumpet (M) 2. Lilis Sadiyah Dr (I) 3. Mudjekeewis Santos (P) 4. Ronnie Romero (P) 5. Ellaine Garvilles (P)	
Skipjack Tuna	Malaysia <Mr. Samsudin Basir>	1. Jamil Musel (M) 2. Khairul Amri Dr. (I) 3. Mudjekeewis Santos (P) 4. Ronnie Romero (P) 5. Ellaine Garvilles (P)	
2) Tuna Spawning Grounds Study	DOF/ Malaysia <Mr. Zulkifli Talib>	1. Rosdi Md. Nor (M) 2. Renny Puspasari Dr (I) 3. Alma C. Dickson (P) 4. Rafael Ramiscal (P) 5. Rhoda Bacordo (P) 6. Valeriano Borja (P)	<ul style="list-style-type: none"> • Analysis of larvae samplings from M.V. SEAFDEC 2 • Require all oceanographic data from M.V. SEAFDEC2
3) FADs for Tuna Fisheries Study	Philippines <Dr. Jonathan Dickson>	1. Alma C. Dickson (P) 2. Rafael Ramiscal (P) 3. Joeren Yleana (P) 4. Lawrence Kissol (M) 5. Mahiswara (I) 6. Raja Bidin Raja Hassan (M)	
4) Others:			
<i>Genetic Study</i>	BFAR, Philippines	Dr. Mudjekeewis Santos	
<i>Oceanographic Data</i>	TD	Ms. Penchan Laongmanee	
<i>Hydro-Acoustic and sonar data</i>	MFRDMD	Mr. Raja Bidin Raja Hassan	

* For cost effectiveness in communications and coordination within the sub-regional working group, internet should be used

Tentative Cruise Plan of M.V.SEAFFDEC 2 in Sulu-Sulawesi Seas

(Revised base on suggestion of the “Sub-regional Technical Meeting for Development of Joint Research Program for Tuna Research Survey in Sulu-Sulawesi Sea” 20-21 August 2013, Malaysia)

- 1. Period** : 52 days
2. Area of Operation : Sulu Sea and Sulawesi Sea
3. Port of Call : Puerto princesa (Philippines), Zambonga (Philippines), Sandakan (Malaysia), Bitung (Indonesia).
4. Objectives : To carry out the following joint research survey on:
 1. Oceanographic survey (ICTD, Larvae and Plankton net, Bongo net, Neuston net, Temperature-Depth Sensor (TD), Current indicator) for 61 stations.
 2. Hydro-acoustic survey by scientific echo sounder, echo sounder and full circle scanning sonar. Scientific echo sounder will be operate according to track of sailing.
 3. Fishing trial by trolling, handline and short “longline” at any survey station or any appropriate position (some station may use small boat with portable echo sounder to check fish school near fish aggregating device (FAD)).
5. Schedule:
 Day 1- 5 : Sailing from TD to Puerto Princesa(1336 Nm)sp. 11 kts =5 days
 Day 6-7 : Discussion and loading instrument, refill fuel (43,000 liters), fresh water, and provisions.

1st leg

Day 8-15 Survey station 1 to 23 (25 stations)

- Day 8
 0800 : Leave Puerto Princesa for st.1 (88.6')
 1500 : Arrive st.1
 1500-1730 : survey at st.1
 1730 : Proceed to st.2 (44.3')
 2200 : Arrive st.2
 2200-2430 : Survey at st.2
 2430 : proceed to st.3 (44.3')
 Day9
 0630-0900 : Survey at st.3
 0900 : Proceed to st.4 (33.4')
 1230 : Arrive st.4
 1230-1500 : Survey at st.4
 1500 : Proceed to st.5 (47.4')
 2000 : Arrive st.5
 2000-2230 : Survey at st.5
 2230 : Proceed to st.6 (44.4')
 Day10
 0630-0900 : Survey at st.6
 0900 : Proceed to st.7 (54.3')
 1430 : Arrive st.7
 1430-1700 : Survey at st.7
 1700 : Proceed to st.8 (44.4')
 1930 : Arrive st.8
 1930-2200 : Survey at st.8
 2220 : Proceed to st.9 (49.4')
 Day11
 0630-0900 : Survey at st.9
 0900 : Proceed to st.10 (42.2')
 1330 : Arrive st.10
 1330-1600 : Survey at st.10
 1600 : Proceed to st.11 (42.2')
 2030 : Arrive st.11
 2030-2300 : Survey at st.11

2300	: Proceed to st.12 (59.4')
Day12	
0630-0900	: Survey at st.12
0900	: Proceed to st.13 (44.5')
1330	: Arrive st.13
1330-1600	: Survey at st.13
1600	: Proceed to st.14 (44.5')
2030	: Arrive st.14
2030-2300	: Survey at st.14
2300	: Proceed to st.15 (33.5')
Day13	
0630-0900	: Survey at st.15
0900	: Proceed to st.16 (26.9')
1145	: Arrive st.16
1145-1300	: Survey at st.16
1300	: Proceed to st.17 (45.3')
1730	: Arrive st.17
1730-2000	: Survey at st.17
2000	: Proceed to st.18 (44.6')
Day14	
0630-0900	: Survey at st.18
0900	: Proceed to st.19 (59.5')
1500	: Arrive st.19
1500-1730	: Survey at st.19
1730	: Proceed to st.20 (42.0')
2200	: Arrive st.20
2200-2430	: Survey at st.20
2430	: Proceed to st.21 (41.9')
Day15	
0630-0900	: Survey at st.21
0900	: Proceed to st.22 (40.6')
1315	: Arrive st.22
1315-1545	: Survey at st.22
1545	: Proceed to st.23 (42.8')
2000	: Arrive st.23
2000-2230	: Survey at st.23
2320	: Proceed to Zamboanga
Day16	
0900	: Arrive Zamboanga
1000-1300	: Immigration and custom Clearance
Day17-18	
	: Unloading sample, refill fuel (19,164.4 liters), fresh water & provisions.

2nd leg

Day 19-27 Survey station 24 to 44 (21 stations)

Day19	
0800	: Leave Zamboanga for st.24 (30')
1100	: Arrive st. 24
1100-1330	: Survey at st.24
1330	: Proceed to st.25 (30')
1640	: Arrive st.25
1640-1910	: Survey at st.25
1910	: Proceed to st.26 (30')
2230	: Arrive st.26
2230-0100	: Survey at st.26
0100	: Proceed to st.27 (38')
Day20	
0630-0900	: Survey at st.27
0900	: Proceed to st.28 (44.7')



1330	: Arrive st.28
1330-1600	: Survey at st.28
1600	: Proceed to st.29 (66.8')
Day21	
0630-0900	: Survey at st.29
0900	: Proceed to st.30 (59.7')
1500	: Arrive st.30
1500-1730	: Survey at st.30
1730	: Proceed to st.31 (59.7')
2350	: Arrive st.31
2350-0220	: Survey at st.31
Day22	
0220	: Proceed to st.32 (35.8')
0630-0900	: Survey at st.32
0900	: Proceed to st.33 (50.6')
1415	: Arrive st.33
1415-1645	: Survey at st.33
1645	: Proceed to st.34 (59.8')
2245	: Arrive st.34
2245-0115	: Survey at st.34
Day23	
0115	: Proceed to st.35 (59.8')
0720-1000	: Survey at st.35
1000	: Proceed to st.36 (36.6')
1400	: Arrive st.36
1400-1630	: Survey at st.36
1630	: proceed to st.37 (40.8')
2045	: Arrive st.37
2045-2315	: Survey at st.37
2315	: Proceed to st.38 (138.3)
Day24	
1315-1545	: Survey at st.38
1545	: Proceed to st.39 (49.9')
2045	: Arrive st.39
2045-2315	: Survey at st.39
2315	: Proceed to st.40 (44.9')
Day25	
0630-0900	: Survey at st.40
0900	: Proceed to st.41 (59.9')
1500	: Arrive st.41
1500-1730	: Survey at st.41
1730	: Proceed to st.42 (49.9')
Day26	
0630-0900	: Survey at st.42
0900	: Proceed to st.43 (63.3')
1530	: Arrive st.43
1530-1800	: Survey at st.43
1800	: Proceed to st.44 (38.9')
2200	: Arrive st.44
2200-2430	: Survey at st.44
Day27	
0030	: Proceed to Sandakan (194')
2000	Arrive Sandakan
Day28	
0800-1200	: Immigration and custom clearance
1200-1600	: Refill fresh water and provisions
Day29-30	
	: Unloading sample, refill fuel (20,031.2 liters), fresh water & provisions
Day31	
0800	: Leave Sandakan for Bitung (555')

Day32-33 : Sailing
 Day33
 1000 : Arrive Bitung
 0800-1000 : Immigration and custom clearance
 1300-1500 : Discussion
 Day 34-35 : Loading instrument, refill fuel (8,000 liters), fresh water and provisions

3rd leg

Day 36-41 Survey station 45 to 61 (17 stations)

Day36
 0700 : Leave Bitung for st.45 (69')
 1300 : Arrive st.45
 1300-1500 : Survey at st.45
 1500 : Proceed to st.46 (60')
 2000 : Arrive st.46
 2000-2200 : Survey at st.46
 2200 : Proceed to st.47 (60')
 Day37
 0600-0800 : Survey at st.47
 0800 : Proceed to st.48 (85.6')
 1510 : Arrive st.48
 1510-1710 : Survey at st.48
 1710 : Proceed to st.49 (60')
 2210 : Arrive st.49
 2210-0010 : Survey at st.49
 Day38
 0010 : Proceed to st.50 (85.6')
 0720 : Arrive st.50
 0720-0920 : Survey at st.50
 0920 : Proceed to st.51 (60')
 1420 : Arrive st.51
 1420-1620 : Survey at st.51
 1620 : Proceed to st.52 (60')
 2120 : Arrive st.52
 2120-2320 : Survey at st.52
 2320 : Proceed to st.53 (60')
 Day39
 0600-0800 : Survey at st.53
 0800 : Proceed to st.54 (60')
 1300 : Arrive st.54
 1300-1500 : Survey at st.54
 1500 : Proceed to st.55 (60')
 2000 : Arrive st.55
 2000-2200 : Survey at st.55
 2200 : Proceed to st.56 (67')
 Day40
 0600-0800 : Survey at st.56
 0800 : Proceed to st.57 (60')
 1300 : Arrive st.57
 1300-1500 : Survey at st.57
 1500 : Proceed to st.58 (60')
 2000 : Arrive st.58
 2000-2200 : Survey at st.58
 2200 : Proceed to st.59 (60')
 Day41
 0600-0800 : Survey at st.59
 0800 : Proceed to st.60 (60')
 1300 : Arrive st.60

1300-1500	: Survey at st.60
1500	: Proceed to st.61 (60')
2000	: Arrive st.61
2000-2200	: Survey at st.61
2200	: Proceed to Bitung (92')
Day42	
0700	: Arrive Bitung
0800-1000	: Immigration and custom clearance
1000-1600	: Unloading sample, refill fuel, fresh water and provisions
Day43-44	
	: Discussion, refill fuel (23,774.3 liters), fresh water and provisions
Day45	
0800	: Leave Bitung to SEAFDEC/TD (1858')
Day52	
0800 hrs.	: Arrive SEAFDEC/TD and finish the cruise.

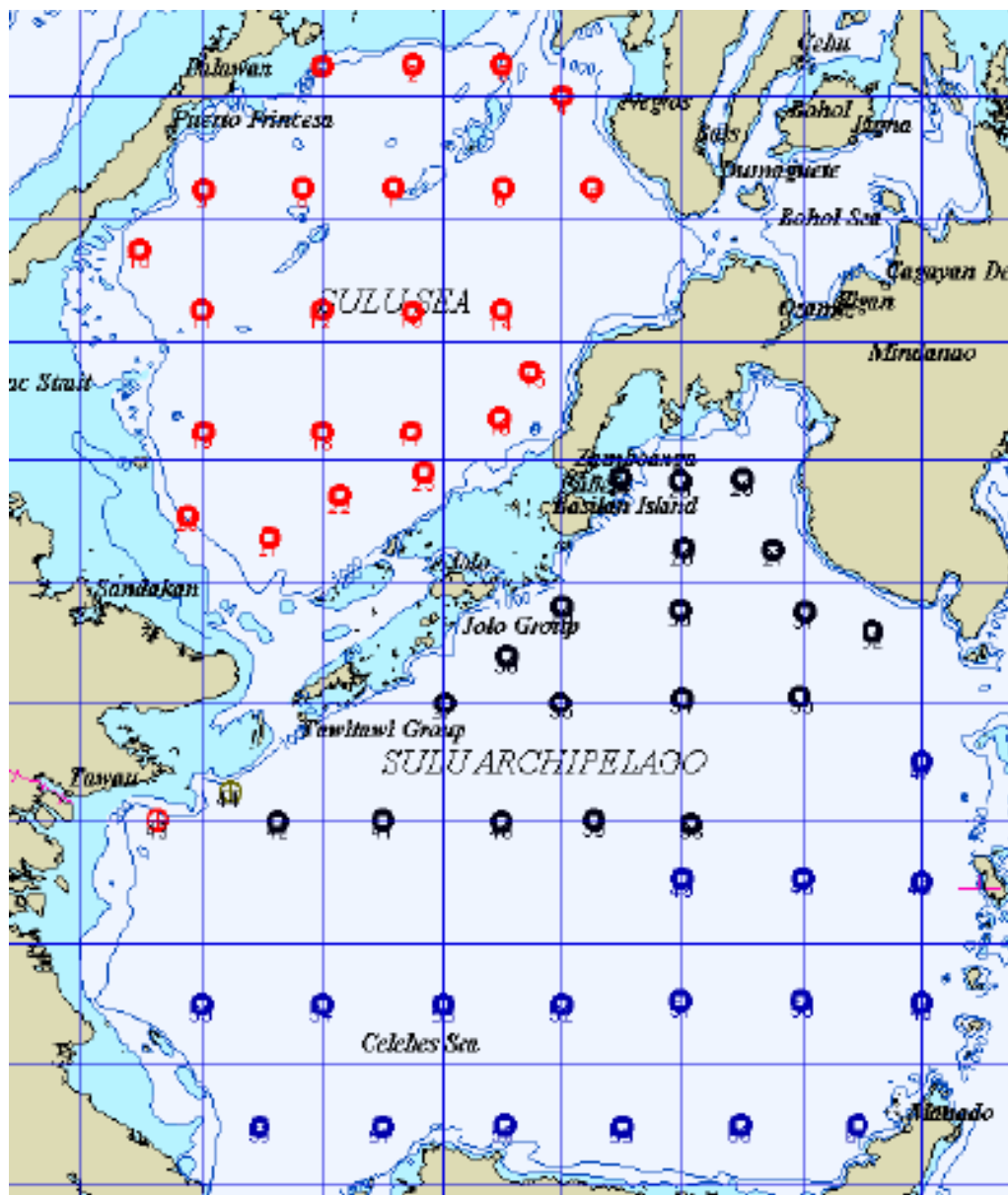


Figure 1 Map of survey area: red symbol denote 1st leg, black symbol denote 2nd leg and blue symbol denote 3rd leg

Revised Guidelines on the Cost Sharing Policy for the Operation of the M.V. SEAFDEC 2¹

I. Introduction

With favorable understanding of the Government of Japan about the function of SEAFDEC to assist in the sustainable development of fisheries of the Member Countries, the Government of Japan agreed to provide a new research vessel, the M.V. SEAFDEC 2 under the Japanese Grant Aid Program to SEAFDEC.

Through a series of consultations with the Government of Japan, SEAFDEC and Japan reached to an agreement that the utilization of the M.V. SEAFDEC 2 should be secured for the benefit of the countries which are eligible to the Japanese Grant Aid Program. On the other hand, it was also agreed among the SEAFDEC Member Countries that the operation of the M.V. SEAFDEC 2 should be based on cost-sharing policy taking into account such aspects as the benefits of the operation of the vessel to the Member Countries and the expected budgetary constraints of SEAFDEC in the future. The cost-sharing policy regarding the operation of the M.V. SEAFDEC 2 has also been recognized as an important element to establish the ownership of research activities by the Member Countries and to promote sustainable research activities using the M.V. SEAFDEC 2 in the region.

In exploring the research needs of the Member Countries, SEAFDEC established two mechanisms, namely: the Eligible Countries Committee where the eligible countries could provide or propose their own research needs or plans for the use of the M.V. SEAFDEC 2; and the Operations Committee where the annual plan of operation of the M.V. SEAFDEC 2 would be developed taking into account the needs of the SEAFDEC Member Countries other than the eligible countries as well.

During the 26th Meeting of the SEAFDEC Program Committee held in Manila in 2004, three categories of the expected operation using the M.V. SEAFDEC 2 were presented. It was also recommended that all categories of collaborative operations that are related to the needs of the Member Countries and operation in the national waters would be under the cost-sharing policy except the operation by SEAFDEC to verify the application of standardized research methods using the M.V. SEAFDEC 2, which have been considered through the Technical Consultative Meeting in October 2003 and November 2004.

At the 45th Meeting of the Council of SEAFDEC held in Cebu City, Philippines in 2013, SEAFDEC/TD proposed a revision of the Guidelines on the cost sharing policy for operating the M.V. SEAFDEC 2 particularly on the proposed modification of the cost-sharing policy for countries requesting for the use of the M.V. SEAFDEC 2. The Council however, expressed the apprehension that the Member Countries might not be able to shoulder the increased costs as proposed by SEAFDEC considering difficulties with internal negotiations within the respective national budget agencies of the countries. Nevertheless, with regards to data sharing, the Council agreed that some basic data collected onboard during the survey should be shared with SEAFDEC/TD. The data to be shared should be finalized at the planning meeting of the cruise survey between the requesting country and SEAFDEC. Such basic data will be kept confidential and to be used only for the SEAFDEC regional database and for future regional analysis (refer to new *para 4* of the Part IV of this document).

II. Objectives

This Guideline will provide the outline of the expected cost-sharing policy to be considered by the Member Countries, for the operation of the M.V. SEAFDEC 2 based on the policy established by SEAFDEC in early March 2004.

¹ The revised **Guidelines on the Cost Sharing Policy for the Operation of the M.V. SEAFDEC 2** was endorsed by the 45th Meeting of the Council of SEAFDEC held in Cebu City, Philippines on 1-4 April 2013 (refer to para 111-113 of the Report of 45th SEAFDEC Council Meeting).

III. Outline of the Proposed Cost-Sharing Policy

Regardless of whether it is in cash or in kind, the following financial items related to the operations cost should be borne as a matter of principle, by the Member Country requesting for the collaborative operation of the M.V. SEAFDEC 2 in her national waters in response to her needs and interests.

- 1) **Supply of fuel** for the entire duration of the research including cruising to and back to the requesting country;
- 2) **Supply of fresh water** that would be consumed by the vessel during the operation of research in the national waters;
- 3) **Salary and necessary DSA of the local or national participants** onboard, who are involved in the research activities should be borne by the Member Country based on its own national standard; and
- 4) **Agency fee and port clearance fee** should be borne by the Member Country when the vessel visits and stays at the port in the course of the implementation of the collaborative research program.

IV. Working Scheme for the Collaborative Research with the Member Countries

- 1) Each Member Country is requested to prepare its research proposal, if any, taking into account short or medium-term activities. The proposal should be presented to the Eligible Countries Committee and/or Operations Committee to consider the cruise plans for the M.V. SEAFDEC 2. As a matter of principle, the staying period for the operation of the M.V. SEAFDEC 2 in the national waters is limited to a maximum period of one month, taking into account also the availability of the M.V. SEAFDEC 2 for the other Member Countries.
- 2) Through consultation with the Operations Committee, each proposal from the Member Countries and Departments should be reviewed and finalized based on priority, practicability, readiness and financial background of the proposed research programs. The schedule of the research program of the country finalized by the Operations Committee could be adjusted to cater to the next priority country's needs or could be postponed until financial arrangements become ready by the requesting country.
- 3) Two months prior to the implementation of the individual research program, TD staff in charge of the operation will communicate through E-mail/or visit each beneficiary Member Country to discuss with the concerned staff on the detailed arrangements of the cruise and research program. The concerned members of the Regional Fisheries Policy Network (RFPN) could be mobilized for effective communication with their respective countries, as the case may be.
- 4) With regards to data sharing, the Member Countries agreed that some basic data collected onboard during the survey should be shared with SEAFDEC/TD. The data to be shared should be finalized at the planning meeting of the cruise survey between the requesting country and SEAFDEC. Such basic data will be kept confidential and to be used only for the SEAFDEC regional database and for future regional analysis.
- 5) Preliminary cruise report including comments on the immediate impacts of the utilization of the M.V. SEAFDEC 2 as well as the results of the national research program should be submitted to SEAFDEC/TD within six months after the cruise.

STATEMENT

By Mr. Timothy P. Moore

*The ASEAN-U.S. Maximizing Agricultural Revenue through Knowledge,
Enterprise Development and Trade (MARKET)*

The ASEAN-U.S. MARKET Project is funded by the U.S. Agency for International Development (USAID), and is part of Feed the Future, the U.S. Government's Global Hunger & Food Security Initiative. The project is working with ASEAN to promote more sustainable and efficient use of aquaculture and fishery resources in the region through the adoption of better production practices and fisheries management, building stronger public-private partnerships and improving the policy environment for sustainable and inclusive aquatic resources management.

SEAFDEC will be a key partner for the MARKET project through March 2015. The MARKET-SEAFDEC collaboration is envisioned as a partnership that complements the strengths of both entities to meet the shared objective of improving the sustainability of fisheries and aquaculture in the ASEAN region.

MARKET has worked since 2012 to establish the ASEAN Public-Private Taskforce for Sustainable Fisheries and Aquaculture (Taskforce) and continued engagement with key private sector and non-governmental stakeholders. The project brings an important dimension and perspective to the activities – namely, a private sector viewpoint. SEAFDEC's technical expertise and policy role in ASEAN on sustainable fisheries and aquaculture management provides a wealth of knowledge that forms a strong technical foundation and network by which the activities can be implemented.

The collaboration with SEAFDEC is exemplified by the following MARKET activities:

- *Institutionalize the Taskforce as an effective regional platform for partnership between ASEAN government officials, private sector and smallholder farmer/fisher stakeholders on key issues affecting the growth and sustainability of capture and inland fisheries and the aquaculture sector.* SEAFDEC has been appointed as the technical advisor to the Taskforce, which was endorsed by the ASEAN Sectoral Working Group on Fisheries (ASWGF_i) in October 2013. The Taskforce identified the following initial issues that MARKET will help to address through March 2015: (1) aquatic animal health and environment management; (2) sustainable feed development and management; and (3) promote the implementation of fishery improvement projects. MARKET will support up to three Taskforce meetings in coordination with the ASEAN Secretariat and SEAFDEC through March 2015.
- *Improve aquatic animal health management and promote successful models for disease prevention.* The MARKET project will identify and model private sector led and public-private approaches to disease prevention, harmonization of health certification and quarantine procedures governing live broodstock, and adoption of responsible environmental practices. In doing so, MARKET will collaborate with the ASEAN Network of Aquatic Animal Health Centers, NACA, SEAFDEC, private sector and farmer groups.
- *Promote the adoption of sustainable feeding management practices and development of quality feed in ASEAN.* SEAFDEC and MARKET will partner on a regional training and outreach program that will disseminate sound feed management practices and improve feed quality in high-value and economically important aquaculture species. SEAFDEC and MARKET will:
 - Assess feed management practices and research on feed development.
 - Implement a training program on better-feed management and use of substitutes for fishmeal for lead farmers and government representatives.
 - Build public-private partnerships to broaden outreach and training impact and to identify the priority research areas to develop quality and sustainable protein substitutes for fishmeal.
 - Establish a regional feed practitioner network in ASEAN for continuous communication on aquaculture feed management and research issues.



- *Form a regional public-private working group on sustainable fisheries under the Taskforce.* The working group will initially explore the development of an ASEAN fishery improvement project (FIP) protocol piloted for one fishery. The FIP protocol will serve as a tool that can help fisheries in the region to improve their sustainability and receive recognition for their commitment to further improvement. SEAFDEC's involvement will be critical for the development of the regional protocol and engagement of government to make available the information required. The working group can be used as a platform to engage private sector on other regional sustainable fisheries activities. The first stakeholder meeting will take place on the 16th December 2013 in Bangkok, Thailand bringing together ASEAN private sector, fisher group and NGO stakeholders to discuss regional solutions that can catalyze improvements in fishery practices and management, and to plan options for moving forward.

The expected outcomes of these activities are:

- 1) Taskforce maintained after 2015 as an effective public-private platform to coordinate the implementation of sustainable fisheries and aquaculture activities in ASEAN, supported by SEAFDEC and development partners.
- 2) Standard operating procedures for health certification and quarantine procedures for the live movement of disease prone aquaculture species in ASEAN developed.
- 3) Increased adoption of better feed management practices and reduced dependence of key aquaculture systems in ASEAN on fishmeal and fish oil.
- 4) ASEAN FIP protocol developed and tested, providing fisheries with a mechanism to take steps towards sustainability and receive some reward in the marketplace for their improvements.

The collaboration will start in December 2013 and continue through the end of the MARKET project in March 2015. SEAFDEC will provide technical inputs and in-kind support, and MARKET will provide financial, logistical, management and additional technical experts, for the implementation of these important activities.

STATEMENT

By *Dr. Pham Quang Minh*
ASEAN Secretariat

Program Committee Members,
Distinguished Guests,
Ladies and Gentlemen,

At the outset, I would like to congratulate and thank the SEAFDEC Program Committee to organize and invite us to the 36th Meeting of the SEAFDEC Program Committee. This event provides an opportunity for us to discuss and exchange our view on international cooperation in fishery sector at regional and international levels.

Fishery is recognized is an important sector within ASEAN, and contributes across the three pillars of the ASEAN Communities, including Political Security Community, Economic Community and Socio-Cultural Community. Under the sector of Agriculture, the Fishery sub-sector plays an important role in national and regional economies, especially tradable aspect as ASEAN export of fishery products continuously increased from US\$ 8,017 million (in 2007) to US\$ 11,004 (in 2011) with Indonesia, Thailand and Vietnam as lead exporters in the region while ASEAN import of fishery products increased from US\$ 3,104 million (in 2007) to US\$ 4,910 (in 2011) with Malaysia, Singapore and Thailand as lead importers¹. It means that the cooperation in enhancement of international trade within intra-extra ASEAN for the fish and fishery products need to be strengthened at the time.

As we all know, ASEAN-SEAFDEC collaboration has been formalized since the establishment of the Fishery Consultative Group in 1999 to promote sustainable management and utilization of fisheries resources in the South East Asian region and at the 29th AMAF Meeting in 2007, Secretaries General of the two organization signed in the Letter of Understanding for ASEAN – SEAFDEC Strategic Partnership (ASSP) to promote closer cooperation and support the implementation of ASEAN Policy on sustainable fishery for food security in the region. ASSP plays an important role in fulfilling the ASEAN Member States' commitments to the ASEAN ECONOMIC COMMUNITY Blueprints.

The strong mutual solidarity between ASEAN and SEAFDEC was well signified through the years. In this regard, I would like to recall some important achievements to be discussed by SOM-AMAF Leaders during Special SOM-34th AMAF, from 13-14, August in 2013 Pakse, Champasak Province, Lao PDR, including: initiative in the implementation of the Monitoring, Control and Surveillance (MCS) Scheme to Combat Illegal, Unregulated and Unreported (IUU) Fishing within the region; the work of technical/expert consultations with ASEAN Member States led to the agreement in principle to establish a Regional Fishing Vessels Record (RFVR) as a tool to combat IUU Fishing in the Southeast Asian region; the development of "ASEAN Catch Documentation System" to be supported by SEAFDEC, taking into consideration the concerns from the AMS with the engagement of major importing countries and etc. These activities are important for ASEAN, especially achieving key priorities endorsed by ASEAN Leaders under AEC 2015 for strengthening cooperation on prevention and control of illegal fishing.

We all noted that ASEAN-SEAFDEC cooperation has been further strengthened under the ASEAN-SEAFDEC Strategic Partnership mechanism (ASSP) since its inception and such a collaborative mechanism had benefited ASEAN Member States particularly in promoting sustainable fisheries and aquaculture in the region.

To further strengthen fishery cooperation between ASEAN and SEAFDEC, in the period 2014-2015, some activities need to be focused on, among others, as follows:

- *Food security arrangement:* Training on ecosystem approach and planning in capture fisheries and aquaculture; improving information system with better data collection, storage and dissemination;

¹ ASEAN Statistical Yearbook 2012



strengthening the capacity of fisheries communities to increase reliance, improve livelihood and alleviate poverty and adjust existing program to take into consideration the effect of climate change.

- *Enhance international competitiveness:* Strengthening fish quality and safety management system, encouraging the application of appropriate international standards as well as developing standards and guidelines for aquaculture product.
- *Strengthen ASEAN Cooperation on international and regional issues:* Implementing international standards with regard to trade on fish and fishery products; facility the mechanism to work towards common position; fostering cooperation between ASEAN Member State and international organizations in combating IUU fishing; implementing ASEAN guideline for environment – friendly and responsible aquaculture;
- *Accelerate the transfer and adoption of new technology:* Providing support for the development and application of technology that optimize the utilization of catches, reduce post-harvest loss, wastes and discards in commercial and small scale fisheries and small scale fishery fisheries and processing operations, through improved processing, facilities and infrastructure development, onboard and on-shore handling, storage, distribution and marketing of fish and fishery products.

In closing, on behalf of ASEAN Secretariat, I would like to congratulate and thank again SEAFDEC for organizing this event. I wish the Meeting great success.

Thank you very much.

STATEMENT

By Mr. Göran Haag

Sweden through the Embassy of Sweden in Bangkok, Thailand

Dear Friends,

I am very pleased to have been invited to this important meeting together with the Swedish Agency for Marine and Water Management, and for the possibility to make this statement.

It has been interesting to hear about the work performed during 2013, and it is really impressive. It is also clear that the work planned for 2014 will advance the work by SEAFDEC, and the SEAFDEC Member Countries as well as by ASEAN to make the fisheries and aquaculture sectors more sustainable in South East Asia. As presented earlier today, Sweden and SEAFDEC has recently agreed to continue our cooperation over the coming five years towards this overarching goal. The four project areas are:

- Coordination of fisheries and habitat management
- Management of fishing capacity
- Destructive and illegal (IUU) fishing
- Regional and sub-regional fisheries management mechanisms and agreements

These areas are fully in line with SEAFDEC's five working thrusts that were presented during this meeting.

The Project will focus on four sub-regions; The Gulf of Thailand, The Andaman Sea, The Sulu-Sulawesi Seas and The Mekong River Basin.

The ultimate target group of the project is the poor coastal and inland communities who face declining catches and increased competition and conflict over the use of natural resources in coastal and inland waters. Of major importance to sustainable use of marine and aquaculture resources is that "softer" issues like Gender equality (men, women and children) and rights issues, *e.g.* decent working conditions for fisher folks and employees in processing plants (mainly women). The project will give these issues the attention they deserve.

The private sector in fishing and aquaculture throughout the value chain (small scale fisher folk, large scale fishing companies, processing plants, traders, exporters, importers, supermarket chains etc.) are powerful "change agents". The majority of these small and large companies are interested in a long term and sustainable business, and they are the ones to follow and implement the regulations that follow from agreements between the countries in South East Asia as well as international agreements. Therefore is important to involve and consult them in the work on concrete measures towards sustainability, including technical work as well as policy making. A concrete example on this is the on-going cooperation between the Swedish company Abba Seafood (importer) and Thai processing plants (exporter) for sustainable fishing of Tongol Tuna. SEAFDEC has taken an expert and supportive role in this important work.

Even if most of the concrete work must be done on national level, this work must take its departure from regional cooperation. The simple reason is that the issues are shared and are complicated and complex. Sweden has a long and positive experience from such regional and sub-regional cooperation in the EU and Nordic context. The cooperation between Sweden and SEAFDEC has resulted in a range of resolutions, joint action plans and support to national efforts in addressing habitat and fisheries management and the management of fishing capacity. A fundamental aim behind the continued Swedish cooperation with SEAFDEC is to provide support for joint efforts by the Member Countries within the framework of regional cooperation.

SEAFDEC's Member Countries are ASEAN members or dialogue partner to ASEAN. Recently we got the promising information from the ASEAN-secretariat about SEAFDECs contribution to the implementation of the Blueprints within the preparations for the ASEAN Economic Community by 2015. To that end



Sweden encourage the SEAFDEC project that we support to engage and work with the ASEAN-secretariat, the relevant ASEAN Working groups and the ASEAN Member States. Sweden also encourages other Sweden-supported programmes like MFF and BOB/LME to do the same. This would be an effective way to make the most out of the resources and results from these programmes. For the same reason Sweden also encourage these programmes to link up with each other and cooperate. In fact, this is already taking place, *e.g.* in a joint training course at the AIT in Coastal Zone Management, in capacity building for restoration of mangroves and in facilitation of country to country dialogue on shared waters and coastal ecosystems.

Finally, we hope that Sweden's support could contribute to consolidate SEAFDEC's position as the ASEAN fisheries technical expert and advisory body, which would be timely, given the increased demands on ASEAN's future fisheries and aquaculture policies and regulations that could be anticipated from the formation of the 'ASEAN Community by 2015' and in the continued work towards AEC 2020. It is our strong belief that SEAFDEC, being a competent and strong expert-body, could strengthen this important work and generate a range of new opportunities for the Region's fisheries and aquaculture sectors.

Thank you for your attention!

STATEMENT

*By Mr. Robert Lee
Food and Agriculture Organization of the United Nations,
Regional Office for Asia and the Pacific (FAO/RAP)*

Honourable Secretary General of SEAFDEC, Dr. Chumnarn Pongsri,
Honourable Director General, Department of Fisheries Malaysia,
Distinguished Member Country Delegates to the SEAFDEC Programme Committee,
Ladies and Gentlemen,

On behalf of Hiroyuki Konuma, Assistant Director General and Resident representative, FAO Regional Office for Asia and the Pacific, I would like to thank SEAFDEC and our Hosts the Malaysian Department of Fisheries for the opportunity to participate in this 36th PCM.

The historic cooperation and collaboration between SEAFDEC and FAO dates back to the mid 1970's and the cooperative relationship was formalized by MOU on the 6th November 1998. With the recent addition of Singapore and Brunei Darussalam to the membership of FAO, we now have a common membership with SEAFDEC, which FAO expects to further improve the impact of our joint activities.

SEAFDEC merits high esteem for the diverse and important range of activities carried out by the organization and is commended for its wide technical contribution to its members.

Over the past year, the most significant cooperation between SEAFDEC and FAO has been the execution of the GEF funded regional trawl management project, "REBYC-II CTF". FAO places high importance on this project, and sincerely appreciates the strong support of the RFU in SEAFDEC TD. Our close collaboration with SEAFDEC in this project continues to contribute to SEAFDEC's Regional Programme on strengthening fisheries management and development advice to the region. FAO wishes to thank SEAFDEC for their hosting of the project and the large efforts made with their organizational capacity and technical assistance.

On behalf of the APFIC secretariat, I would like to thank SEAFDEC for their active participation in a number of regional consultative workshops with the Asia-Pacific Fishery Commission (APFIC), most notably was their the participation in and the contributions to APFIC Regional Guidelines for the management of tropical trawl fisheries in the Asian Region, held in Phuket, Thailand from the 30 September to the 04 October 2013, where 28 regional experts and resource persons from nine of the APFIC Member Countries participated.

On behalf, FAO, Fisheries Department, I wish to thank SEAFDEC for their generous and well organized hosting of the 2013 Annual Meeting of the ICES-FAO Working Group on Fishing Technology and Fish Behaviour (WGFTFB) at SEAFDEC/TD, from 6 to 10 May, 2013.

FAO very much appreciates SEAFDEC's involvement with the Secretariat of the Bay of Bengal Large Marine Ecosystem and with APFIC. FAO and BOBLME are sincerely hoping for stronger FAO-BOBLME-SEAFDEC collaboration in 2014, particularly in, the roll out of EAFM training of trainers course.

We are pleased to announce that the both the Ecosystem Approach to Fisheries and the Port State Measures Inspectors training courses are now completed and can be found on the APFIC website. In line with this, FAO invites SEAFDEC to consider scaling up of the Inspectors training courses in the region thereby leading to improved fisheries resources management and combating IUU.

As a close partner of SEAFDEC, FAO welcomes all opportunities for greater partnership, collaboration and mutual planning and to use this opportunity to secure funding from both national budgets and international

external donors for implementation for the ambitious 2011 SEAFDEC ASEAN resolution and plan of action and its main thrusts. We believe that building joint regional programmes could greatly enhance member state collaboration.

As we move into 2014, FAO envisages and hopes for very close collaboration on a number of areas, namely:

SEAFDEC's participation at the Committee of Fisheries 31st Session from 9 – 13 June 2014, in Rome and in the Regional Consultative Forum Meeting to be held in India in 2014.

We emphasize FAO's commitment to the smooth implementation of the REBYC-II CTI and to the successful upcoming mid-term evaluation due to take place in February 2014.

We also envisage follow up work on capacity building and looking into practical ways to start model ports and Port State Measures pilots in other countries in the region, particularly since the first model port with inspector training in Phuket has been started. The synergies between SEAFDEC's work on Port State Measures, Thailand's initiative in Phuket, the FAO's Global record of Fishing Vessels and Refrigerated Transport Vessels and the RPOA-IUU should be capitalized on to gain momentum in combating and eliminating IUU.

We also envisage joint collaboration in a training of trainers in EAFM, which a number of SEAFDEC and APFIC Member States have expressed interest. A training program in EAFM would include both capacity building in ecosystem approaches to marine fisheries management, as well as on the ground pilot planning of activities to strengthen fishery management under the ecosystem approach to fisheries. This would be highly complementary to the REBYC-II project and the forthcoming GEF/UNEP/SEAFDEC Fisheries *Refugia* project.

Once again, Mr. Secretary-General, I would like to thank SEAFDEC for the opportunity to participate as an observer in this 36th SEAFDEC PCM and to thank our hosts, the Department of Fisheries, Malaysia and its Ministry of Agriculture and Agro-Based Industry for providing their warm hospitality and for the arrangements which have been extended to FAO.

STATEMENT

By Mr. Ngor Peng Bun
Mekong River Commission (MRC), Fisheries Programme

Mr. Chairman, SEAFDEC Secretary-General,
Committee Members,
Delegates of SEAFDEC,
Ladies and Gentlemen, Good afternoon!

MRC Fisheries Programme is working with and helping its four Member Countries Cambodia, Lao PDR, Thailand and Viet Nam in implementing sustainable fisheries management and development at local, national and regional levels, thus, contributing to improve food security and nutrition, and to reduce poverty in the Mekong region, especially in rural areas. Currently, Myanmar and China are not MRC Member Countries, but they are dialogue partners for data and information exchange. Myanmar is willing to join MRC, and Myanmar's accession to MRC is under discussions among the 12 programmes of MRC and between MRC and Myanmar.

To contribute to the above goal, the Fisheries Programme has prepared a five-year Programme Implementation Plan 2011-2015 (F-PIP 2011-2015), which is currently being implemented by the Fisheries Programme and its national partner agencies. Financial support is granted by three main development partners DANIDA, SIDA and USAID. The F-PIP 2011-2015 has four main outcomes: (1) Riparian fisheries decision makers have a good *science-based understanding* of the situation of fisheries and aquaculture in the LMB; (2) Riparian fisheries *agencies monitor the status and trends* of fisheries and aquaculture; (3) Key stakeholders maintain a high level of *regional and national dialogue* on basin-wide IWRM for fisheries sustainability; and (4) National and local agencies and fishing communities have the **capacity** necessary for improving fisheries management and development.

Mr. Chairman, SG, SEAFDEC Program Steering Committee members, ladies and gentlemen!

Although SEAFDEC's program of activities implemented in 2013 and planned for 2014 *do not specifically focus on freshwater fisheries*, on behalf of the MRC Secretariat through its Fisheries Programme, I would like to draw your attention on three potential areas for future cooperation between MRC-FP and SEAFDEC and its Member Countries. They are: 1) Value and valuation of inland fisheries resources; 2) Impact mitigation measures of water development projects, including hydropower dams and irrigation schemes, *e.g.* fish passage; and 3) Exchange of data, information and knowledge on inland fisheries research, development and management. Cooperation in these important areas could be further explored, jointly planned and implemented with the new technical department, namely the Regional Centre for Inland Fisheries Development, which is currently being established in Indonesia under the overall framework of SEAFDEC.

Furthermore, approaches, methods and strategies for institutional strengthening of cross-border and trans-boundary fisheries management and development are highly relevant both for MRC and SEAFDEC Member Countries. MRC-FP, in close consultation with its national partner agencies are looking forward to enhanced exchange and dialogue on this topic. We think that relevant experiences and lessons learnt from SEAFDEC Member Countries in this respect can inform the process of developing a Basin-wide Fisheries Management Strategy for the Lower Mekong Basin.

Last but not least MRC FP would like to thank SEAFDEC for giving the MRC Fisheries Programme the opportunity to participate in this 36th Meeting of the SEAFDEC Program Committee. I would also like to take the opportunity to express my sincere appreciation and gratitude to the Department of Fisheries of Malaysia for the excellent arrangements and superb hospitality.

Thank you for your kind attention!

STATEMENT

By Dr. Rusty Brainard

U.S. National Oceanic & Atmospheric Administration (NOAA)

Potential Partnership between USAID-NOAA-DOI and SEAFDEC

U.S. National Oceanic & Atmospheric Administration (NOAA)
 U.S. Agency for International Development (USAID)/Regional Development Mission-Asia (RDMA)
 U.S. Department of the Interior (DOI)

Dr. Rusty Brainard, Dr. Kelvin Gorospe
 NOAA Pacific Islands Fisheries Science Center, Honolulu, Hawaii
 For information, please contact me at: rusty.brainard@noaa.gov

USAID-NOAA-DOI Partnership

- 5-Year Interagency Agreements between USAID & NOAA, & USAID & DOI to assist existing regional organizations, e.g. SEAFDEC, in promoting sustainable fisheries, combatting IUU fishing, & supporting continued success of CTI-CFF.
- NOAA & DOI are scientific & technical agencies of the U.S. Gov't
- Focus on regional, multi-national, trans-boundary technical assistance & capacity building.
- Also bilateral work with USAID missions in Indonesia, Philippines, and Timor Leste; possibly Vietnam and Myanmar in the future.

NOAA'S VISION OF THE FUTURE: RESILIENT ECOSYSTEMS, COMMUNITIES & ECONOMIES

Healthy ecosystems, communities, and economies that are resilient in the face of change

NOAA's Mission

Science: To understand and predict changes in climate, weather, oceans and coasts

Service: To share that knowledge and information

Stewardship: To conserve and manage coastal and marine ecosystems and resources

NOAA Line Office Organization

National Weather Service (NWS)
 Oceanic and Atmospheric Research (OAR)
 National Environmental Satellite, Data, & Information Service (NESDIS)
 National Ocean Service (NOS)
 National Marine Fisheries Service (NMFS)

SCIENCE
 SERVICE
 STEWARDSHIP

NOAA Fisheries

Vision: The American people enjoy the riches and benefits of healthy and diverse marine ecosystems.

Mission: Stewardship of living marine resources through science-based conservation and management and the promotion of healthy ecosystems.

Goal: Protect, Restore, and Manage the Use of Coastal and Ocean Resources Through an **Ecosystem Approach to Fisheries Management** (to balance economic, social, and ecological needs through effective governance).

Ecological Well-being
 Governance
 Human Well-being

Science - Service - Stewardship



NOAA Accomplishments Supporting CTI-CFF

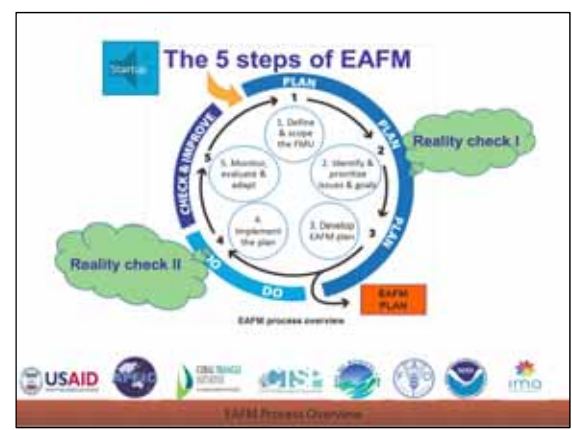
- Assisted development of EAFM Regional Policy Framework
- Supported EAFM Technical Working Group
- Assisted development of EAFM Regional Guidelines
- Conducted Transboundary IUU Exercises
- Training - Reef Fish Stock Assessment in Data Poor Conditions
- "EAFM LEAD" training for Leaders, Executives & Decision-makers
- Developed Essential EAFM Training-of-Trainers Curricula
- Developed guidelines for Climate & Ocean Change into EAFM
- Assisted in developing Fisheries Observer Program
- Monitoring Ecological Impacts of Ocean Acidification
- Assisted Indonesia in developing draft Fisheries Management Plan for Arafura Sea
- IUU & Port State Measures Training

SCIENCE. SERVICE. STEWARDSHIP. NOAA's Vision for the Future

NOAA Draft 2014 Work Plan

NOAA Activities and Deliverables	Description of NOAA Activities and Deliverables
1. Capacity Building	<ul style="list-style-type: none"> 1. Technical assistance and support for the CTI EAFM Technical Working Group Meeting 2. Revise Essential EAFM Training-of-Trainers Curricula (co-organized with FAO, CTFF, and the BOREAL) 3. Develop, finalize, distribute curricula for EAFM for Leaders, Executives, and Decision-makers (EAFM LEAD) 4. Regional EAFM partnership development Workshop with SEAFDEC 5. Conduct EAFM-IUU planning workshop for Sub-Followers Marine Ecosystems in other EPOA sub-region
2. Combat IUU Fishing	<ul style="list-style-type: none"> 1. Establish collaborative relationship with SEAFDEC 2. Regional Combating IUU Fishing Plan of Action - contingent on EPOA-IUU relationship building in FY14 3. Implementation of Regional Plan of Action - contingent on EPOA-IUU relationship building in FY15
3. Combat IUU Fishing	<ul style="list-style-type: none"> 1. Regional Forum in LRTT - Based on findings from Cebu 2013 Joint Target Development Teams (JDTs) 2a. Cebu-2 Develop the Threat assessments with the JDT utilizing GLE analyst assistance 2b. Cebu-3 Follow up to Cebu Workshops focusing on LRTT and Tertes
4. Science & Technology for sustainable fisheries	<ul style="list-style-type: none"> 1. Conduct ongoing assessment of innovative and evolving technologies to support sustainable fisheries management and combat IUU fishing 2. Develop aggregate multi-model (PCC CMIP5 climate & ocean change predictions layers to support regional vulnerability assessments for fisheries management

SCIENCE. SERVICE. STEWARDSHIP. NOAA's Vision for the Future



Outline: Incorporating climate and ocean change into an ecosystem approach to fisheries management (EAFM) plan

Section 1. Introduction

- 1.1 What is the purpose of this climate and ocean change sub-plan?
- 1.2 Who should use the guidelines?
- 1.3 How can the climate and ocean change guidelines be used?
- 1.4 An overview of the EAFM planning process
- 1.5 Scope of these guidelines

Section 2. How is the climate in the Coral Triangle expected to change?

Section 3. How might a changing climate affect fisheries in the Coral Triangle?

- 3.1 Habitat impacts
- 3.2 Biological impacts of temperature change on individuals, larval supply and population
- 3.3 Biological impacts of ocean change
- 3.4 Fisheries yield impacts
- 3.5 Sea level rise impacts
- 3.7 Socioeconomic impacts of climate and ocean change

Section 4. Climate and ocean change vulnerability assessment for an EAFM

- 4.1 Why do a vulnerability assessment?
- 4.2 What is vulnerability and how do you measure it?

Section 5. Including considerations of climate and ocean change into an EAFM (5 Steps)

- 5.1 Overview of the EAFM management cycle and its relevance to climate change
- 5.2 How do you include considerations of climate change and ocean change into an EAFM?

PMU-STEP PLAN (Steps 1-5)
NO (Steps 6-8)

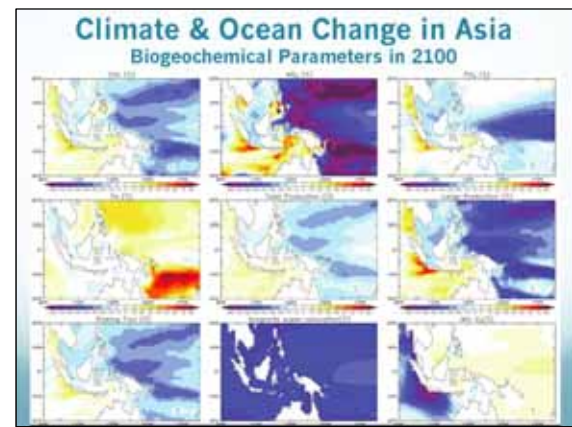
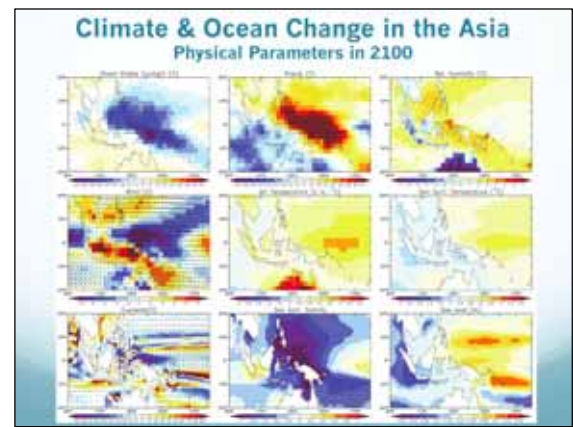
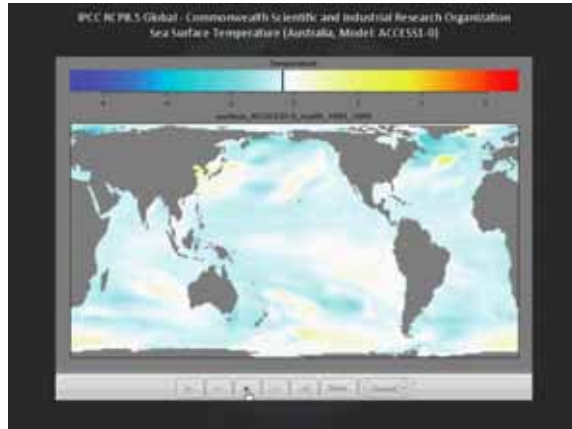
Section 6. Building up

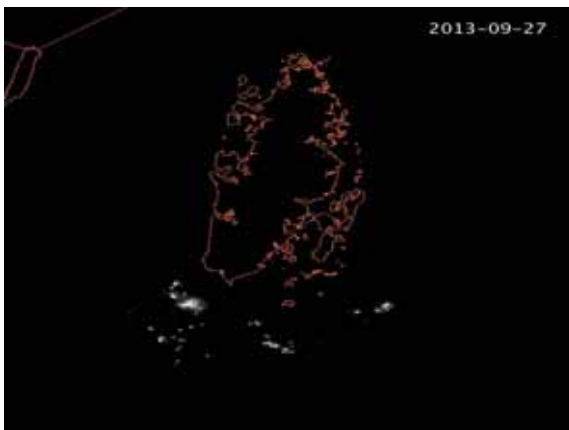
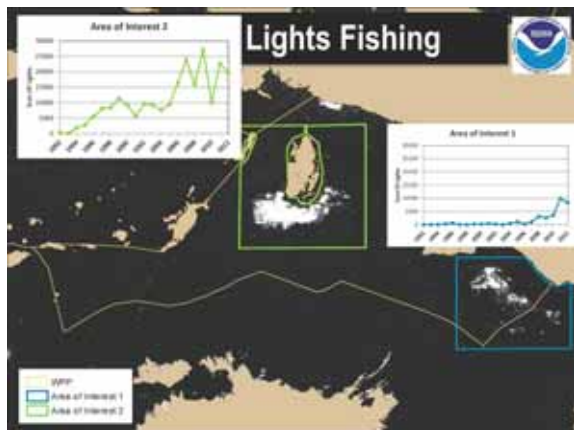
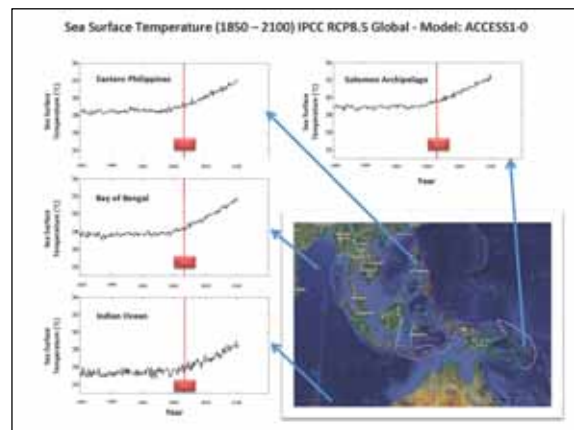
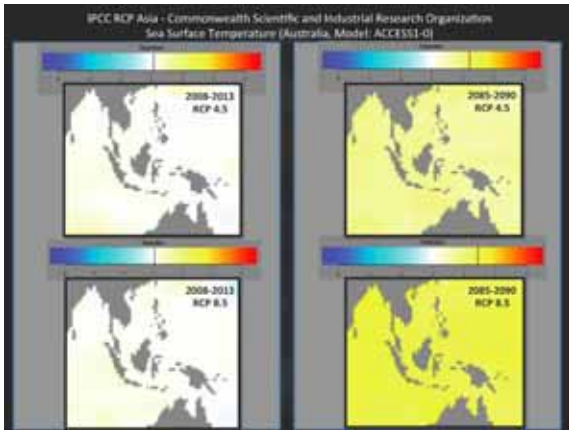
Section 7. Adaptation options: a practical framework

Section 8. Monitoring

Section 9. What can be done at national and regional levels to support nationally led climate change adaptation within an EAFM?

- 9.1 National level actions
- 9.2 Regional level actions





Thank you!

Questions!

SCIENCE SERVICE STEWARDSHIP NOAA's Mission for the Future
Rusty.brainard@noaa.gov

CLOSING REMARKS

*By Dr. Chumnarn Pongsri
SEAFDEC Secretary-General*

Distinguished Members of the SEAFDEC Program Committee,
SEAFDEC Senior Officials,
Representatives from our Collaborating Partners,
Ladies and Gentlemen, Good Evening!

After what seems to be three long days of deliberations on the SEAFDEC programs and important issues, we have come to the end of the Thirty-sixth Meeting of SEAFDEC Program Committee. On behalf of the SEAFDEC Secretariat and Departments, I would like to express our sincere gratitude to all of you for providing us with meaningful ideas, comments and suggestions on the various points discussed, and for other contributions that make this Meeting achieve its objectives. I would also like to thank our staff from MFRDMD and the Secretariat who worked hard to make this Meeting successful.

As you are already aware of, your valuable inputs and recommendations with respect to the projects and activities of SEAFDEC, adopted at this Meeting would be presented to the next Meeting of the FCG/ASSP and to the forthcoming SEAFDEC Council Meeting as appropriate, for final endorsement. We must recall that during our three-day discussion, a wide range of issues on the SEAFDEC programs had been put forward especially with regards to the appropriateness and effectiveness of the program implementation in response to the needs and requirements of the Member Countries. SEAFDEC is therefore thankful to all of you for your efforts.

As expressed earlier, the outputs and recommendations from this Meeting will be deliberated on during the FCG/ASSP Meeting starting tomorrow until Friday. Suggested changes relevant to the implementation of the programs will be presented to the next Meeting of the SEAFDEC Council for approval and inclusion in the overall activities of SEAFDEC.

At this juncture, I would like to offer once again our heartfelt thanks to all of you for your contributions. For those who will leave this beautiful city before the FCG/ASSP Meeting, I wish you safe journey back to your homes. To the rest, I will see you during the FCG/ASSP Meeting. Finally, I would also like to express our wish for the best and every success in the challenges entrusted on us. With that note, I now declare the Thirty-sixth Meeting of the Program Committee closed. Thank you.