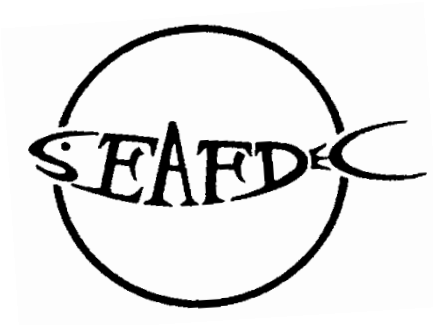


**REPORT OF
THE THIRTY-FOURTH MEETING OF THE PROGRAM COMMITTEE
OF THE SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**

**Manila, the Philippines
14 – 16 November 2011**



**THE SECRETARIAT
SOUTHEAST ASIAN FISHERIES DEVELOPMENT CENTER**

PREPARATION AND DISTRIBUTION OF THIS DOCUMENT

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EXECUTIVE SUMMARY

The Thirty-fourth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center (SEAFDEC) was held in Manila, Philippines from 14 to 16 November 2011 and hosted by the Aquaculture Department (AQD). The objective of the Meeting was to review the SEAFDEC programs implemented in 2011 and scrutinize the programs to be implemented in 2012, to ensure that the programs are formulated and implemented in line with the priorities and needs of the Member Countries. The Meeting was chaired by the Secretary-General of SEAFDEC in his capacity as the Chairperson of the SEAFDEC Program Committee.

The meeting took note of the 37 programs implemented by SEAFDEC in 2011 which have been classified into: nine Departmental Programs, 25 Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism; and three Other Programs. Meanwhile, the meeting endorsed the 39 programs proposed to be implemented in 2012, comprising nine Departmental Programs, 27 Programs under the FCG/ASSP, and three Other Programs. During the Meeting, the Committee made recommendations to better address emerging issues and to ensure that the programs are appropriately linked with the 2011 Resolution and Plan of Action. More particularly, the new Departmental Programs of AQD which were proposed to be conducted starting in 2012 had been reformulated from commodity-based into thematic-based to be in line with the aquaculture-related provisions in the 2011 Resolution and Plan of Action.

Taking into account the challenges confronting the aquaculture sector (*e.g.* impacts of climate change, diseases and market pressures), aquaculture would remain very promising especially in addressing food security provided that it is sustained and maintained in an eco-friendly manner. In this regard, AQD was asked to put more efforts in reducing dependence on fishmeal as main source of feeds by finding plant-based substitutes. Moreover, while recognizing the importance of small-scale aquaculture enterprise as tool for poverty alleviation in rural areas, outputs of relevant research activities and aquaculture technologies should be disseminated in accessible media while publications and pertinent technical papers should be disseminated through the SEAFDEC mechanism in order to enhance their accessibility.

Furthermore, some important freshwater fish species should be considered for R&D in aquaculture development, while studies on organic aquaculture should also be conducted to address the rising demand for organically produced aquaculture commodities. In addition, the training programs implemented by AQD should be evaluated to ensure their effectiveness. In the formulation and conduct of aquaculture R&D activities, AQD should look into relevant studies conducted by other organizations to avoid possible duplication of efforts and in order that the conduct of activities would not start from scratch. Specifically, AQD should collaborate with the Network of Aquaculture Centres in Asia-Pacific which had been promoting “pellet feeds” to small-scale aquaculture farmers.

With due considerations of the species cultured, sources of phyto-proteins should also be carefully studied in terms their applicability, protein efficiency, protein digestibility, and availability. AQD was also requested to provide technical assistance for the development of rural aquaculture in Member Countries particularly Myanmar. With regards to the program on **Improvement of Fisheries Technology and Reduction of the Impacts from Fishing** conducted by TD, the possibility of conducting fish handling activities onboard Indonesian vessels should be considered. Meanwhile, translation of publications into local languages especially on awareness building should be promoted for wider distribution of such materials to various levels of audience.

The Committee endorsed the 27 Programs under the FCG/ASSP for the Year 2012 which comprise 24 programs continued from 2011 and another three new programs. The Committee noted that project on “ASEAN-SEAFDEC Conference on Sustainable Development of Fisheries and Food Security Towards 2020” was completed in 2011.

Under the Program on **Assistance for Capacity Building in the Region to Address International Trade-related Issues**, SEAFDEC was requested to conduct in-depth study on the impacts of the EC regulations especially on small-scale fisheries, taking into account the experience of the Member Countries that already implemented the EC regulations, where the positive results could be used as basis for other countries to comply with and implement such regulations in the future, while the negative results could be used as reference in future discussions and negotiations with EC for possible adjustment/modification of the regulations. Moreover, experts from the Member Countries should be invited to share their experiences on the implementation of the EC regulation during the Regional Technical Consultation (RTC) on International Fisheries Trade-related Issues in 2012. On issues related to combating IUU fishing including Global Record of Fishing Vessels which are associated with trade measures, SEAFDEC was requested to coordinate with RPOA-IUU Secretariat for the development of the guidelines on reducing IUU fishing which could be made compulsory for the region. This is in line with the other FCG/ASSP program on **Promotion on Fishing License, Boats Registration and Port State Measures** in which SEAFDEC was also requested to consider using the FAO Expert Consultation Report on FAO Global Record on Fishing Vessels as reference, and that sharing of information should be promoted among the Member Countries and capacity building should be carried out to make the Member Countries ready for the implementation of the Port State Measures, and in addressing issues related to catch certificate.

For the programs under the **Information Collection of Highly Migratory Species in Southeast Asia Waters: focusing Tuna**, and **Resource Enhancement of International Threatened and Over-Exploited Species in Southeast Asia through Stock Release**, Myanmar requested SEAFDEC to provide assistance on the stock assessment of tuna species in Myanmar waters and also to assist in breeding and culture of seahorse, mud crab and sea cucumber for conservation purposes. Meanwhile, AQD was requested to provide technical assistance on the mariculture of sea bass, sea cucumber and seahorse as well as on other modern techniques for fish culture. Furthermore, regional technical cooperation and HRD on stock assessment of selected aquatic species and on commercially-exploited aquatic species such as hilsa, Indian mackerel, sharks, tuna, sea cucumber, and seahorse among others, should also be carried out under the Program on **Promotion of Sustainable and Region-Oriented Aquaculture Practices**.

With regards to the program on **Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region**, the Member Countries had been requested to submit updated fishery statistics based on the Regional Framework for Fishery Statistics of Southeast Asia in more timely manner, and ensure the accuracy of capture data through the focal point persons of the ASEAN Fisheries Statistics Network. In this connection, SEAFDEC was also requested to keep the National Coordinators informed when following up such concern with the focal point persons. Nevertheless, even if the SEAFDEC Fishery Statistical Bulletin may not be published on time, SEAFDEC should consider facilitating the dissemination of available statistics through the SEAFDEC website based on the online database of SEAFDEC.

Concerning the use of the M.V. SEAFDEC 2 under the program on **Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2**, the Member Countries were encouraged to make full use of the M.V. SEAFDEC 2 especially in conducting surveys and exploration activities to be able to compile valuable data that are useful for the analysis of the respective countries' fishery resources. The low utilization of the M.V. SEAFDEC 2 could affect the conduct of collaborative projects such as the program on **Fisheries Resources Exploration in the Southeast Asia Including Deep Sea Program** which aims to establish the status of the fishery resources in this region. In this connection, SEAFDEC was requested to conduct activities on deep sea fishery

resource exploration in the waters of Myanmar and provide relevant information that could be used as basis for the Department of Fisheries of Myanmar to plan its deep sea fisheries resource exploration activities in the future.

For the program on **Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement**, experts should be engaged to assist Thailand in improving the installation of artificial reefs (ARs) including the appropriate design of ARs and in evaluating the fishery resources around ARs before and after their installation, while the published outputs from R&D on artificial reefs undertaken in Malaysia with various objectives such as preventing trawlers from fishing in coastal areas as well as enhancing the fishery resources and habitats, could be used as reference. Since Malaysia has been conducting studies on the effectiveness and impacts of ARs to the livelihood of fishers, local researchers and engineers from Malaysia working on ARs could be invited to serve as resource persons in any planned SEAFDEC workshop on resource enhancement.

With regards to the program on **Promotion of Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management**, SEAFDEC should collaborate with international organizations such as the FAO for its Regional Fisheries Livelihood Programme (RFLP) in order to optimize resources and avoid duplication of efforts in implementation of related activities, especially in the promotion of alternative livelihood and in addressing gender issues. In addition, SEAFDEC was requested to support capacity building activities aimed to enhance the knowledge of fisheries officers of the Member Countries on the concept and theoretical framework of co-management and rights-based fisheries for fisheries resource management.

The Committee took note of the **three new programs under the FCG/ASSP** proposed for the 2012, namely: 1) Climate Change and Its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation Towards Food Security; 2) Enhance Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management; and 3) Strategies for Trawl Fisheries By-catch Management.

For the program on **“Enhance Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management”**, the proposal has been submitted to the Islamic Development Bank (IDB) in 2007 and is expected to be officially approved for funding by the IDB starting in 2012. To complete the procedure for official approval of the proposal by the IDB, the ASEAN Secretariat was asked to coordinate with SEAFDEC and the eligible participating countries for the remaining processes to facilitate the implementation of the project in 2012.

For the program on **Climate Change and Its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation Towards Food Security**, the ASEAN-US Technical Assistance and Training Facility (AU-TATF) has planned to conduct a meeting as an initial activity tentatively in February 2012, to discuss and formulate the activities that should be undertaken under this program. However, financial support to be provided by the AU-TATF for the conduct of future activities would be based on the outputs and recommendations of the said initial meeting.

The Other Programs proposed for 2012, comprise three continuing programs from 2011, namely: 1) Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program; 2) Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches; and 3) Safety at Sea for Small Fishing Boats. In this regard, SEAFDEC/TD is requested to consider expanding its HRD activities to include the coastal areas of the countries under the “Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches”. In addition, the guidelines on safety at sea for small

fishing boats which had been published in the Thai language should be translated into other languages of the Southeast Asian region.

The Meeting took note of a pipeline project on the **Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand (UNEP/GEF/SCS)** which is still under discussion and negotiation with potential donor agencies. Due to the changes in the GEF funding component of the program, the proposal was revised by SEAFDEC and submitted to UNEP in June 2011. In this regard, the Member Countries were requested to submit their respective letters of endorsement to UNEP by the end of 2011 so that UNEP could submit the proposal to GEF for project approval. As the submission process for funding support from GEF has been prolonged for several years, the SEAFDEC Secretariat was requested to follow up with UNEP and keep the Member Countries informed on the status of the project proposal.

With regards to the development of “**The Southeast Asian State of Fisheries and Aquaculture (SEASOFIA)**” which was submitted to the Program Committee for consideration, the representative from FAO/RAP suggested that if the publication could be finished within six months before the next COFI meeting, this could be very useful to facilitate the preparation of the global review as this publication is expected to reflect a science-based analysis of the fisheries at the regional level. In addition, SEASOFIA could also support the development of the State of Fisheries and Aquaculture (SOFIA) by FAO as well as enhance the rationalization of fisheries information of the region which could be properly reflected in the global perspective. In this regard, SEAFDEC was also requested to consider developing this publication periodically and on a regular basis.

On the Program/Activities Structure of SEAFDEC, an apprehension was expressed that some activities could have been misclassified and conducted by Departments that were not supposed to carry out such activities in accordance with their functions. In addition, some activities which are of common interest to Member Countries such as tuna fisheries and IUU fishing, among others, could be grouped in the report so that a clearer picture of the situation of such fisheries and practices in the region would be clearly understood. In such a situation, the Agenda of the Program Committee Meeting could be restructured in order that reporting of activities could be grouped based on the Program Thrusts of SEAFDEC.

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

14 – 16 November 2011, Manila, the Philippines

I. INTRODUCTION

1. The Thirty-fourth Meeting of the Program Committee of the Southeast Asian Fisheries Development Center (SEAFDEC) was held in Manila, Philippines from 14 to 16 November 2011 and hosted by the Aquaculture Department (AQD).

2. The Meeting was attended by the National Coordinators from Brunei Darussalam, Cambodia, Indonesia, Japan, Lao PDR, Malaysia, Myanmar, Philippines, Singapore, Thailand, and Vietnam as members of the Program Committee together with their respective delegations as well as the representatives from the FAO Regional Office for Asia and the Pacific (FAO/RAP) and the Association of the Southeast Asian Nations (ASEAN) Secretariat. The SEAFDEC Secretary-General, Deputy Secretary-General and Department Chiefs together with officers from the SEAFDEC Secretariat and the Departments also attended the Meeting. The list of participants 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 thanked the Aquaculture Department for hosting and making the arrangements of the Meeting. He cited the year 2011 as a momentous year because of the successful organization of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment” in June 2011, and specifically emphasized on the adoption of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 during the Conference by the SEAFDEC-ASEAN Ministers responsible for fisheries. After stressing on the reformulation of the Departmental Programs of AQD and TD as well as the development of the Southeast Asian State of Fisheries and Aquaculture (SEASOFIA) which has been initiated by the SEAFDEC Secretariat in collaboration with the Departments, he declared the Meeting open. His Opening Remarks appears as **Annex 2**.

III. ADOPTION OF THE AGENDA AND ARRANGEMENT OF THE MEETING

4. After considering the request of the Committee Member for Indonesia to include in Agenda 6.2 under Other Matters the “Expert Consultation on Effective Surveillance and Law Enforcement to Combat IUU Fishing from 5 to 8 December 2011 in Jakarta, Indonesia”, the Committee adopted the Agenda of the Meeting, which appears as **Annex 3**.

IV. MATTERS RELATED TO SEAFDEC PROGRAMS

4.1 2011 Resolution and Plan of Action and Linkage to SEAFDEC Existing Programs and Program Framework

5. While taking note of the list of SEAFDEC programs for the year 2011-2012 as presented by the Policy and Program Coordinator of SEAFDEC (**Annex 4**), which have been categorized in accordance with the SEAFDEC Program Framework taking into consideration the linkage of the programs with the 2011 Resolution and Plan of Action, the Committee suggested that relevant activities at the national level should also be linked to the 2011 Resolution and Plan of Action.

6. Moreover, the Committee Member for Cambodia requested SEAFDEC in coordination with the Member Countries, to facilitate the reporting of the implementation of the 2011 Plan of Action. In this regard, a report format highlighting the activities implemented by the Member Countries should be developed.

7. The Committee Member for Malaysia also informed the Committee that the Department of Fisheries Malaysia had conducted a national workshop on the 2011 Resolution and Plan of Action. He added that the results of the workshop indicating the proposed projects and activities to be conducted in line with the implementation of the 2011 Resolution and Plan of Action would be submitted to the Government of Malaysia for funding support.

8. The Committee Member for Cambodia added that as the country's gesture of support to the implementation of the 2011 Resolution and Plan of Action, such instruments had been translated into the Khmer language for wider dissemination and to enable the stakeholders to implement relevant activities at the national level. He also mentioned that the progress of the relevant activities would be reported to the Ministry of Agriculture and Forestry of Cambodia and other policy making bodies.

9. The Committee Member for Myanmar informed the Committee that the Department of Fisheries of Myanmar would implement the 2011 Resolution and Plan of Action according to the prioritized areas of fisheries-related issues to support the promotion of sustainable fisheries, food security and food safety in the country, line with the efforts at regional level.

10. While noting that the implementation of the 2011 Resolution and Plan of Action has different layers of activities at local, national and regional levels, the Committee specified that the Member Countries would implement the local and national activities, while SEAFDEC would focus on regional activities to support the Member Countries during the implementation of the 2011 Resolution and Plan of Action.

11. The Secretary-General of SEAFDEC commended the Member Countries for their efforts in promoting the 2011 Resolution and Plan of Action as such initiatives demonstrated their keen sense of ownership of such instruments. In this regard, the assistance of SEAFDEC especially on the technical aspects could also be sought by the Member Countries during the implementation of the 2011 Resolution and Plan of Action.

4.2 Priorities Identified in the Third SEAFDEC Review Exercise

12. The Preliminary Report containing the Member Countries' Views on the Expected Roles, Functions and Activities of SEAFDEC as part of the Third SEAFDEC Review Exercise (**Annex 5**) was presented by the Information and Program Coordinator of SEAFDEC. In this connection, the Committee Member for Singapore reiterated that as proposed during the 43rd Meeting of the SEAFDEC Council, the review should be done in conjunction with the assessment of the Plans of Operation of the Departments and that the review should be conducted by an independent entity. While sharing such concern, the Committee Member for Malaysia suggested that such review should also reflect the directives of the Council Directors.

13. While noting the preliminary output of the Review, the Committee Member for the Philippines suggested that in the process of reviewing the Plans of Operation of the Departments, the roles and functions of SEAFDEC should also be enhanced to ensure that the requirements of the Member Countries are addressed. In addition, the Committee Member for Vietnam requested that future activities to be undertaken after the preliminary review should also be developed.

14. With regards to the Preliminary Report, the Committee Member for Malaysia suggested that based on the countries' views, the SEAFDEC Secretariat should propose the next course of action to pave the way for the decision of the SEAFDEC Council. Furthermore, the Committee Member for Indonesia also suggested that the report to be submitted to the Council Directors should be short and precise indicating only the priorities identified by the Member Countries. In response, the Committee was informed that the initial results of the preliminary review had already been submitted for comments by the Council Directors after which their comments would be incorporated in the report of the preliminary review which would be submitted to the Member Countries for appropriate guidance especially on ways and means of improving the activities of SEAFDEC, taking into consideration the recommendations made at this Program Committee Meeting.

4.3 Introduction of Japanese Trust Fund Projects 2011-2012

15. The Japanese Trust Fund (JTF) Projects for the Year 2011-2012 (**Annex 6**) was presented by the Assistant Japanese Trust Fund Manager of SEAFDEC. In addition, the Committee Member for Japan provided supplementary information that some projects under the JTF II would be terminated in 2012 except the projects under the component on 'Promotion of Sustainable Fisheries and IUU Fishing Related Countermeasures in Southeast Asia'. He also informed the Committee that in spite of Japan's financial constraints, the Fisheries Agency of Japan would exert efforts to source additional funding from the Government of Japan to enable SEAFDEC to implement projects that would address emerging issues such as energy-saving in fisheries and safety at sea.

V. REVIEW OF SEAFDEC PROGRAM IMPLEMENTATION FOR THE YEAR 2011 AND PROPOSED PROGRAMS FOR THE YEAR 2012

5.1 Departmental Programs

16. The Committee was informed on the reformulation of Departmental Programs of AQD and TD where the Departmental Programs of AQD had been changed from commodity-based to thematic-based programs to be aligned with the Aquaculture Component of the 2011 Resolution and Plan of Action. Under the revised format, AQD would implement programs and activities under five thematic areas, namely: 1) Adapting to Impacts of Climate Change; 2) Healthy and Wholesome Aquaculture; 3) Maintaining Environmental Integrity through Responsible Aquaculture; 4) Meeting Socio-economic Challenges in Aquaculture; and 5) Quality Seeds for Sustainable Aquaculture. On the other hand, the Departmental Programs of TD would emphasize on enhancing regional fishery information systems and mechanisms to facilitate the sharing, exchange and compilation of information as well as on research and development aimed at improving fisheries technology to reduce the impacts of fishing to the environment.

17. While considering the progress and achievements in the implementation of SEAFDEC Departmental Programs in 2011 and the proposed activities for 2012 (**Annex 7**), the Committee provided recommendations for the improvement of the programs and endorsed the programs including the reformulation of the Departmental Programs of AQD and TD, taking into consideration the recommendations made at this Program Committee Meeting.

• SEAFDEC Secretariat

18. The Committee took note of the program on "**Center-wide Information Network**" which is aimed at keeping the Member Countries, stakeholders, and other organizations well informed on the programs and activities of SEAFDEC; raising public awareness and improving the visibility of SEAFDEC; providing various forms of information to support development of the fisheries sector; and enhancing coordination and communication between SEAFDEC and other concerned parties.

• Training Department

19. The Committee noted the program on "**Information and Communication Technology**" implemented by the SEAFDEC/TD, which also aimed to enhance the visibility of SEAFDEC. In this regard, several forms of information materials such as the TD Newsletter, technical reports, e-books, among others, had been produced and disseminated to the Member Countries and other organizations. Moreover, the Committee was also informed that the source of funds to implement the Departmental Programs of SEAFDEC/TD comes from counterpart funds provided by collaborating partners such as the Government of Thailand, Fish Marketing Organization of Thailand, National Agriculture Training Center of Malaysia, and other donors.

20. For the Program on "**Improvement of Fisheries Technology and Reduction of the Impacts from Fishing**", the Committee Member for Indonesia while recognizing the importance of some aspects of the program to Indonesia especially on the improvement of fish handling onboard fishing vessels through the use of sherbet ice and exhaust heat recirculation for energy optimization in refrigeration onboard fishing vessels, suggested that SEAFDEC should also consider the possibility of

conducting such activities onboard Indonesian vessels. He added that the TD publication “Story of a boy named Por” had been translated into Bahasa Indonesia by the current member of the Regional Fisheries Policy Network (RFPN) for Indonesia and has been made ready for printing, however, the name “Por” had been changed into a local name. He also suggested that similar publications could be translated by the Member Countries into their respective local languages for distribution to a wider audience.

21. On “**Tailor Made Training and Study Tour**”, the representative from FAO/RAP commented that since TD functions as the Training Center for the region, inputs for such training programs should be broadened by considering possible support from several partner organizations. He added that FAO could collaborate with SEAFDEC in this aspect, more particularly on the training program on Ecosystem Approach to Fisheries (EAF) as well as on other programs that are aimed at enhancing regional capacity building.

- **Aquaculture Department**

22. The Committee was informed on the highlights of several programs/projects undertaken by AQD in 2011, which include Marine Fish, Small-holder Freshwater Aquaculture, Mollusk (Abalone), Mud Crab and Shrimp Domestication, Seaweed Strain Improvement, and Aquatic Ecology. AQD also informed the Committee on the various training activities, technology verification and extension services conducted in 2011. Furthermore, AQD also presented the results of its 2011 in-house strategic planning workshop following the outputs of the Fish for the People 2020 Conference. In this connection, the Committee was informed that starting 2012, AQD would shift from commodity-based to thematic programs taking into consideration the 2011 Resolution and Plan of Action.

23. Under marine fish program, research activities focused on improving seed production of selected marine fish species, developing plant-based substitutes for fish meal in aquafeeds, promoting fish health management strategies, and examining the effects of temperature rise to aquaculture species. On freshwater aquaculture program, the activities included the development and refinement of techniques on seed production and domestication/selective breeding of freshwater aquaculture species. For the mollusk program, activities focused on abalone broodstock development, seed production, selection of high-growing lines, and conduct of demonstration hatcheries. On the other hand, the mud crab and shrimp program entailed the domestication and selective breeding, and refinement of feeding and water management strategies in larval rearing, while the seaweeds program involved activities in improving high profit-yielding strains for aquaculture. Furthermore, the aquatic ecology program included activities on impact assessment of aquaculture practices to the environment and development of bio-remediation techniques to improve water quality in aquaculture media.

24. Moreover, the Committee was also informed on the training programs conducted by AQD during the last 10 years (2002-2011) which received participants from forty-eight countries including the 11 SEAFDEC Member Countries. Considering such accomplishment, the Philippine Bureau of Fisheries and Aquatic Resources (BFAR) has concluded an agreement with AQD for the conduct of ‘Trainers’ Training on Culture of High-value Aquatic Species’ with the participation of all extension workers from the Regional Fisheries Training Centers (RFTC) of BFAR who will then serve as technical experts for the transfer of the various technologies to all stakeholders in the country.

25. While commending the well-implemented programs being embarked by AQD, the Committee made several recommendations to better address emerging issues and link such programs with the 2011 Resolution and Plan of Action. Specifically, the Committee Member for Myanmar cited that despite the challenges confronting the aquaculture sector (*e.g.* impacts of climate change, diseases and market pressures), it still remains very promising especially in addressing food security provided that it is sustained and maintained to be eco-friendly. In this regard, he suggested that more efforts should be made in reducing the dependence of the sector on fish meal as main source of feeds by finding plant-based substitutes. He also requested that feeds for soft-shell mud crab should be developed by AQD, and recognizing the importance of small-scale aquaculture enterprise as tool for poverty alleviation in the countryside, he further suggested that dissemination of relevant aquaculture technologies should be given more emphasis in the relevant programs and activities of AQD.

26. The Committee Member for Lao PDR requested AQD to consider including some important freshwater fish species for its R&D activities, while the Committee Member for Indonesia also requested AQD to make available the outputs of its research activities and the pertinent technical manuals in accessible media for the benefit of the Member Countries. Specifically, he also suggested that AQD should consider disseminating its publications and pertinent technical papers through the SEAFDEC mechanism in order to enhance their accessibility. On the other hand, the Committee Member for the Philippines suggested that AQD should also consider conducting studies on organic aquaculture to address the rising demand for organically produced aquaculture commodities. As for training activities, he also suggested that an evaluation of the AQD training programs should be undertaken to ensure their effectiveness.

27. The Committee Member for Myanmar informed the Committee that Myanmar is considering the non-mandatory issues on reduction of fish meal in aquafeeds. Although aquaculture in Myanmar had been using raw plant ingredients for feeds such as rice bran, broken rice and peanut cake for a long time, the Department of Fisheries of Myanmar has also considered the potentials of using fish meal as major component of the ingredients in formulated feeds. However, since the sustainability of capture fisheries is not ensured, Myanmar also agreed to promote the substitution of phyto-protein in feeds using soybean. Nevertheless, he added that in order to facilitate the introduction of such technology to the farmers, field demonstration through pilot farms should be conducted by making use of the intensified technology developed by AQD.

28. Regarding the dissemination of research publications, AQD informed the Committee that relevant information on results from its research results could be accessed through the AQD website as well as through the SEAFDEC/AQD Institutional Repository (SAIR) in downloadable formats. On the issue of aquafeeds, AQD cited that feeds formulation for soft-shell mud crab culture would vary depending on availability of materials in a locality. Nonetheless, the feeds for mud crab formulated by AQD could also be applied for any crab culture in general.

29. The Committee also suggested that in the formulation and conduct of R&D activities, AQD should look into relevant studies conducted by other organizations to avoid possible duplication of efforts and in order that the conduct of activities would not start from scratch. In addition, sources of phyto-proteins should be carefully studied with considerations on their applicability, protein efficiency, and protein digestibility to culture species, as well as their availability. The representative from FAO/RAP informed the Committee that FAO and the Network of Aquaculture Centres in Asia-Pacific (NACA) had embarked on the promotion of “pellet feeds” which had been piloted with small-scale aquaculture farmers with positive results. He therefore suggested that AQD should collaborate with NACA to improve the results of relevant pilot studies taking into consideration the maximum utilization of fishery by-catch.

30. Furthermore, the Committee Member for Myanmar informed the Committee that the current Government of the Republic of the Union of Myanmar has considered rural development and poverty alleviation as high priority in the country’s development plan, and that small-scale aquaculture has been considered crucial for the rural people in the coastal and central dry zone areas of the country, specifically in the establishment of community-based organizations. He then requested AQD to provide technical assistance especially for the development of rural aquaculture in Myanmar. While considering that aquaculture is facing various challenges brought about by climate change, he suggested that appropriate technologies for adaptation should be studied in the context of pond designs, species selection, as well as on aquafeeds and health management. In this connection, he also proposed that the impacts of climate change on aquaculture should be assessed by a regional body.

5.2 Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism

31. The Committee considered and endorsed the progress and achievements in the implementation of the programs under the Fisheries Consultative Group Mechanism of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) in 2011 and the activities proposed for 2012 (**Annex 8**).

- **SEAFDEC Secretariat**

32. For the Program on “**Assistance for Capacity Building in the Region to Address International Trade-related Issues**”, the Committee suggested that SEAFDEC should conduct in-depth study on the impacts of the EC regulations especially on small-scale fisheries. SEAFDEC was also requested to develop a methodology of obtaining data and information on the experiences of Member Countries that have already implemented the EC regulations in order that the positive results could be used as basis for other countries in complying and implementing the said regulations in the future. Meanwhile, the negative results could be used as reference in future discussions and negotiations with EC for possible adjustment/modification of the regulations. In this connection, the Committee requested SEAFDEC to convey the concerns of the region to the FAO Sub-committee on Fish Trade and FAO COFI which would be convened in 2012. The Committee was also informed that SEAFDEC Secretariat has conducted in 2009 a review on the implementation of the EC regulations. However, since at that time most of the Member Countries had just started the implementation of the regulations, the SEAFDEC Secretariat would consider following-up and compiling the updated progress of implementation of the EC regulations by the Member Countries. In this regard, the Member Countries were requested to provide the necessary inputs for the analysis which would be carried out by the SEAFDEC Secretariat.

33. Moreover, with regards to catch certification as a requirement for complying with the EC regulations, the Committee Member for Malaysia requested SEAFDEC to consider inviting experts from the Member Countries which had already received the EU Evaluation Mission Report to present their cases and share their experiences during the proposed Regional Technical Consultation (RTC) on International Fisheries Trade-related Issues in 2012. SEAFDEC was also requested to conduct a study that would address the issues on Global Record of Fishing Vessel, the results of which could be used as inputs for the forthcoming RTC.

34. The Committee Member for Myanmar requested SEAFDEC to provide assistance on stock assessment of tuna species and also for AQD to assist in the breeding and culture of sea horses, mud crab and sea cucumber for conservation purposes. In response, SEAFDEC reiterated that during the conduct of the Regional Technical Consultation (RTC) on Addressing Technical Issues on Selected Commercially-exploited Aquatic Species in October 2011, difficulties were encountered with respect to the collection of quality data from the Member Countries, which are necessary for the stock assessment of certain aquatic species. For such reason, the Member Countries were requested during the said RTC, to collect relevant data in a more detailed manner which could serve as inputs for stock assessment, after which SEAFDEC would consult with the relevant Departments for the possible conduct of activities including stock assessment based on the data and information provided by the Member Countries.

35. While conveying a concern on combating IUU fishing issues related to trade measures, the Committee Member for Cambodia expressed the apprehension that certain requirements under such measures could not be complied by some Member Countries especially on Port State Measures and traceability. In this connection, he suggested that SEAFDEC should coordinate with the RPOA-IUU Secretariat to develop guidelines on reducing IUU fishing, which could be made compulsory for the region. SEAFDEC was also requested to consider the involvement of experts who could provide substantial recommendations to the Member Countries during the discussion on relevant issues identified during the relevant RTC.

36. With regards to the Program on “**Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region**”, the Member Countries were encouraged to submit updated fishery statistics in more timely manner, based on the Regional Framework for Fishery Statistics of Southeast Asia. In this regard and in order to expedite the production process of the Fishery Statistical Bulletin of Southeast Asia by the SEAFDEC Secretariat, the Committee Member for the Philippines suggested that the members of the ASEAN Fisheries Statistics Network comprising the focal point persons in the ASEAN countries should be encouraged to make commitments for the timely submission of the necessary data and that SEAFDEC should also keep the National Coordinators informed when following up such concern with the focal point persons.

37. Furthermore, in addition to providing the necessary data and information, the Committee also suggested that the Member Countries should ensure the accuracy of the data by improving their respective data collection and compilation systems. In addition, the Member Countries should also try to provide statistics and information on fishery production based on fishing areas, which could be classified as those from Exclusive Economic Zone (EEZ) or those from outside their EEZ, as this would facilitate the analysis of the state of the fisheries resources and the formulation of appropriate national policies.

38. The representative from the ASEAN Secretariat expressed the view that even if inputs for the preparation of the Fishery Statistical Bulletin of Southeast Asia could not be provided by the Member Countries in a timely manner, SEAFDEC should consider facilitating the dissemination of certain fishery statistics through its website, based on available information in the online database which SEAFDEC had already developed.

39. Regarding the program on “**Activities Related to Climate Change and Adaptation in Southeast Asia with Special Focus on the Andaman Sea**”, the Committee Member for Myanmar informed the Committee that his country supports the activities and would actively participate in the program’s forthcoming activities.

40. As for the program on “**Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing Related Countermeasures**”, the Committee Member for Vietnam suggested that SEAFDEC should consider enhancing its cooperation with the ASEAN Tuna Working Group to avoid duplication of efforts, considering that the Working Group focuses on trade promotion of tuna and private participation by enhancing the international competitiveness of the ASEAN tuna products and private sector’s involvement. However, since some Member Countries are not members of the RPOA-IUU, the Committee Member for Vietnam also suggested that SEAFDEC should consider disseminating relevant information that have emanated from its discussions with the RPOA-IUU Secretariat, to the Member Countries especially information related to IUU fishing vessels.

41. In addition, the Committee Member for Myanmar informed the Committee that Myanmar has planned to install Vessel Monitoring System (VMS) on its fishing vessels. He also expressed the view that VMS could be more effective than the Global Positioning System (GPS) since the former compared to the latter, could monitor not only IUU fishing vessels but also natural hazards, e.g. storms, of which the information could be immediately disseminated to the fishers.

42. The Committee took note of the information dissemination activities under this program which had been conducted in an *ad-hoc* manner and could be different from those under the Program on “**Center-wide Information Network**” which are routine activities. Moreover, while considering that some activities of this program could be duplicating other SEAFDEC programs, the Committee suggested that coordination among the various project activities implemented by SEAFDEC should be enhanced to avoid any duplication of efforts.

43. The Committee was also informed on the compilation of the results of tuna stock assessment in the Western and Central Pacific Ocean based on the analysis at the 7th Scientific Committee of the Western and Central Pacific Fisheries Commission (WCPFC). Results of the analysis had been used as reference during the Special Tuna Meeting convened by SEAFDEC in September 2011 in Songkhla, Thailand to promote importance of the stock assessment to the relevant tuna-producing countries in the WCPFC area such as Indonesia, the Philippines, Thailand and Vietnam. In this connection, SEAFDEC was encouraged to assist these countries and to come up with synthesized information on and stock assessment of tuna fishery resources in the Southeast Asian region.

- **Training Department**

44. With regards to the Program on “**Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2**”, the Committee was requested to consider the planning activities that could maximize the utilization of the M.V. SEAFDEC 2. In this connection, the Committee Member for Vietnam informed the Committee that the detailed 5-year plan of Vietnam to conduct a survey of small pelagic species using the M.V. SEAFDEC 2 had been proposed, but due to unforeseen circumstances

especially the flooding situation in Thailand, the mission team from TD was unable to visit Vietnam to finalize the said plan. On the other hand, the Committee Member for Myanmar informed the Committee that an inshore fishery resource survey had been conducted in the waters of Myanmar using the M.V. SEAFDEC 2, and requested TD to provide the analysis of the data collected during the said survey.

45. The Committee Member for Japan expressed a concern regarding the low usage of the M.V. SEAFDEC 2 which could affect the conduct of collaborative projects in the region. In this connection, he encouraged the other Member Countries to make full use of the vessel especially in conducting surveys and exploration activities to enable the countries to compile valuable data that are useful for the analysis of the respective countries' fishery resources.

46. For the Program on “**Deep Sea Fisheries Resources Exploration in the Southeast Asia**”, the Committee Member for Singapore sought clarification on the rationale of this program, specifically drawing the attention of the Committee to the priority of such activity which had been reflected by the Member Countries in the survey as part of SEAFDEC Review Exercise. In response, SEAFDEC/TD informed the Committee that the cruises for deep sea fishery resource surveys had been integrated with other survey activities to maximize resources use. The Committee was also informed that continued activities under this program could secure the funding support for the optimum utilization of the M.V. SEAFDEC 2. The Committee Member for Myanmar informed the Committee that although activities on deep sea fishery resource exploration has not yet been conducted in Myanmar, such activities could be explored in the near future and requested SEAFDEC to provide relevant information to the Department of Fisheries of Myanmar on the results of the deep sea fisheries resource exploration activities conducted by TD, for its reference.

47. Moreover, the Committee was informed that one of the objectives of deep sea exploration activities is to come up with a picture of the potential deep sea fishery resources in the Southeast Asian region considering that almost 50% of the sea areas in the region are deep seas. In spite of such situation, limited activities on deep sea fisheries have been conducted in the region. More particularly, since economically-important species in the deep sea areas such as the purpleback flying squid has not been exploited, appropriate technologies should be developed by SEAFDEC based on the results of its exploration activities, to harvest such resources in a sustainable manner.

48. The Committee was also informed that SEAFDEC in collaboration with the research vessel of the National Fisheries University of Japan, the R.V. Koyo Maru has been conducting exploration activities to study the deep sea resources in the region. Currently, the study focused on the underwater sea mounts in Philippine waters involving researchers from the Philippine Bureau of Fisheries and Aquatic Resources.

49. Regarding the program on “**Development of Regional Database for Fishery Management**”, the Committee Member for Myanmar requested TD to also provide HRD training on database development and processing.

50. For the program on “**Promotion of Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management**”, the Committee Member for Vietnam suggested that in order to optimize resources and avoid duplication of efforts in implementation of the activities, especially on alternative livelihood and gender issues, SEAFDEC should consider collaborating with international organizations such as FAO for its Regional Fisheries Livelihood Programme (RFLP) which is being carried out in some Member Countries of SEAFDEC. Furthermore, the Committee also requested SEAFDEC to support the activities on capacity building to enhance the knowledge of fisheries officers of the Member Countries especially on the concept and theoretical framework of co-management and rights-based fisheries for fisheries resource management, and to disseminate the outputs of the program to the Member Countries.

51. With regards to the program on “**Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement**”, the Committee Member for Thailand requested SEAFDEC to engage experts from the region to assist Thailand in improving the installation

of artificial reefs (ARs) including the appropriate design of ARs and to evaluate the fishery resources before and after the installation of ARs. The Committee was also informed that MFRDMD had already published the outputs from an R&D activity on artificial reefs undertaken in Malaysia, with various objectives that include preventing trawlers from fishing in coastal areas and enhancing the fishery resources and habitats, among others.

52. Moreover, the installation of ARs that had been undertaken by the Government of Malaysia for resource enhancement included many designs that are suitable for all types of bottom substrates, while other agencies in the country also deployed ARs to serve as aggregating devices. Furthermore, Malaysia is also conducting a study on the effectiveness of ARs and on the impacts of ARs to the livelihood of fishers. In this connection, the Chief of MFRDMD suggested that local researchers and engineers from Malaysia who are working on ARs could be invited to serve as resource persons during the planned SEAFDEC workshop on resource enhancement. In addition, the Committee was informed that SEAFDEC plans to conduct a study on the assessment of ARs. Although such study could take a long time to undertake, experts from the region should be sourced for such study.

53. The Committee Member for the Philippines suggested that SEAFDEC should inform the Member Countries on the progress of the implementation of the program on Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand. In this connection, the Committee was informed that SEAFDEC in collaboration with FAO and the Bay of Bengal Large Marine Ecosystem (BOBLME) Project plans to organize a Workshop on Marine Protected Areas (MPA) including fisheries *refugia* where the FAO Guidelines on MPAs would be discussed. In this connection, SEAFDEC was encouraged to disseminate the outputs of the Workshop to the Member Countries for their information. In addition, the Committee Member for Myanmar requested SEAFDEC to extend the implementation of this activity to Myanmar.

54. In response to the request of Malaysia for capacity building with respect to observer program onboard fishing vessels, under the program on “**Improvement of Information Gathering System for IUU Fishing Related Countermeasures in the Southeast Asia**”, SEAFDEC/TD cited that collaboration with the World Wildlife Fund (WWF) and the National Oceanic and Atmospheric Administration (NOAA) had been established for the training fisheries officers and university graduates in Vietnam and Indonesia to enable them to observe onboard operations and collect data and information of tuna longline fisheries.

55. The Committee Member for Malaysia suggested that issues related to the FAO Global Record should be included in the program on “**Promotion on Fishing License, Boats Registration and Port State Measures**”. In this connection, the Committee was informed that during the proposed Regional Technical Consultation/Workshop on Fishing License and Boat Registration, SEAFDEC was requested to obtain a copy of the FAO Expert Consultation Report on FAO Global Record on Fishing Vessels for dissemination to the Member Countries as well as with relevant organizations and stakeholders to facilitate sharing of information.

56. In this connection, the Committee requested SEAFDEC to consider conducting capacity building for the Member Countries to make them ready for the implementation of the Port State Measures. The Committee Member for Vietnam suggested that SEAFDEC should include catch certificate issues while conducting activities to enhance the capacity of Member Countries in addressing IUU fishing concerns. The Committee Member for Myanmar also informed the Committee that experts from European Commission had visited Myanmar in August 2011 to assess the country’s existing catch certification systems relevant to combating IUU fishing and to make sure that such systems are equivalent with the recognized international practices. In addition, he also informed the Committee that Myanmar would take part in future training activities on combating IUU fishing as well as on other relevant workshops, and requested SEAFDEC to work closely with RPOA-IUU Secretariat and other organizations about this matter.

57. The Committee Member for the Philippines informed the Committee that in relation to the implementation of the EC regulation on IUU fishing, the EU has conducted an audit in the Philippines to evaluate the implementation on EC regulations on IUU fishing in the country. Considering the

significant recommendations made from such audit, he suggested that the country evaluation reports compiled by EU should be used as reference in addressing IUU fishing activities in the region.

58. For the program on “**Human Resource Development for Sustainable Fisheries**”, the Committee Member for Malaysia while recognizing the importance of human resources development for sustainable fisheries specifically on Ecosystem Approach to Fisheries (EAF), suggested that TD should continue to conduct the training program on EAF to promote better understanding on the concept of EAF in the region. However, since the EAF concept is new to the region, he also suggested that TD should conduct a pilot study on the application of EAF before promoting the said concept. In this regard, the Committee was informed that the training to be conducted by TD in November 2011 is aimed at introducing the concept of EAF to all stakeholders especially to those who have active role in disseminating the information on EAF, and the participants of the training would include representatives from the Member Countries as well as from relevant organizations and stakeholders.

- **Marine Fisheries Research Department**

59. While supporting the programs of MFRD on “**Chemical and Drug Residues in Fish and Fish Products in Southeast Asia: Biotoxins Monitoring in ASEAN**” and “**Utilization of Freshwater Fish for Value-added Products**”, the Committee Member for Myanmar informed the Committee that Myanmar is conducting a survey on biotoxins which would be completed in 2012 and that the report would be disseminated after the completion of the survey. In addition, Myanmar is upgrading its monitoring system with particular reference to traceability and that the country would participate in the planned Workshop to be organized by MFRD on this issue.

- **Marine Fishery Resources Development and Management Department**

60. On the “**Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea**”, the Committee noted that the recovery rate from the tagging activities conducted by MFRDMD had been about 1% for small pelagic and about 2% for large pelagic fish species. In this regard, the Committee suggested that MFRDMD should increase its efforts to be able to achieve higher recovery rates of the tagged fishes.

61. While noting that the data collected under the program on “**Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asia Waters**” also included those for sharks and rays, the Committee suggested that the title of the program should be changed accordingly to take into consideration to the context of the program.

- **Aquaculture Department**

62. With regards to the program on “**Promotion of Sustainable and Region-oriented Aquaculture**”, the Committee Member for Myanmar expressed the appreciation of his Government to AQD for conducting research activities on mud crab hatchery operations in Myanmar.

63. While also reiterating the need to promote collaborative activities and regional technical cooperation specifically on stock assessment of selected aquatic species and on commercially-exploited aquatic species such as hilsa, Indian mackerel, sharks, tuna, sea cucumber, and sea horse among others, the Committee Member for Myanmar suggested that HRD programs on stock assessment should be conducted. He also requested AQD to provide technical assistance on the mariculture of sea bass, sea cucumber and sea horses as well as on other modern techniques for fish culture.

64. While commending SEAFDEC for the implementation of various activities in 2011, the Committee Member for Indonesia suggested that SEAFDEC should provide the overall timeline of the activities under each program to enable the Committee to monitor the implementation of the activities based on the timeline as planned. Moreover, SEAFDEC should modify the activities and harmonize the linkage of such activities with the SEAFDEC Program Framework. In addition, the representative from FAO/RAP suggested that the strategic direction of each program or project should also be indicated and linked to available resources.

65. In response, the Committee was informed that the modality of the programs would be improved based on SEAFDEC Program Framework to ensure that every program would fit into the framework.

- **Non-funded Programs**

66. The Committee agreed to remove the list of non-funded programs from the FCG/ASSP as recommended by the 19th ASEAN Sectoral Working Group on Fisheries (ASWGF).

5.3 Other Programs

67. Considering the results of the other programs conducted by SEAFDEC (**Annex 9**), the Program Committee provided recommendations for the improvement of such programs.

68. For the “**Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program**”, the Committee Member for Cambodia requested TD to compile the information on the identification of cetacean species found in the Southeast Asian waters and to disseminate such information to the Member Countries. In this regard, SEAFDEC/TD informed the Committee that training on the identification of cetacean species had been previously conducted for the Member Countries and that the initial outputs of this activity had already been published and would be disseminated to Member Countries for their information.

69. For the program on the “**Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches**”, the Committee Member for Myanmar informed the Committee that a survey conducted in one area of the country had shown positive results. In this connection, he requested TD to consider expanding the HRD activities to the other coastal areas of the country.

70. With regards to the program on “**Safety at Sea for Small Fishing Boats**”, the Committee Member for Malaysia, while noting that the guidelines on safety at sea for small fishing boats have been published in the Thai language, requested that the guidelines should also be translated into other languages. In this connection, the Committee was informed that TD would consider developing the regional guidelines, which would take into consideration the outputs of the forthcoming ‘Regional Technical Workshop on Safety at Sea and Optimizing Energy Use for Small Fishing Boats’ in December 2011.

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

71. The Committee discussed and endorsed the pipeline projects and emerging needs for the preparation of future project proposals as shown in **Annex 10**.

72. Regarding the proposed program on “**Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management**”, which has been submitted to the Islamic Development Bank (IDB) in 2007 for funding, the Committee was informed that the IDB had communicated with the SEAFDEC Secretariat in early 2011 to revise the project proposal, while the representative from the ASEAN Secretariat also followed up with the IDB on the status of the proposal. In this connection, the Committee was informed by the representative of the ASEAN Secretariat at this Program Committee Meeting that the proposal is expected to be officially approved for funding by the IDB in 2012. However, in order to complete the process of the official approval by IDB, the ASEAN Secretariat would coordinate with SEAFDEC Secretariat and the eligible participating countries to facilitate compliance with the remaining requirements for the project implementation in 2012.

73. For the program on “**Climate Change and its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation towards Food Security**”, the representative from the ASEAN Secretariat informed the Committee that the ASEAN-US Technical Assistance and Training Facility (AU-TATF) has agreed to support the conduct of a meeting tentatively in February 2012, as

an initial activity to discuss and formulate the activities that would be undertaken under this program. However, the Committee was also informed that any financial support which the AU-TATF would provide for future activities would be subject to the outputs and recommendations from the initial meeting.

74. In this connection, the Committee Member for Myanmar informed the Committee that Myanmar has formed a new environment commission to assess the significant indicators that could determine the impacts of climate change especially in biology, habitats, migration, unseasonal disease occurrence, and aquaculture. Moreover, the Department of Fisheries of Myanmar has also mandated the various levels of the country's fisheries sector to monitor sudden changes in fisheries resulting from climate change, and that Myanmar would be willing to participate in the regional activities under the program.

75. As for the program on **“Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand”**, the Committee was informed that the proposal was revised by SEAFDEC and submitted to UNEP in June 2011 to take into consideration the changes in the GEF funding component of the program. In this regard, the Member Countries were encouraged to submit their respective letters of endorsement to UNEP by the end of 2011 so that UNEP could submit the proposal to GEF for project approval. As the submission process for funding support from GEF has been prolonged for several years, the Committee requested the SEAFDEC Secretariat to follow-up the status of the project proposal with UNEP and to inform the Member Countries on the status of the proposal.

76. Regarding the program on **“Strategies for Trawl Fisheries By-catch Management”** which is supported by FAO/GEF with SEAFDEC as the regional facilitating unit and executing partner, the Committee was informed that in principle the program is now operational, and that the corresponding inception meeting would be conducted in early 2012.

VII. OTHER MATTERS

7.1 Southeast Asian State of Fisheries and Aquaculture (SEASOFIA)

77. The Committee noted the production of the State of Southeast Asian Fisheries and Aquaculture (SEASOFIA) which has been undertaken by SEAFDEC Secretariat in collaboration with all Departments as presented by the SEAFDEC Secretariat which appears as **Annex 11**. In this regard, the representative from FAO/RAP suggested that if the publication could be finished within six months but before the next COFI meeting, this could serve as very useful information to facilitate the preparation of the global review as this is expected to reflect a science-based analysis of the fisheries at the regional level. In addition, SEASOFIA could also support the development of the State of Fisheries and Aquaculture (SOFIA) by FAO as well as enhance the rationalization of fisheries information of the region which could be properly reflected in the global perspective.

78. Considering the possibility that similar synthesis is being prepared by FAO on the global level in the so-called ‘State of Fisheries and Aquaculture (SOFIA)’ while in the Asia-Pacific region a synthesis is also being done by APFIC in its ‘Status and Potential of Fisheries and Aquaculture in Asia and the Pacific’, the Committee requested SEAFDEC to consider developing this publication periodically and on a regular basis to provide reference for the other relevant initiatives at the regional and international levels. In response, the Committee was informed that this activity which is being supported by the JTF project would be completed in 2012. Meanwhile, the Committee Member for the Philippines informed the Committee that internal consultation would be conducted especially among the various offices of BFAR to review the draft document on SEASOFIA and the compiled comments would be sent back to SEAFDEC Secretariat by the end of December 2011, in order that the SEASOFIA could be published before the forthcoming SEAFDEC Council Meeting.

7.2 Expert Consultation on Effective Surveillance and Law Enforcement to Combat IUU Fishing

79. The Committee took note of the forthcoming event on “**Expert Consultation on Effective Surveillance and Law Enforcement to Combat IUU Fishing**” (Annex 12) which was presented by the National Coordinator for Indonesia. The said Expert Consultation to be organized by the Ministry of Marine Affairs and Fisheries of Indonesia from 5 to 8 December 2011 in Jakarta, Indonesia, is expected to come up with recommendations on effective surveillance and law enforcement to combat IUU fishing. Such information could be used as reference by policy making bodies as well as in improving compliance with regional and global laws and regulations related to fisheries management.

7.3 Program/Activities Structure

80. The Committee Member for Indonesia expressed the concern that there had been activities conducted by some Departments that are not tasked to carry out such activities based on their functions. He then suggested that these activities should be adjusted accordingly and delegated to appropriate Departments. Otherwise, such Departments could be renamed in accordance with their current activities. This concern should be raised for the consideration of the SEAFDEC Council during its Meeting next year.

81. The Committee Member for Indonesia also expressed the opinion that some activities which are of common interest to the Member Countries, such as tuna fisheries and IUU fishing should be grouped together in the report so that a clearer picture of the situation could be presented and properly understood. He also suggested that in order to avoid confusion and enhance clarity, the Program Committee Meeting could be restructured in such a way that reporting of the activities is grouped based on the program thrusts of SEAFDEC.

VIII. COOPERATION WITH DONORS, NON-MEMBER GOVERNMENT AND INTERNATIONAL/REGIONAL ORGANIZATIONS

82. The representative from FAO/RAP, *Dr. Simon Funge-Smith* expressed his appreciation to SEAFDEC for inviting FAO to the 34th Program Committee Meeting and to AQD as host, for the warm hospitality. He then informed the Committee on the status of the proposal for GEF funding on “Reduction of By-Catch Phase II” and that FAO looks forward to working closely with SEAFDEC in the implementation of this regional project as well as other activities of common interest between SEAFDEC and the BOBLME project. However, he viewed that the current streamlining structure of the SEAFDEC programs could still be based on inputs-driven and formulated in the form of projects rather than programs. He therefore encouraged SEAFDEC to consider re-arranging the projects into programs in order to facilitate possible funding support from other sources and organizations. The same should also apply with the activities undertaken by the countries at national level. In addition, he also suggested that SEAFDEC activities should reflect a coherent regional program, particularly with respect to reporting of the program outcomes by conducting strategic planning of the program activities involving the Departments. He added that streamlining of the SEAFDEC programs in accordance with the 2011 Plan of Action would be crucial for the development of the plans of the Departments to be reviewed during the Program Committee Meeting, to ensure that relevant provisions of the Plan of Action are addressed accordingly. His statement appears as **Annex 13**.

83. The representative from the ASEAN Secretariat, *Ms. Pouchamarn Wongsanga* thanked SEAFDEC for inviting the ASEAN Secretariat to this Program Committee Meeting, and especially cited the progress of the efforts towards ‘Strengthening the ASEAN-SEAFDEC Strategic Partnership’. She recalled that since the establishment of the FCG in 1999 and the ASEAN-SEAFDEC Strategic Partnership in 2007, the ASEAN and SEAFDEC had enhanced the collaborative mechanism especially on the implementation of programs under FCG/ASSP from “Collaborative Projects” to “Strategic Collaborative Program”. She then stressed on the future perspectives of ASSP highlighting on the implementation of the Resolution and Plan of Action that were adopted in 2011. She added that the ASEAN Supporting Program on Sustainable Fisheries for Food Security (2011-2015) would be the platform of cooperation and partnership between the ASEAN and SEAFDEC under the ASSP, to enhance the contribution of the fisheries sector to the ASEAN Community Building in 2015, as well as

ensure the sustainable development of the sector and promote better livelihoods of the people involved in fisheries. Her statement is shown in **Annex 14**.

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

9.1 Adoption of Report of the Meeting

84. The Committee adopted the report of the Thirty-fourth Meeting of the SEAFDEC Program Committee on 16 November 2011, and mentioned that the Report would be submitted to the 44th Meeting of SEAFDEC Council for consideration and endorsement. As for the programs under the FCG/ASSP mechanism, the progress of the activities conducted in 2011 and the proposed activities for 2012 would also be reported to the Fourteenth Meeting of the FCG/ASSP.

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

85. The Chief of MFRD expressed his Department's willingness to host the Thirty-fifth Meeting of the Program Committee in November 2012. However, considering the high cost of holding the Meeting in Singapore especially in terms of hotel accommodation, the Committee agreed that the venue of the Meeting would be in Thailand. While abiding with the decision of the Program Committee, the Committee Member for Singapore asked MFRD to coordinate with the SEAFDEC Secretariat in finalizing the schedule and related arrangements for the Meeting as well as the date and venue of the Meeting.

X. CLOSING OF THE MEETING

86. In his Closing Remarks, the Chairperson of the Program Committee thanked the Committee Members and participants for their active participation and contributions to the Meeting. He also thanked AQD for hosting the Meeting especially the outstanding hospitality extended to the participants. He assured the Committee that SEAFDEC would do its best to address the issues considered and to follow-up the recommendations under the program and non-program matters of this Meeting, and declared the Meeting closed. His Closing Remarks appears as **Annex 15**.

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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!

It is indeed a great honor for me to give the opening remarks for this very important Thirty-fourth Meeting of SEAFDEC Program Committee. But before I go on, please allow me on behalf of all of us here, to thank the Aquaculture Department as this year's host, for making the necessary arrangements for this Meeting in this magnificent hotel with splendid surroundings.

Ladies and Gentlemen, we consider 2011 a very momentous year in the annals of SEAFDEC, firstly because of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security towards 2020 "Fish for the People 2020: Adaptation to a Changing Environment" which was successfully organized in June. At this juncture, I would wish to take this opportunity to express our deepest gratitude to the Member Countries, the SEAFDEC Departments as well as to our collaborating partners for their cooperation and support during the Conference.

Secondly, the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region towards 2020 which would serve as renewed and revitalized regional fishery policy frameworks were adopted during the Conference in June. As a matter of fact, in order to raise the profile and commemorate the adoption of the Resolution and Plan of Action, these will be presented in one of the Agenda of this Meeting in conjunction with the SEAFDEC Program Framework, which has been the basis for mapping out the programs of SEAFDEC. With such instruments, it is envisaged that SEAFDEC would be able to set our course of action towards promoting and realigning our activities to ensure that our programs would support the implementation of these regional fishery policy frameworks. SEAFDEC is therefore confident that with the collaboration and support of relevant organizations and institutions in the region, we will collectively put forth our efforts to support the Member Countries in the implementation of their initiatives in line with the issues and required actions identified in the Resolution and Plan of Action.

Ladies and Gentlemen, in the next three days, we would listen and review the accomplishments of SEAFDEC projects conducted in 2011 as well as those proposed for 2012. I would therefore wish to invite you to discreetly consider, scrutinize and when and where necessary, make constructive assessment of such activities especially with regards to the objectives and direction of the projects proposed for 2012. I am hopeful that this Meeting with its environment conducive to discussion and deliberation would stimulate your active participation, taking into consideration the needs, priorities and requirements of the Member Countries.

At this point in time, I would like to request you to take note and put special attention on some important areas of the proposed program activities, one of which is the reformulation of Departmental Programs of AQD and TD. For AQD, its Departmental Programs from now on would be changed from commodity-based to thematic-based to be aligned with the Aquaculture Component of the new Resolution and Plan of Action. On the other hand, TD would emphasize on the enhancement of regional fishery information systems and mechanisms to facilitate the sharing, exchange and compilation of information as mentioned in the new Resolution and Plan of Action as well as on research and development aimed at improving fisheries technology to reduce the impacts of fishing to the environment. Moreover, the SEAFDEC Secretariat has already started the development of the Southeast Asian State of Fisheries and Aquaculture or SEASOFIA which is meant to provide a

platform for compilation of synthesized data and information generated from various activities of SEAFDEC while also incorporating other available data and information from various sources. SEASOFIA is also intended to provide better understanding of the status and trend of fisheries and aquaculture of our region. We would encourage the participants to take a look at the progress of this initiative and provide suggestions for improvement.

Ladies and Gentlemen, as you are all aware of, the programs and proposals considered by the Committee together with your recommendations, will be submitted to the next Council Meeting for final endorsement while relevant programs would be endorsed through the Fisheries Consultative Group Meeting of the ASEAN-SEAFDEC Strategic Partnership during its meeting which will be held back-to-back with this Program Committee Meeting. We would therefore seek for your active participation during the next three days, for the success of this Meeting in order that its objectives would become a reality.

Since there is so much to discuss with very limited time, so I will waste no more of our precious time and declare this meeting open.

Thank you very much.

AGENDA

- Agenda 1:** Opening of the Meeting
- Agenda 2:** Adoption of Agenda and Arrangement of the Meeting
- Agenda 3:** Matters Related to SEAFDEC Programs
- 1.1 2011 Resolution and Plan of Actions and Linkage to SEAFDEC Existing Programs and Its Program Framework
 - 1.2 Priorities Identified in the Third SEAFDEC Review Exercise
 - 1.3 Introduction of Japanese Trust Fund Projects 2011-2012
- Agenda 4:** Review of SEAFDEC Program Implementation for the Year 2011 and Proposed Programs for the Year 2012
- 4.1 Departmental Programs¹
 - 4.1.1 Secretariat
 - Center-wide Information Network
 - 4.1.2 Training Department
 - Information and Communications Technology
 - Tailor Made Training and Study Tour
 - Promotion and Enhancement Fisheries Information (*New*)
 - Improvement of Fisheries Technology and Reduction of the Impact from Fishing (*New*)
 - 4.1.3 Aquaculture Department
 - Aquatic Ecology
 - Marine Fish
 - Mud Crab and Shrimp Domestication
 - Integrated Mollusc Production
 - Small-holder Freshwater Aquaculture Program
 - Seaweed Strain Improvement
 - Adaptation to Climate Change Impacts (*New*)
 - Healthy and Wholesome Aquaculture (*New*)
 - Maintaining Environmental Integrity through Responsible Aquaculture (*New*)
 - Meeting Socio-economic Challenges in Aquaculture (*New*)
 - Quality Seed for Sustainable Aquaculture (*New*)
 - 4.2 Programs under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
 - 4.2.1 Secretariat
 - Assistance for Capacity Building in the Region to Address International Trade-related Issues
 - Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region
 - ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020²

¹ Marine Fisheries Research Department (MFRD) and Marine Fishery Resources Development and Management Department (MFRDMD) have no Departmental Programs.

² The Program was completed in 2011

- Activities Related to Climate Change and Adaptation in Southeast Asia with Special Focus on the Andaman Sea³
- Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing Related Countermeasures

4.2.2 Training Department

- Responsible Fishing Technologies and Practices (Fishing in Harmony with Nature)
- Sustainable Utilization of Potential Fisheries Resources and Reduction of Post-harvest Losses
- Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2
- Deep Sea Fisheries Resources Exploration in the Southeast Asia
- Information Collection of Highly Migratory Species in Southeast Asian Waters
- Development of Regional Database for Fishery Management
- Promotion of Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management
- Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement
- Improvement of Information Gathering System for IUU Fishing Related Countermeasures in the Southeast Asia
- Promotion on Boats Registration, Fishing License and Port State Measures
- Human Resource Development for Sustainable Fisheries

4.2.3 Marine Fisheries Research Department

- Chemical and Drug Residues in Fish and Fish Products in Southeast Asia: Biotoxins Monitoring in ASEAN
- Traceability Systems for Aquaculture Products in South Asian Region
- Utilization of Freshwater Fish in ASEAN Member Countries

4.2.4 Marine Fishery Resources Development and Management Department

- Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea
- Research and Management of Sea turtles in Foraging Habitat in the Southeast Asia Waters

4.2.5 Aquaculture Department

- Promotion of Sustainable and Region-oriented Aquaculture
- Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia Through Stock Release
- Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia
- Food Safety of Aquaculture Products in Southeast Asia

4.2.6 Non-funded Programs⁴

- The Use of Indicators for Sustainable Development and Management of Capture Fisheries in the ASEAN Region
- Development of Integrated Inland Fisheries Management in ASEAN Countries

³ The Program was completed in 2011, however, it has been extended until mid of 2012

⁴ As agreed by the lead countries at the 16th ASWGF Meeting, the program that has been no progress of activities will be put under a list of 'Non-funded Programs'.

- Capacity Improvement of Fisheries Community for Fisheries Management and Alleviation of Poverty⁵

4.3 Other Programs

- Cetacean Research in Southeast Asia Waters: Cetacean Sighting Program
- Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches⁶
- Safety at Sea for Small Fishing Boats

- Agenda 5:** Pipeline Projects and Emerging Needs for Preparation of Future Project Proposals
- 1.1 Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (SEC-TD/ Islamic Development Bank)
 - 1.2 Climate Change and its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation towards Food Security” (ASEAN)⁷
 - 1.3 Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (SEC/UNEP/GEF/SCS)
 - 1.4 Strategies for Trawl Fisheries Bycatch Management (REBYC-II CTI)

- Agenda 6:** Other Matters
- 6.1 State of Southeast Asian Fisheries and Aquaculture (SEASOFIA)
 - 6.2 Expert Consultation on Effective Surveillance & Law Enforcement to Combat IUU fishing
 - 6.3 Program/Activities Structure

- Agenda 7:** Cooperation with Donors, Non-member Government and International/Regional Organizations
(*Preparation of the Meeting Report*)

- Agenda 8:** Recommendations of the Thirty-fourth Meeting of the Program Committee
- 8.1 Adoption of Report of the Meeting
 - 8.2 Date and Venue of the Thirty-fifth Meeting of the Program Committee

- Agenda 9:** Closing of the Meeting

⁵ This Program will be linked with the pipeline project on “Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management”

⁶ The Program will be ended in 2011

⁷ The Meeting was also informed on the support by AU-TATF on three Concept Notes as proposed by SEAFDEC at the 18th Meeting of ASWGF_i in 2010 and endorsed by SOM-31st AMAF in 2009, namely; i) Strengthening food security arrangements through fisheries intervention; ii) Promoting sustainable food production through responsible fishing technologies and practices; and iii) Climate change and its impacts on fisheries and aquaculture. Due to a number of considerations, the three concept notes have been merged and formed a new concept note entitled “Climate Change and its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation towards Food Security”

**SEAFDEC PROGRAMS FOR THE YEAR 2011-2012
CATEGORIZED BASED ON SEAFDEC PROGRAM FRAMEWORK
WITH LINKAGE TO 2011 RESOLUTION AND PLAN OF ACTION**

According to the SEAFDEC Program Framework, which was endorsed during the 41st SEAFDEC Council Meeting, aims to enable the SEAFDEC programming implemented to use an integrated approach and to facilitate sourcing of funds for the implementation of the activities. The Program Trusts in formulations of program/activities were established including of i) Developing and promoting responsible fisheries for poverty alleviation and food security; ii) Enhancing capacity and competitiveness to facilitate international and intra-regional trade; iii) Improving management concepts and approaches for sustainable fisheries; iv) Providing policy and advisory services for planning and executing management of fisheries; v) Addressing international fisheries related issues from a regional perspective.

All Programs implemented in 2011 and proposed Programs for the year 2012 were reviewed and categorized in each group according to the Program Trusts of the SEAFDEC Program Framework as well as its linkage to the *Resolution and Plan of Action on Sustainable Fisheries for Food Security For the ASEAN Region Towards 2020* which have been endorsed during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment” in June 2011. In this connection, SEAFDEC Secretariat has prepared this summary document for consideration of the Meeting.

REQUESTED ACTIONS BY THE MEETING

The Meeting may reconsider the Program Trusts that have a number of projects involved while some Program Trusts have limited activities/projects and may give advice for improvement or adjustment of the project objectives/activities to fulfill the needs. In addition, the Meeting may wish to provide comments on the need to enhance collaboration among government agencies that have responsibility for fisheries and fisheries-related issues in order to harmonize policies, plans and activities that support sustainable fisheries, food security and safety at the national and regional levels.

The following table is the list of program categorized in each group according to the Program Trusts of the SEAFDEC Program Framework.

Program Trusts / Program Title		Responsible Department	Link to the 2011 Resolution and Plan of Action
I. Developing and promoting responsible fisheries for poverty alleviation and food security			
1.	Aquatic Ecology ⁸	AQD	P45
2.	Marine Fish ⁸	AQD	P43, P45
3.	Mud Crab and Shrimp Domestication ⁸	AQD	P44, P45
4.	Integrated Mollusk Production ⁸	AQD	P44, P45
5.	Small-holder Freshwater Aquaculture ⁸	AQD	P39
6.	Seaweed Strain Improvement ⁸	AQD	P44
7.	Responsible Fishing Technologies and Practices (Fishing in Harmony with Nature)	TD	R7, P25 and P26
8.	Sustainable Utilization of Potential Fisheries Resources and Reduction of Post-harvest Losses	TD	R20, P1, P58 and P63
9.	Rehabilitation of Fisheries Resources and Habitats/ Fishing Grounds through Resource Enhancement	TD	P27

⁸ The Departmental Programs will be completed in December 2011. However, most of the activities under these Programs will be continued in 2012 under different Program themes

Program Trusts / Program Title		Responsible Department	Link to the 2011 Resolution and Plan of Action
10.	Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea	MFRDMD	R10, P8
11.	Promotion of Sustainable and Region-oriented Aquaculture	AQD	R15,R16,R17, P39, P41, P42, P43, P44, P45, P46, P56
12.	Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD	P27
13.	Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program	TD	P13
14.	Adapting to Climate Change Impacts (<i>New</i>)	AQD	R9, P12, P20, P55
15.	Healthy and Wholesome Aquaculture (<i>New</i>)	AQD	R15, R16, R17, P39, P45, P46, P51, P52, P53, P56
16.	Maintaining Environmental Integrity through Responsible Aquaculture (<i>New</i>)	AQD	R17, P42
17.	Meeting Socio-economic Challenges in Aquaculture (<i>New</i>)	AQD	R9, R15, P39, P41, P43, P46, P55
18.	Quality Seed for Sustainable Aquaculture (<i>New</i>)	AQD	P43, P44, P46
19.	Human Resource Development for Sustainable Fisheries	TD	P8, P9, P13, P21
II. Enhancing capacity and competitiveness to facilitate international and intra-regional trade			
20.	Chemical and Drug Residues in Fish and Fish Products in Southeast Asia - Biotoxin Monitoring in ASEAN	MFRD	R21, P61, P63
21.	Traceability Systems for Aquaculture Products in Southeast Asian Region	MFRD	R19, P60, P63
22.	Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD	R21, P63
23.	Food Safety of Aquaculture Products in Southeast Asia	AQD	R21, P62, P63
24.	Utilization of Freshwater Fish for Value-added Products	MFRD	R20, P58,P63
III. Improving management concepts and approaches for sustainable fisheries			
25.	Promotion of Rights-based Fisheries and Co-management towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management	TD	R7, P13
26.	Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches	TD	R7, P33
27.	Activities Related to Climate Change and Adaptation in Southeast Asia with Special Focus on the Andaman Sea	SEC	R7, R9, P12, P23
28.	Promotion on Fishing License, Boats Registration and Port State Measures	TD	P21, P22, P23, P24
IV. Providing policy and advisory services for planning and executing management of fisheries			
29.	Center-wide Information Network	SEC	P5
30.	Information and Communications Technology	TD	P5
31.	Tailor Made Training and Study Tour	TD	R3
32.	Promotion and Enhancement Fisheries Information (<i>New</i>)	TD	P5
33.	Improvement of Fisheries Technology and Reduction of the Impact from Fishing (<i>New</i>)	TD	P15, P29
34.	Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region	SEC (TD)	P3, P4, P5
35.	Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2	TD	P18
36.	Deep Sea Fisheries Resources Exploration in Southeast Asia	TD	P18
37.	Information Collection of Highly Migratory Species in Southeast Asian Waters	TD	R8,P2, P3, P4
38.	ASEAN-SEAFDEC Conference on Sustainable Fisheries for	All	R2, R5, R8, R16,

Program Trusts / Program Title		Responsible Department	Link to the 2011 Resolution and Plan of Action
	Food Security Towards 2020	Departments	P19, P67
39.	Development of Regional Database for Fishery Management	TD	R10, P3, P4, P5
40.	Improvement of Information Gathering System for IUU Fishing Related Countermeasures in the Southeast Asia	TD	P21
41.	Research and Management of Sea Turtles in Foraging Habitat in the Southeast Asia Waters	MFRDMD	R5, R10, P4, P29
V. Addressing international fisheries related issues from a regional perspective			
42.	Assistance for Capacity Building in the Region to Address International Trade-related Issues	SEC	R18, P67, P69, P76
43.	Safety at Sea for Small Fishing Boats	TD	R13, P30
44.	Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing Related Countermeasures	SEC	R8, P21, P22, P23

THIRD SEAFDEC REVIEW EXERCISE

BACKGROUND AND PROGRESS

With a view to improve the operations and enhance the roles and functions of SEAFDEC in order to efficiently and effectively support the Member Countries in achieving sustainable fisheries and attaining food security in response to the changing fisheries situation, the conduct of the Third SEAFDEC Review Exercise was proposed by SEAFDEC Secretary-General during the closed session of the 43rd Meeting of the SEAFDEC Council (4-8 April 2011, Malaysia)

The Council supported the Proposal. In particular, the Council requested the Secretary-General to communicate with the National Coordinators of the respective countries to compile the information on the countries' views on the activities of SEAFDEC, of which the report should be completed within six months after the Council Meeting. In addition, the Council also identified relevant documents/information that should be incorporated in the report.

In response to the recommendation by the Council, the Secretariat in close coordination with Departments developed the Questionnaire on Expected Roles, Functions and Activities of SEAFDEC, and send to the Member Countries to gather their respective inputs through the National Coordinators. Inputs were provided by all respective countries; and the "Preliminary Report on Member Countries' Views on the Expected Roles, Functions and Activities of SEAFDEC" (*Appendix 1*) was prepared and submitted together with the relevant information/documents to all Council Directors in September 2011.

It should however be noted that this report is considered as a "Preliminary Report" of the study based on the inputs provided by the National Coordinators, and the SEAFDEC Council Directors are requested to provide respective feedback to the SEAFDEC Secretariat (by the end of December 2011). After accommodating such feedback, SEAFDEC Secretariat would further submit the "Final Report" to the Council; and the report would be tabled for discussion and further directives from the Council during its Forty-fourth Meeting in 2012.

REQUIRED ACTIONS BY THE PCM

The PCM is requested to take note on the "Preliminary Report on Member Countries' Views on the Expected Roles, Functions and Activities of SEAFDEC".

The PCM is also requested to further follow-up with the Council Director of their respective country to provide feedback to the SEAFDEC Secretariat *by the end of December 2011*.

PRELIMINARY REPORT ON MEMBER COUNTRIES' VIEWS ON THE EXPECTED ROLES, FUNCTIONS AND ACTIVITIES OF SEAFDEC

By SEAFDEC Secretariat

I. INTRODUCTION

Since the establishment of SEAFDEC in 1967, several review exercises had been conducted to evaluate the effectiveness and efficiency of SEAFDEC. The first review exercise was conducted in 1986; and the second in 1991. In addition, the organizational structure and plan of operations of SEAFDEC and its Departments had also been occasionally reviewed and adjusted in accordance with the changing situation of fisheries in the region and the related requirements. During the past decade however, the fisheries situation had continuously undergone changes that led to challenges that could tremendously impact the sustainable development of fisheries in the region. It is therefore envisaged that another review exercise is deemed necessary to enhance the role of SEAFDEC in efficiently and effectively supporting the Member Countries in their continuing efforts towards achieving sustainable fisheries and attaining food security.

During the 43rd Meeting of the SEAFDEC Council, the proposal for the conduct of the Third SEAFDEC Review Exercise was proposed by the SEAFDEC Secretary-General. While agreeing to have the Third Review on the roles and functions of SEAFDEC, the Council requested the Secretary-General to communicate with the National Coordinators of the respective countries to provide the information on the countries' views on the activities of SEAFDEC, and compile other relevant documents/information of SEAFDEC and provide to the Member Countries.

In response to the directives given by the Council, SEAFDEC Secretariat in close coordination with Departments developed a questionnaire on expected roles, functions and activities of SEAFDEC, and send to the Member Countries to gather their respective inputs through the National Coordinators. Responses were provided by all Member Countries, and were compiled and synthesized.

It should however be noted that this report is considered as a preliminary report of the study based on the inputs provided by the National Coordinators, and the report is to be submitted to the SEAFDEC Council Directors by *ad referendum* for their respective feedback and further guidance. After accommodating such feedback, SEAFDEC would further submit the final report to the Council Directors also by *ad referendum*; and the report would be tabled for discussion and further directives from the Council during its Forty-fourth Meeting in 2012.

II. SUMMARY ON MEMBER COUNTRIES' VIEWS ON EXPECTED ROLES, FUNCTIONS AND ACTIVITIES OF SEAFDEC

1. Priority areas that should be addressed/improved in the Member Countries

Through the returned questionnaires, Member Countries identified ten fisheries priority areas that should be addressed/improved in the respective countries⁹. Common elements¹⁰ could be identified from wide ranges of priority areas identified by countries, which are listed as follows:

- Sustainable aquaculture technologies/practices (incl. GAP) (10 countries)
- Post-harvest and safety of fish and fishery products (8 countries)
- Fish trade (incl. marketing, distribution, traceability and certification, enhancing trade competitiveness) (7 countries)
- Combating IUU fishing (incl. MCS and Port State Measures) (7 countries)
- Fishery resources (incl. resources surveys) (6 countries)

⁹ For countries that identified more than ten priority areas, only the first ten areas were used

¹⁰ Elements that are common for at least two countries

- Sustainable/responsible fishing technologies/practices (6 countries)
- Fisheries management (marine, coastal and inland) (6 countries)
- Fishery statistics, information, inventories, STF (5 countries)
- Fish disease and aquatic animal health (5 countries)
- Habitat conservation/rehabilitation and resources enhancement (marine, coastal and inland) (5 countries)
- Climate change (4 countries)
- HRD and technology transfer (4 countries)
- Product development (3 countries)
- Fisheries Impact Assessment (3 countries)
- Addressing over-fishing, management of fishing capacity (3 countries)
- Development of aquaculture feed (3 countries)
- Broodstock management and seed production (3 countries)
- Rice-field bio-diversity and fisheries (2 countries)
- Ecosystem Approach to Fisheries (2 countries)
- Enhancing sustainable small-scale fisheries (2 countries)
- Aquaculture for rural development, food security and poverty alleviation (2 countries)
- Emerging requirements (2 countries)
- Research on aquatic species, biology, ecology, etc. (2 countries)
- Regional coordination and cooperation (2 countries)

2. Views on expected roles and function of SEAFDEC

Member Countries provided their views on *expected roles and functions of SEAFDEC*, which could be ranked¹¹ from the higher to the lower priorities as follows:

1. Research, development and verification of relevant technologies (4.3);
2. Transfer of technologies through training and HRD activities to government officers (4.1);
3. Facilitate regional discussion/collaboration and development of common/coordinated positions, regional standards (3.6), etc.;
4. Awareness raising, and generation/dissemination of information package and toolkits (3.2); and
5. Facilitate coordination and networking with other regional/international organizations (2.6).

3. Views on fisheries-related scopes/activities that should be undertaken by SEAFDEC

While noting that there are several sectors/institutions/organizations working at the national/regional/global levels, undertaking different roles and functions to contribute to sustainable fisheries development of the region; this part of questionnaire aimed to gather Member Countries' views on what should be the priority scopes/activities to be undertaken specifically by SEAFDEC. The questionnaire categorized fisheries-related scopes into: i) Fishery Resources; ii) Fisheries Management and Policy Planning (General, Coastal/Marine, and Inland); iii) Responsible Fishing Technologies and Practices; iv) Aquaculture; v) Post-harvest of Fish and Fishery Products; vi) Trade in Fish and Fishery Products; and vii) Emerging Requirements, with list of activities under the respective scopes. Member Countries were requested to give priority (1=lowest priority, 5= highest priority) on each activity under these scopes.

Based on the responses given by the Member Countries, the *priority scopes*¹² and *priority activities*¹³ that should be undertaken by SEAFDEC could be ranked as follows:

¹¹ **Priority roles/functions** of SEAFDEC are ranked by “means” of the priorities given by Member Countries to each category of roles/functions

¹² **Priority scopes** are ranked by “means” of the priority scores of all activities within that scope. However, note should be made that the scopes with the higher “means” not necessary to be more important than those with lower “means”.

¹³ **Priority activities** are grouped by “mode” of the priority score: 5=high priority; 4=moderate priority; 3=low priority (if there are more than one “mode” value, the higher one will be used); then within the same priority group, the activities are ranked by “means” of priority scores

i. Fisheries Management: General Policy Planning and Management (4.44)

Priority	Activities
High	i. Harmonization and compilation of fishery statistics; and enhancing the collection/use of non-routine data and indigenous knowledge for policy planning and management (4.5) ii. Promote the implementation and regionalization of International Agreements/ Instruments (4.4) iii. Facilitate development of common/coordinated positions on international fisheries-related issues (4.4)
Moderate	-
Low	-

ii. Responsible Fishing Technologies and Practices (4.29)

Priority	Activities
High	i. Improving fish quality through on-board handling technologies and good practices (4.7) ii. Improving safety and working conditions of fishers on-board fishing vessels (4.5) iii. By-catch reduction including the implementation of international by-catch guidelines (4.4) iv. Development of appropriate fishing gears, improvement of technologies and practices including selective fishing gears and devices (4.3)
Moderate	v. Reduction of impacts from fisheries to the inland/coastal/marine ecosystems (4.0) vi. Reduction of impacts from fisheries to climate change (including energy saving/ optimization) (3.9)
Low	-

iii. Trade in Fish and Fishery Products (4.22)

Priority	Activities
High	i. Preventing trade of IUU fishing products (4.7) ii. Traceability and certification (4.5) iii. ASEAN standards for fishery and aquaculture products (4.1)
Moderate	iv. Product eco-labeling, branding (3.5)
Low	-

iv. Emerging Requirements (4.18)

Priority	Activities
High	i. Requirements relevant to combating IUU fishing (e.g. port-state measures, etc.) (4.6) ii. CITES-related issues and requirements (4.1) iii. Requirements on safety and working conditions of fisheries workers (4.0) iv. Requirements relevant to Fishery Subsidies (4.0)
Moderate	v. Emerging requirements from the ASEAN Community Building (4.1)
Low	-

v. Fisheries Management: Coastal/Marine Fisheries (4.16)

Priority	Activities
High	i. Management of fishing capacity and combating IUU fishing (4.6) ii. Regional, Sub-regional coordination for fisheries management (4.4) iii. Ecosystem approach to fisheries (4.2) iv. Indicators for sustainable fisheries development (4.2) v. Co-management, rights-based fisheries, strengthening institutions, alternative livelihood (4.1) vi. Habitat conservation/rehabilitation and resources enhancement (e.g. Refugia, ARs, MPAs) (4.1) vii. Conservation and management of species under international concerns (4.0)

Priority	Activities
Moderate	viii. Sustainable exploitation of resources (e.g. under-utilized and deep-sea resources) (4.1) ix. Measures to mitigate impacts of climate change and to build adaptive capacity (4.1) x. Maximizing utilization of by-catch (3.8)
Low	-

vi. Aquaculture (4.15)

Priority	Activities
High	i. Advancing aquaculture technologies (broodstock management to grow out phase) (4.7) ii. Regional Guidelines for good aquaculture practices (4.6) iii. Development of aquaculture feeds to reduce dependence on fish meal and fish-based products (4.5) iv. Minimizing impacts of aquaculture on the environment/biodiversity (4.5) v. Genetic improvement of aquaculture species (4.1) vi. Regional collaboration on disease diagnosis, surveillance and control (4.1)
Moderate	vii. Aquaculture for rural development, food security and poverty alleviation (4.2) viii. Regional Guidelines on Aquaculture Certification (4.1) ix. Capacity building in responsible aquaculture practices (4.1) x. Impacts of climate change on aquaculture (4.0)
Low	xi. Stock enhancement of endangered species (3.7) xii. Energy saving/optimization for aquaculture (3.1)

vii. Post-harvest of Fish and Fishery Products (4.03)

Priority	Activities
High	i. Improving post-harvest technologies and safety/quality of products for export (4.5) ii. Capacity building on analysis of chemicals, drugs, toxins, etc. (4.4) iii. Improving post-harvest technologies and safety/quality of local/traditional fishery products (4.1)
Moderate	iv. Improved handling and preservation, product development and innovation (4.4) v. Optimize utilization of catch, and reduction of post-harvest losses (3.9) vi. Optimizing socio-economic returns from fisheries/post-harvest activities (3.8)
Low	vii. Promotion of “One Village, One Fisheries Products” (3.0)

viii. Fishery Resources (3.80)

Priority	Activities
High	i. Improvement of information on status and trends of fishery resources (4.5) ii. Study on impacts of climate change on fishery resources (4.2) iii. Data collection on shared stocks (4.1) iv. Data collection on species under international concerns (3.9)
Moderate	v. Fishery resources survey in the territorial seas and EEZs (3.8) vi. Fishery resources survey in the inland waters (3.5)
Low	vii. Fishery resources survey in the high-sea and deep-sea areas (3.2) viii. Fish species identification (e.g. deep-sea fishes) (3.0)

ix. Fisheries Management: Inland Fisheries (3.56)

Priority	Activities
High	-
Moderate	i. Habitat conservation/rehabilitation and resource enhancement for inland fisheries (3.9) ii. Indicators for sustainable inland fisheries (3.6) iii. Addressing multiple use resources, and conflict resolution/mitigation (3.3)
Low	iv. Co-management, rights-based fisheries, strengthening institutions, alternative livelihood (3.9) v. Enhancing awareness on the importance of inland fisheries (3.7) vi. Ecosystem approach to inland fisheries (3.4) vii. Management of fishing capacity and combating IUU fishing (3.5)

Priority	Activities
	viii. Enhancing interconnectivity of habitat and mitigating impacts from water infrastructure (3.3)
	ix. Measures needed to mitigate effects of climate change and to build adaptive capacity (3.4)

4. Other views on roles and functions of SEAFDEC

Some Member Countries also provide additional views on roles and functions of SEAFDEC, which are as follows:

- SEAFDEC should implement activities in efficient and cost-effective manner
- SEAFDEC should actively follow-up on international fisheries-related issues/forum and safeguard interest of countries in the region
- SEAFDEC should assist in development and implementation of regional plan of actions to enhance and improve sustainable fisheries development
- SEAFDEC should undertake more work on CITES-related issues and requirements in order to support Member Countries in evaluating listing proposals
- SEAFDEC should incorporate aspect on possible impacts from natural disasters (including Tsunami) in the activities
- SEAFDEC should promote the role of aquaculture for food security and poverty alleviation, particularly for least developed countries
- SEAFDEC should promote collaboration and sharing of existing scientific information/knowledge among countries, including those on inland fisheries research methodologies, inland development and management
- SEAFDEC should help monitoring and providing information on relevant regional/international meetings in advanced; and facilitate sharing of outcomes from these meetings to Member Countries
- Training by SEAFDEC should not be conducted for free of charge on regular basis, but under cost-recovery policy. Some funds could be used to subsidize such training fee. In addition, follow-up and assessment should be undertaken, *e.g.* on the outcomes and benefit from the training
- Activities need to be more open to individual member country requirements, and then develop these to become a regional activity/activities

III. REQUIRED CONSIDERATION BY THE COUNCIL

Taking into consideration the information compiled in this Preliminary Report, the Council Directors are requested to provide feedback to the Secretariat **by the end of December 2011**. After accommodating feedback and additional inputs, SEAFDEC would further submit the final report to the Council Directors by *ad referendum*; and the report would be tabled for discussion and further directives from the Council during its Forty-fourth Meeting in 2012.

JAPANESE TRUST FUND PROGRAM FOR 2012

Japanese Trust Fund Program has following 2 components.

- (1) Japanese Trust Fund II
“Promotion of sustainable use of shared stocks in Southeast Asia”
- (2) Japanese Trust Fund V
“Promotion of sustainable aquaculture and resource enhancement in Southeast Asia”

In 2011, Programs of JTF II and JTF V have been being implemented. These two programs will continue to be implemented in 2012.

Total budget for 2012 is US\$ 1,039,031. This amount is 92.3% of total budget for 2011. The reason of the decrease of JTF budget for 2012 is the constraint of budgetary condition in Government of JAPAN.

JTF Budget for 2012			
	2011 (USD)	2012 (USD)	2012/2011 (%)
TF II	728,433	677,382	93.0
TF V	397,519	372,199	93.6
Total	1,125,952	1,049,581	93.2

TF BUDGETARY REQUIREMENT FOR THE YEAR 2012 (As of 10-18 2011)

Component / Project /Activity	Responsible Departments	2011	2012(Draft)
		Budget (USD)	Budget (USD)
Information Collection for Sustainable Pelagic Fisheries in the South China Sea and Andaman Sea		95,304	88,669
1. Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea	MFRDMD (TD)	75,304	70,100
2. Development of Regional Database for Fishery Management	TD/SEC	20,000	18,569
Development of Demersal Fishery Resources Living in Untrawable Fishing Ground in the Southeast Asian Region		64,000	60,250
1. Deep Sea Fisheries Resources Exploration in the Southeast Asia	TD (MFRDMD)	37,000	35,150
2. Sustainable Utilization of Potential Fisheries Resources and Reduction of Post-harvest Losses	TD	27,000	25,100
Fishery Management of Shared Stocks in Southeast Asian Waters		70,000	62,000
1. Information Collection of Highly Migratory Species in Southeast Asian Waters	TD	26,000	21,500
2. Promotion of Right-based Fisheries and Co-management towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management	TD	44,000	40,500
Research for the Safety of Fisheries Products in the Southeast Asia		41,000	39,000
1. Chemical and Drug Residues in Fish and Fish Products in the Southeast Asia: Biotoxins Monitoring in ASEAN	MFRD	41,000	39,000
Information Collection about International Fisheries Issues		77,000	84,500
1. Assistance for Capacity Building in the Region to Address International Trade-related Issues	SEC/TD	62,000	77,000
2. Cetacean Research in Southeast Asia Waters: Cetacean Sighting Program	TD	15,000	7,500

Component / Project / Activity	Responsible Departments	2011	2012(Draft)
		Budget (USD)	Budget (USD)
Promotion of Sustainable Fisheries and IUU Fishing Related Countermeasures in the Southeast Asia		381,129	342,963
1. Improvement of Information Gathering System for IUU Fishing Related Countermeasures in the Southeast Asia	TD/SEC	79,000	77,000
2. Promotion on Fishing License, Boats Registration and Port State Measures	TD/MFRDMD	115,000	93,950
3. Human Resource Development for Sustainable Fisheries	TD	95,000	79,000
4. Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing related Countermeasures	SEC	92,129	93,013
TOTAL (PROJECT)		728,433	677,382

TFV BUDGETARY REQUIREMENT FOR THE YEAR 2012 (As of 10-19 2011)			
Component / Project / Activity	Responsible Departments	2011	2012 (draft)
		Budget (USD)	Budget (USD)
Promotion of Sustainable and Region-Oriented Aquaculture Practices		99,776	86,400
1. Promotion of Sustainable and Region-oriented Aquaculture	AQD	99,776	86,400
Promotion of Environment-friendly Resource Enhancement		107,365	98,400
1. Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD	46,665	39,200
2. Research and Management of Sea Turtles in Foraging Habitat in the Southeast Asia Waters	MFRDMD /TD	60,700	59,200
Preservation of Critical Fishing Ground		75,800	70,400
1. Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement	TD	75,800	70,400
Food Safety of Aquaculture Products		114,578	117,000
1. Traceability Systems for Aquaculture Products in the ASEAN Region	MFRD	33,518	31,100
2. Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD	60,277	46,800
3. Food Safety of Aquaculture Products in Southeast Asia	AQD (MFRD)	20,783	39,100
TOTAL (PROJECT)		397,519	372,200

**SEAFDEC DEPARTMENTAL PROGRAMS OF ACTIVITIES
FOR THE YEAR 2011-2012**

SEAFDEC Departmental Programs for the Year 2011-2012 are listed below, of which detailed information on the respective project appears as *Appendix 1*, *Appendix 2* and *Appendix 3*.

Program Title	Responsible Department	2011	2012	
Center-wide Information Network	SEC	Y	Y	<i>Appendix 1</i>
Information and Communication Technology	TD	Y	N	<i>Appendix 2</i>
Tailor-made Training and Study Tour	TD	Y	N	
Promotion and Enhancement Fisheries Information	TD	N	Y	
Improvement of Fisheries Technology and Reduction of the Impacts from Fishing	TD	N	Y	
Integrated Mollusk Production	AQD	Y	N	<i>Appendix 3</i>
Mud crab and Shrimp Domestication	AQD	Y	N	
Marine Fish	AQD	Y	N	
Small-holder Freshwater Aquaculture	AQD	Y	N	
Seaweed Strain Improvement	AQD	Y	N	
Aquatic Ecology	AQD	Y	N	
Adapting to Climate Change Impacts	AQD	N	Y	
Healthy and Wholesome Aquaculture	AQD	N	Y	
Maintaining Environmental Integrity through Responsible Aquaculture	AQD	N	Y	
Meeting Socio-economic Challenges in Aquaculture	AQD	N	Y	
Quality Seed for Sustainable Aquaculture	AQD	N	Y	

Y = Program implemented during the year

N = Program not implemented during the year

**SEAFDEC DEPARTMENTAL PROGRAMS OF ACTIVITIES
FOR THE YEAR 2011-2012**

THE SECRETARIAT

For SEAFDEC Secretariat, one Departmental Program on “Center-wide Information Network” was implemented in 2011, and proposed for 2012.

PROGRAM DOCUMENT

Program Category:	Departmental Program
Program Title:	Center-wide Information Network
Responsible Department:	SEAFDEC Secretariat
Total Duration:	Since 1998

1. INTRODUCTION

Considering the vital role of information as a tool in the development and management of fisheries, the program on Center-wide Information Network was initiated and adopted by the Council of SEAFDEC in 1998. Since then, based on SEAFDEC Information and Communication Policies, the Secretariat has developed several information and statistics programs and services to support management and development of sustainable fisheries in the region. In addition, during its 38th Meeting, the SEAFDEC Council endorsed the Information Strategies for Enhancing SEAFDEC Visibility and Communication, which is envisaged to streamline information activities in a more cost-effective manner, and enhance visibility of the organization. Since then, activities under the Program have therefore been formulated and implemented in-line with the adopted Information Strategy.

2. PROGRAM

The Program on Center-wide Information Network aims at keeping the Member Countries, other organizations and public well informed of SEAFDEC activities; raising public awareness and visibility of SEAFDEC; providing various forms of fisheries information to support decision-making, management and development of fisheries sector; and enhancing communication/ coordination and information sharing both within SEAFDEC and with others.

In order to achieve the above objectives, the program will generate tools and materials to promote activities and visibility of the Center as a whole; widen the dissemination of useful fisheries information; enhance communication among the SEAFDEC staff and communication within SEAFDEC, with the Member Countries and other organizations; and provide HRD opportunities would also provided for the relevant SEAFDEC staff in order to improve the undertaken of relevant activities. In addition, the program also provide platform for overall monitoring of the progress undertaken by all Departments in the implementation of the Information Strategies in order that the progress be appropriately report to the SEAFDEC Council at its annual meeting.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Activities were undertaken by the Secretariat in collaboration with Departments in 2011 as follows:

Activity Title	Duration	Remarks
Production and dissemination of Annual Report 2010 SEAFDEC Annual Report publishes highlighted activities and achievement of SEAFDEC during the annual working cycle. 1,000 copies of Annual Report 2010 were prepared and distributed to Member Countries, Network Libraries, fisheries-related institutions/ organizations, collaboration organizations, and interested people.	Q1-3	100%
Information Compilation CD-ROM 2010 CD-ROM containing information/technical materials published by SEAFDEC Secretariat and Departments in 2010 were prepared and provide to the SEAFDEC Council during the 43 rd annual meeting.	Q1	100%
Production and dissemination of reports of SEAFDEC annual meetings <ul style="list-style-type: none"> • Report of the 33rd SEAFDEC Program Committee Meeting • Report of the 13th FCG/ASSP Meeting • Report of the 43rd SEAFDEC Council Meeting 	Q1 Q1 Q2-3	100% 100% 100%
Production and dissemination of Newsletter Volume 33 Number 4 and Volume 34 Number 1-3 SEAFDEC Newsletter publishes activities of SEAFDEC in promoting fisheries development in Southeast Asia, with inputs from all SEAFDEC Departments and Member Countries (if any). Current production is 1,600 copies, distributed to Member Countries, Network Libraries, fisheries-related institutions/organizations, collaboration organizations, and interested people. Newsletter is also available through SEAFDEC Website. In addition to the English version, approximately 200 copies of Japanese version Newsletter were also produced for distribution in Japan.	Q1-Q4	75% (Vol.34 No.3 will be published by Q4)
Production and dissemination of Special Publication “Fish for the People” Volume 9, Number 1-3 The Special Publication will be in easy reading style, targeting not only the technical people but also the non-technical including policy makers, young scientists and managers and others who are interested in the fisheries issues in ASEAN region. The number of copies for Vol.9 No.1 and No.3 is 1,500 copies/issues, while for Vol.9 No.2, 2,000 copies were produced as special issues for dissemination during ASEAN-SEAFDEC Conference. The Special Publication is also available through SEAFDEC Integrated Website.	Q1-Q3	100%
Fishery Statistical Bulletin of Southeast Asia <ul style="list-style-type: none"> • Fishery Statistical Bulletin for 2009 • Fishery Statistical Bulletin for 2010 	Q1-3 Q4	100% 40%
SEAFDEC Calendar 2012 (2,500 copies) SEAFDEC Calendar 2012 was produced/ disseminated to promote the visibility of SEAFDEC, particularly the Resolution as adopted by the ASEAN-SEAFDEC Ministers during the Conference. Illustrated in the Calendar are selected drawings from the National Drawing Contests organized as part of the Conference.	Q3-4	100%
Maintaining and improving of the Website and Secretariat e-mail system <ul style="list-style-type: none"> • Maintaining e-mail system of SEAFDEC Secretariat • SEAFDEC Integrated Homepage (www.seafdec.org) • Portal Website for the ASEAN-SEAFDEC Strategic Partnership (http://www.asspfisheries.net) 	Q1-Q4	On-going
Other promotional activities <ul style="list-style-type: none"> • SEAFDEC Introductory Video • SEAFDEC Brochures (3,000 copies) • SEAFDEC Information Catalogue 2011 (2,000 copies) • Conference promotional materials/activities, e.g. Conference video, Conference Website, Conference Third Announcement, Third Press Conference, etc. 	Q1 Q1 Q1 Q1-Q2	100% 100% 100% 100%

Activity Title	Duration	Remarks
Twelfth SEAFDEC Information Staff Exchange Program Meeting The 12 th ISEP was organized from 3-4 November 2011 hosted by MFRDMD. The ISEP reviewed the achievements and monitor the progress of implementation of SEAFDEC information activities, and the Information Strategy; discussed and concluded activities to be incorporated under the Center-wide Information Network Program framework in 2012; and identified initiatives to be undertaken to enhance the SEAFDEC information activities and visibility in the future.	3-4 Nov.	100%
Enhancing communication and coordination through Regional Fisheries Policy Network (RFPN) In 2011, SEAFDEC Secretariat was stationed by Regional fisheries Policy Network (RFPN) comprises members from Indonesia, Malaysia, Myanmar, Philippines, and Thailand (with support from Sida) and Cambodia, Lao PDR and Vietnam (with support from Japanese Trust Fund). The main roles of the RFPN are to promote the formulation of regional fisheries policies and recommendations on the important regional fisheries-related issues. The RFPN also assist in coordination with Member Countries, and to promote closer collaboration between SEAFDEC and Member Countries. <i>Remarks: During Q3-Q4, there is no RFPN from Cambodia and Vietnam</i>	Q1-Q4	On-going

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The activities proposed for 2012 include:

Activity Title	Remarks	Approximate costs (USD)*
1. Production of SEAFDEC Annual Report 2011	1,000 copies	5,600
2. Information Compilation CD-ROM 2011	50 copies	500
3. Production of the reports of SEAFDEC Annual Meetings (PCM, FCG, Council)	150 copies each	6,800
4. Production of SEAFDEC Newsletter Vol. 34 No.4, Volume 35 No.1-3	1,600 copies each	6,100
5. Production of Special Publication: "Fish for the People" Vol. 10 No. 1-3	1,500 copies each	(Supported by JTF)
6. Compilation and Production of Fishery Statistical Bulletin 2010 and 2011	400 copies each	3,500
7. Production of SEAFDEC Calendar 2013	2,500 copies	4,000
8. Production of SEAFDEC New Year Card 2013	Hard copy and e-card	1,000
9. Developing and maintaining Websites and Secretariat e-mail system <ul style="list-style-type: none"> • Maintaining e-mail system of SEAFDEC Secretariat and MFRD • SEAFDEC Integrated Homepage • ASSP Portal Website • Development of repository center for SEAFDEC Publications 		10,500
10. Production of other promotional materials e.g. brochures, posters, etc.	(on demand)	(1,000)
11. Thirteenth SEAFDEC Information Staff Exchange Program (ISEP) Meeting		15,000
12. Enhancing communication and coordination through the Regional Fisheries Policy Network (RFPN)		(Supported by Sida and JTF)

* For the activities that use MRC, approximate costs were indicated in the last column, including production and mailing costs (Total MRC budget for Information Program = US\$ 54,000)

Tentative Timeframe

Activity	J	F	M	A	M	J	J	A	S	O	N	D
1. Production of SEAFDEC Annual Report 2011												
2. Information Compilation CD-ROM 2011												
3. Production of 34 th PCM Report												
4. Production of 14 th FCG/ASSP Meeting Report												
5. Production of 44 th Council Meeting Report												
6. Production of SEAFDEC Newsletter Vol. 34 No.4, Volume 35 No.1-3												
7. Production of Special Publication: "Fish for the People" Vol. 10 No. 1-3												
8. Compilation and Production of Fishery Statistical Bulletin 2010 and 2011												
9. Production of SEAFDEC Calendar 2013												
10. Production of SEAFDEC New Year Card 2013												
11. Developing and maintaining websites and e-mail system												
12. Other promotional materials/activities	<i>(On demand)</i>											
13. Preparation/conduct of 13 th ISEP Meeting												
14. Enhancing communication and coordination through the RFPN												

**SEAFDEC DEPARTMENTAL PROGRAM OF ACTIVITIES
FOR THE YEAR 2011-2012**

TRAINING DEPARTMENT

1. Information and Communication Technology

Four exhibitions and displays of TD activities were organized and more than 57,100 visited TD booth. Two volumes of Advance Fisheries Technology Magazine (volume three will be printed in December 2011) were published. TD souvenirs such as key chains, bookmarks, T-shirts and polo-shirts were produced and distributed to the public and worldwide. The development of five E-books such as a Tanu story, Story of a boy named Por, TD website on TEDs and JTEDs was initiated. Moreover, Nine VCDs on training courses, TD project implementation and meetings were produced and twelve publications and reports were printed.

2. Tailor-made Training and Study Tour

In the year 2011, there were about 5 regional/international and 3 nation level tailor-made training courses, study tour programs and practical training programs that were conducted by TD based on the need and requirement from partners. The programs were designed and planned out by the consultation and agreement of TD and training partners. This included the choice of subjects, duration, location, and target participants.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Information and Communication Technology
Responsible Department: Training Department
Total Duration: 1 year (2011)

1. INTRODUCTION

Presently, Information Technology (IT) is essential for communication inside and outside the organization and worldwide. IT has been developed as a high technology to support the implementation of activities in the organization. Information and Communication Technology as information service, the Internet and multimedia in Training Department have to be developed and improved to support SEAFDEC and Training Department activities. Moreover, it is the channel to promote SEAFDEC visibility to worldwide.

2. PROGRAM

2.1 Objectives:

- 1) To promote role of TD and organization to worldwide
- 2) To manage and develop TD's information communication technology
- 3) To utilize and apply new technology for department

2.2 Program Description:

In 2011, The Department implemented activities to promote role and awareness raising TD and organization to worldwide. The activities on public relations, information and communication technology development and development and production multimedia packages were conducted.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

In 2011, the Training Department continued to implement a project on Information and Communications Technology under the Departmental Program. The following activities were implemented:

3.1 Public Relations

TD organized four exhibitions and displays of TD activities to present and promote SEAFDEC roles in sustainable fisheries development in the ASEAN region. An audience of more than 57,100 visited TD booth. Two volumes of Advance Fisheries Technology Magazine (Volume Three will be printed in December 2011) and TD souvenirs such as key chains, bookmarks, T-shirts and polo-shirts were produced and distributed to the public and worldwide. An article focusing on fisheries was also written and appeared in the column titled "Open fishery in the world" of local newspaper every month. Moreover, TD always extends a warm welcome to delegations and guests from member countries and other organizations. TD considers it as an important channel for public relations of SEAFDEC.

3.2 Information and Communication Technology Development

Information databases, data links, news and activities/events on TD website were updated in time. The development of five E-books such as a Tanu story, Story of a boy named Por, TEDs and JTEDs on TD website were initiated. Moreover, electronic newsletters and Advance Fisheries Technology were produced and distributed to TD network and worldwide.

3.3 Development and Production Multimedia Packages

Nine VCDs on TD's training courses, project implementation and meetings were produced to promote TD organization and activities. Twelve publications and reports were printed and served as new information to develop capacity of those who are engaged in the fisheries field. They were distributed in all occasions to share and exchange information among fisheries related organizations and through networks.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

Program ended in 2011.

PROGRAM DOCUMENT

Program Category:	Departmental Program
Program Title:	Tailor-made Training and Study Tour
Responsible Department:	Training Department
Total Duration:	1 year (January-December 2012)

1. INTRODUCTION

The significance and value of training has long been recognized. Consider the popular and often repeated quotation, "Give a person a fish and you feed him for a day. Teach a person to fish and you feed him for a lifetime." To provide training staff not only helps them develop their skills and knowledge, but it is also motivational and a building block to organizational success.

Moreover, in referring to the Resolution on Sustainable Fisheries for Food Security Towards 2020 which adopted in ASEAN-SEAFDEC Conference Fish for the People 2020 "Adaptation to a Changing Environment" in Bangkok, Thailand during 13-17 June 2011 emphasised to Strengthen human capacity of relevant stakeholders through mobilization of resources and the harmonization of initiatives that support fisheries communities and governments, with a special focus on the women and youth.

In each year TD has conducted several regional training courses that are a channel to transfer activities outcomes and technology, which are found out or developed by SEAFDEC to its member countries. Therefore, participants will come home with knowledge about "how they learn and how they do in SEAFDEC/TD, Thailand". In addition to the said courses, in every year SEAFDEC/TD has also be requested to conduct some tailor-made courses 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 organizations. From this kind of course, they can get enormous benefit in developing the capabilities of their workforce. However, training do not come cheaply. Training needs to be for right people, it needs to be a right type/design of training and it needs to be carried out at the right time. Due to them, participants' background, work responsibilities, objectives and expectation to be able to do at the end of the training course/program will be used for course designing. It is tailored in response to the specific training needs of requesting organization's staff. The tailor-made training courses programs which are conducted by TD emphasize learning by doing and 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. PROGRAM

2.1 Objectives:

- 1) To provide a wide range of tailor-made training courses in the field of fisheries and other relevant aspects to other organizations/institutes.
- 2) To fully utilize training facilities of the TD and make use of them for the Member Countries and the region.
- 3) To raise fund which supports courses from other donors/organizations.

2.2 Program Description:

The tailor-made training courses will be conducted based on the need and requirement from partners. The programs will be designed and planned out by the consultation and agreement between 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 supported by the organization partners to TD and the fee will be estimated based on the cost recovery and actual expense.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Tailor-made Training Programs

3.1.1 Thailand

Short-term training course for university students

Two short-term training courses for university students were held at SEAFDEC/TD from 14 to 24 March (Batch 51) and 19-29 October 2011 (Batch 52), respectively. The courses focus on raising awareness and understanding on sustainable coastal fisheries management as well as the responsible fisheries to young university students as the new generation. Courses consisted of class presentation, discussion, practice for the basic fishing gear construction, study survey to fishing villages and ship board training. About 45 university students attended to each training course, for the Batch of 52 There were six students from two Universities of Japan (Hokkaido and TUMSAT Universities) attend to the training course.

A long-term training course on fishing operation for Pramong Tinasulanon 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. The course is conducted for four months, from 3 October 2011 to 24 February 2012. 9 students attended this training course for this batch.

Practical Training/On the Job Training Courses for University Students

In the year 2011, six (6) practical training courses were organized at SEAFDEC/TD. About nineteen (19) students from six (6) different universities, namely, Rajamangala University of Technology Srivijaya, Trang Campus, Walailak University, Thai Chamber University, King Mongkut's Institute of Technology Ladkrabang Chumporn Campus, Silpakorn University, Phetchaburi Campus and Asian Institute of Technology (AIT) completed the practical training on oceanographic research and survey in SEAFDEC/TD.

3.1.2 Malaysia

A Special Training Program and Study Visit to Educational Institute Management

This training program was conducted for 30 officers from NATC and DOF of Malaysia from 25-29 January 2011. It focused upon the educational institute management and aspects of knowledge on aquaculture research, marine fisheries research and management. Its program activities were composed of presentation/discussion, study visit to the related and concerned places such as Tinsulanonda Fisheries Collage, Rajamangala University of technology Srivijaya, Prince of Songkla University, Coastal Aquaculture Research Institute, Southern Marine Fisheries Research and Development Center-Songkhla and Songkhla Fishing Port.

Onsite Training for the Trainers Course on Line Fishing Operation

This onsite training course was conducted for about 12 fishing technologist and fishing instructors/operators at Labuan, Malaysia, from 26 September to 3 October 2011. The course aimed to provide knowledge and experience in long line fishing technologies and practices. Participants are trained on the entire process of long line fishing technology, *i.e.*, fishing gear materials, tuna long line construction and its accessories, bottom and tuna long line design, practice on tuna long line construction and shipboard training on long line fishing operation. The course also addressed the fishing techniques consideration of selective characteristics.

Onsite Training for the Trainers Course on Coastal Purse Seine Fishing Operation

This onsite training course is conducted at Lumut, Malaysia, from 17 to 24 October 2011. The course objectives are to train fisheries officers/instructors on the coastal purse seine technologies and operation. Subjects included in the course are the use of echo sounder, sonar and purse seine operation (materials, purse seine construction and operation).

Onsite Training for the Trainers Course on Trawl Fishing Operation

This onsite training course was conducted for about 15 participants of fishing gear technologists, fishing gear instructors/operators and fisheries managers at Ache, Lumut, Malaysia, from 7 to 16 November 2011. The course aimed to train its participants on the trawl fishing technology such as trawl net material, construction of trawl net and its accessories, design and operation of trawl net. Shipboard training for trawl fishing operation was also covered in the training course.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

TD will continue to support Member Countries and other organizations/institutes to build up human capacity on the fisheries related issues especially based on the need and requirement of training partners/donors. The course titles, programs and activities will be designed based on the requirements/needs from the training partners. SEAFDEC's Member Countries can request TD to conduct the tailor-made training programs.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Promotion and Enhancement Fisheries Information
Responsible Department: Training Department
Total Duration: 1 year (January-December 2012)

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” and “Adaptation to a Changing Environment” in Bangkok, Thailand during 13-17 June 2011 emphasize 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, TD will initiate the project on “Promotion and Enhancement Fisheries Information” to promote and enhance fishery information which implement by TD which has benefits to member countries and public.

2. PROGRAM

2.1 Objectives:

- 1) To promote and enhance fisheries knowledge to public;
- 2) To deliver fishery information to public; and
- 3) To establish network on fisheries information with other organizations and institutions.

2.2 Program Description:

In 2012, TD will initiate a new project under Departmental Program, namely, “Promotion and Enhancement Fisheries Information”. This project will consist of three main activities. They are 1) Promotion and Enhancement of Fisheries Knowledge, 2) Production of Advance Fisheries Technology Magazine, and 3) Establishment of Fishery Information Network.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

This program would start in 2012.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project Activity Title	Duration	Remarks
1) Promotion and Enhancement of Fisheries Knowledge The knowledge on fisheries topic in the region including the implementing activities on TD projects in collaboration with SEAFDEC Member Countries will be promoted and enhanced to public via national and international exhibitions as required	Jan.-Dec.	

<p>2) Production of Advance Fisheries Technology Magazine Three volumes of The Advance Fisheries Technology Magazine (AFT) will be produced. The AFT magazine will review and present new and advance fisheries technology in the world which might be applied to the Southeast Asian Region. Moreover, TD project implementation in collaboration with SEAFDEC Member Countries will also be promoted worldwide in this magazine. The AFT magazine will be produced as hardcopy and electronic file and then, distributed to TD network and the public via e-mails, the mail, workshops, meetings, exhibitions and etc.</p>	<p>Apr. Aug. Dec.</p>	
<p>3) Establishment of Fishery Information Network At the first step to implement this activity as a pilot, the Meeting on Fishery Information and Establishment of Network will be organized in Thailand. The objectives of this meeting are the establishment of fishery information network to share and exchange related fishery information in the future, consultation and improvement of training course curriculum. Some of training courses such as university student training courses will be used as case study for improvement. Representative(s) from other organizations/ institutions in Thailand will be invited to participate in this meeting.</p>	<p>Jul.</p>	

4.2 Expected Outcomes

- The public will receive the knowledge on fisheries technology and related issues especially that implementing by TD in collaboration with Member Countries
- Collaboration between TD and other organizations/ institutions in fisheries information technology, training information through information exchange via E-mail, network group, website and etc.

PROGRAM DOCUMENT

Program Category:	Departmental Program
Program Title:	Improvement of Fisheries Technology and Reduction of the Impact from Fishing
Responsible Department:	Training Department
Total Duration:	2012

1. INTRODUCTION

Several of activities on research and development for improvement of appropriate fisheries technology to support sustainable fisheries and their maximum utilization have been conducted under this program. The activities under this program can be categorized into seven activities as follows:

- 1) Improvement of fish handling onboard fishing vessels through the use of sherbet ice (2011);
- 2) Exhaust heat recirculation for energy optimization onboard fishing vessels for the refrigeration system (2011 and onward);
- 3) FADs monitoring in Andaman Sea (2011);
- 4) Fisheries information improvement: deep-sea fisheries resources (2011~2013);
- 5) Study on reduction of energy use in trawl fishing (2011 and onward);
- 6) Set-net for community-based fisheries management (2011); and
- 7) Study on impact of light fishing on fishery resources around artificial reefs area (2011~2012).

2. PROGRAM

2.1 Objectives:

The program comprise objectives as follows:

- 1) To strengthen collaboration with relevant agencies at the national level;
- 2) To promote/introduce the use of fisheries technologies in response to the current situation of fishery resources and other emergency issues;
- 3) To transfer major findings to other Member Countries of SEAFDEC;
- 4) To promote and build public awareness of the fisheries co-management concept by means of set-net fishing gear activity;
- 5) To provide an alternative source of income for the local fishers to uplift their livelihood; and
- 6) To promote the concept of energy saving aspects in terms of reduction of fuel consumption in fishing operation; and
- 7) To develop database for managing the existing data collected from the resource surveys.

2.2 Program Description:

1) *Improvement of fish handling onboard fishing vessels through the use of sherbet ice (2011)*

This activity was implemented with the financial support from the Fish Marketing Organization of Thailand (FMO Thailand) with the aim to promote and support utilization of fishery resources, promotion on the use of improved fish handling techniques for better environmental friendly fish handling/preservation technique to be applicable for small and medium scale of fishing boats will be implemented. The activity of this program includes the training course on the technique by introducing the shurry system with the sherbet ice (produced from seawater). In addition, other good practices for improvement of fish quality onboard fishing vessels will also be introduced and discussed during the training course.

2) *Exhaust heat recirculation for energy optimization onboard fishing vessels for the refrigeration system (2011~2013)*

To optimize the use of energy in fishery sector, development of the system to recirculate the exhaust heat of the fishing vessels will be carried out under this activity with the financial support from FMO

Thailand. Prototype of exhaust heat circulation based on development of a “*calcium chloride salt system*” which is installable for onboard fishing vessels (middle and commercial-scale) will be developed. This technology will be transferred to fishers and other key stakeholders for future application. It is envisaged that the energy consumption onboard fishing vessels will be reduced through this initiatives.

3) *FADs monitoring in Andaman Sea (2011)*

This activity was developed with the aim to monitor the effectiveness on the use of FADs in gathering tuna resources in Andaman Sea area. Moored or anchored FADs were used and deployed in Andaman Sea area in 2008 and 2010 by M.V. SEAFDEC. It would provide the alternative fishing area in the deep-sea water.

4) *Fisheries information improvement: deep-sea fisheries resources (2011~2013)*

Based on the previous and current data/information collected by M.V. SEFADEC and R.V. Chulabhorn, and R.V. Mahidol, database system will be developed to facilitate better understanding of the deep-sea fishery resources in the survey areas. It is envisaged that the followings will be achieved from the activity implementation:

- Manual for deep-sea fisheries resources information collection
- Manual for using information/database system for deep-sea fishery resources exploration
- Manual for database manager for deep-sea fishery resources exploration
- Harmonized documents for deep-sea fishery resources exploration
- Establishment of the database system for deep-sea fishery resources exploration

5) *Study on reduction of energy use in trawl fishing (2011 and onward)*

This activity was developed to explore ways to reduce energy consumption of the trawlers as it is major type of fishing vessels in Thailand and in the Southeast Asia. Review of relevant studies and study experiment using M.V. Plalung will be carried out. Comparison of: (i) energy consumption for modified- and the conventional design of the trawl net; data collection on catch composition in terms of diversity index; and other key issues considering the reduction of energy consumption in trawl fishing will be made.

6) *Set-net for community-based fisheries management (2011)*

This project was partly funded by the Government of Japan through SEAFDEC and technology transfer from the Set-net Fisheries Cooperatives of Himi City, Toyama Prefecture, Japan under the JICA-Grass root Partnership Program. The project aimed to alleviate fishing constraints in the coastal areas, develop the basic concepts of coastal fisheries management and to protect, rehabilitate and enhance the coastal fisheries resources by means of Set-net fishing gear.

The project area is in Bang Sapan Bay, Bang Sapan District, Prachuab Kiri Khan Province to support and prove the performance of set-net and to establish and promote the co-management concept to the local fisher groups started in 2011 by the Department of Fisheries. The project provides some materials and technology transfer of set-net.

7) *Study on impact of light fishing on fishery resources around artificial reefs area (2011~2012)*

In order to obtain better understanding on the impact from fishing with lights on fishery resources around the area of artificial reefs, implementation of the activity includes three major sub-activities as follow:

- Study on the catch composition from fishing with lights
- Study on the underwater light migratory pattern
- Study on the relationship between distance of fishing operation and its catch composition

It was envisaged that recommendation on the appropriate distance for fishing operation using lights will be made for further establishment of proper measures at national and local level.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

1) *Improvement of fish handling onboard fishing vessels through the use of sherbet ice (2011)*

The shurry system was completely built.

2) *Exhaust heat recirculation for energy optimization onboard fishing vessels for the refrigeration system (2011~2013)*

The “calcium chloride salt system” to be used as the prototype of exhaust heat circulation is being developed.

3) *FADs monitoring in Andaman Sea*

Data collected during the cruise survey of M.V. SEAFDEC in Andaman is currently analyzed. It includes: catch composition using pelagic longline, drifting vertical longline, squid jigging, trolling line, and handline; fish larvae identification; gonad and stomach content (index of relative importance) of the selected species (deep-sea squid, dolphin fish, skipjack tuna); daily growth rate of the selected species; oceanographic survey; hydro-acoustic survey; nutrients. Cruise reports of the survey made by M.V. SEAFDEC were published. It is envisaged that the draft report of major findings could be circulated for information around the end of 2011.

4) *Fisheries information improvement: deep-sea fisheries resources (2011~2013)*

Technical meeting was organized with the aim to harmonized information/data collection format. Participants of the meeting include technical staff of SEAFDEC and fisheries officials who responsible for deep-sea fishery resources exploration. The output from the Meeting will provide a basis for further development of the database system for managing the previous and current data/information collected by SEAFDEC and DOF-Thailand in deep-sea area of Andaman Sea.

5) *Study on reduction of energy use in trawl fishing (2011 and onward)*

Trawl net that will be used for the sea trial and experiment is now designing and to be constructed. Desk study to review the outputs from the past and ongoing initiative/study related to the reduction of energy consumption in trawl fishing is carried out. Planning of the sea trial and experiment will be made in close collaboration with DOF Thailand.

6) *Set-net for community-based fisheries management (2011)*

An on-site training on set-net construction has been carried out. The training was attended by Bang Sapan Fisher Group. The installation of a Choko-ami Japanese type set-net was completed in February 2011. After that the set-net hauling operations have been made every 2 days in the morning by the fisher group. Catch data were collected and maintained by the DOF. Three consecutive follow-up surveys have been made by the project in March, April and June 2011 to repair and maintain good performance of set-net. An annual evaluation of this project is scheduled to be made in November 2011.

7) *Study on impact of light fishing on fishery resources around artificial reefs area (2011~2013)*

Preliminary survey on fishing gears using lights in the area of artificial reefs was carried out. Depth of the penetration of light intensity under the seawater from anchovy purse seine, anchovy falling net and squid cast net was measured. And catch composition from squid cast net was also collected.

Data from the survey was analyzed and report of the survey was submitted to DOF Thailand.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

1) *Improvement of fish handling onboard fishing vessels through the use of sherbet ice (2011)*

There is yet confirmation on the source of financial support from FMO Thailand. However, it is envisaged that the technology on the developed system will be transferred to the key stakeholders including fishers, fishery managers, concerned private sectors, etc.

2) *Exhaust heat recirculation for energy optimization onboard fishing vessels for the refrigeration system (2011~2013)*

The prototype for using the exhaust heat recirculation using “calcium chloride salt system” will be further promoted and modified where applicable and appropriate. It is planned that training programs will be organized in close collaboration with FMO and DOF Thailand.

3) *FADs monitoring in Andaman Sea*

Information based on the major findings of the project will be disseminated to the key stakeholders.

4) *Fisheries information improvement: deep-sea fisheries resources (2011~2013)*

Development of database system will be continued. It is also planned that national meeting for development of tuna fishery information in relation to oceanographic conditions will be carried out. During the meeting, the database system for the tuna fisheries resources based on data/information collected over the years will be tested. All reports of findings from the activity implementation will be published and disseminated to DOF-Thailand and other relevant agencies/meetings.

5) *Study on reduction of energy use in trawl fishing (2011 and onward)*

Sea trial and experiment will be carried out. Result from the experiment will be analyzed together with the reviewed documents. Findings and recommendation for improvement of fishing technology especially for the reduction of energy consumption in trawl fishing will be made through the report.

6) *Set-net for community-based fisheries management (2011)*

No activity will be implemented in 2012.

7) *Study on impact of light fishing on fishery resources around artificial reefs area (2011~2013)*

Sampling survey will be continued until the first quarter of 2012. Reports of the studies that carried out in 2011 will be published.

4.1 Expected Outcomes

The expected outcomes from this program are:

- Catch quality onboard, especially the medium- and commercial-scale fishing vessels improved;
- Technology on the use of sherbet ice onboard fishing vessels transferred;
- Prototype of the system of recirculating the exhaust heat for energy optimization (reduction) developed and to be further promoted as the alternative energy;
- Major findings on the potential tuna fishery resources in Andaman Sea reported.
- Way forward to improve designs/constructions of fishing gear and practices for reduction of energy consumption
- Database system for some commercially important species in Andaman Sea established
- Appropriate measure for management of light fishing in the artificial area established.

SEAFDEC DEPARTMENTAL PROGRAMS OF ACTIVITIES FOR THE YEAR 2011-2012

AQUACULTURE DEPARTMENT

1. OVERALL REVIEW

The accomplishments of SEAFDEC/AQD during the period covered by this report are based on strategic thrusts which overall, are expected to assist the SEAFDEC Member Countries in addressing issues related to aquaculture development and its contribution to food security. These thrusts are being addressed through activities of Departmental Programs and Regional Programs. In 2011, the Departmental Programs focused on the following areas: (i) Integrated Mollusk Production; (ii) Mud crab and Shrimp Domestication; (iii) Marine Fish Production; (iv) Small-holder Freshwater Aquaculture; (v) Seaweed strain improvement; and (vi) Aquatic Ecology.

The highlights of accomplishments under these Programs are summarized in the sections below:

1.1 Integrated Mollusk Production

The program focused on donkey's ear abalone, *Haliotis asinina* and addressed the following objectives: (i) produce seed stocks for stock enhancement and abalone grow-out aquaculture, (ii) create a science-based technology that is economically-viable and appropriate to the region, (iii) demonstrate developed technologies for seed production and culture, and (iv) disseminate information on SEAFDEC/AQD developed technologies. The progress of activities is discussed below:

In 2011, studies were conducted to refine the culture techniques during the hatchery phase. One of the studies conducted was on the mass production and utilization of diatom diets (*Cocconeis* sp./ *Nitzschia* sp.) to improve the settlement rate and growth of abalone postlarvae. To reduce dependence on diatoms and to provide a more balanced diet for the young postlarvae, a microparticulate diet was also developed. Results showed that daily feeding of the larvae with microparticulate diet is best in terms of larval settlement.

To improve the quality of seeds and to develop a strategy for genetic management of abalone, new sets of breeders from other places in the Philippines (Palawan/Masbate) were collected and bred. Preliminary results showed that several years (or generations) of domestication had no adverse effect on the performance of the hatchery stocks since the growth of progenies of breeders being maintained at the hatchery was better than the growth of cohorts of the newly domesticated breeders from Masbate and Palawan. In another experiment, the role of the microbial biota in the abalone hatchery was further studied.

Under the nursery and broodstock systems, seven continuing studies have been implemented with the addition of finding other suitable macroalgae as alternative feed to abalone juveniles and breeders, besides *Gracilaria bailinae* which is limiting. Highest daily increase in shell length and body weight in both juvenile and adult were still attained by *G. bailinae*-fed abalones. Meanwhile, the culture conditions of the marine thraustochytrid *Schizochytrium* sp. was optimized and will be used as lipid/DHA source for the artificial diet of abalone juveniles. To improve the spawning frequency and the quality of larvae during hatchery phase, broodstock diets were developed and feeding trials of four kinds of diets with varying protein/energy ratios are on-going.

The financial viability of using four types of nursery cages (black box; round mesh cage, prefabricated, black plastic tray and blue box) and stocking densities of 500 and 1,000 pieces m⁻² shelter surface area in the nursery rearing of abalone was assessed and verified. Abalone juveniles reared in black boxes had the highest average body weight (8.3 g) and lowest, in blue boxes (6.9 g). To demonstrate AQD's developed technologies for seed production and culture, the large-scale

production of *H. asinina* juveniles was continued. Also, the successful seed production and economic feasibility of using low-cost hatchery facility was demonstrated. In another experiment, the abalone hybrids growth performance in sea-based cages and the quality of meat were evaluated and compared with the pure *H. asinina*. The F₁ of HAFGM (*H. asinina* female x *H. glabra* male) presumptive hybrids grew better than the pure *H. asinina* strain. Also, the pure *H. asinina* was found to have superior taste compared to the two presumptive hybrids (HAFGM and HAFPM- *H. asinina* female x *H. planata* male).

1.2 Mud Crab and Shrimp Domestication

The program aims to develop techniques for sustainable production of good quality broodstock and seed of indigenous species of shrimp and mud crab, *Scylla serrata*. Studies are conducted towards selective breeding of target species to address this goal. As a prerequisite 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. Stock assessment and socio-economics of each culture phase are included to evaluate impacts of adoption of generated technologies. The activities are also linked with AQD's regional program on 'Sustainable Aquaculture'. The progress of activities is discussed below:

Shrimps

Domestication and selective breeding efforts are also being undertaken for *P. indicus*. About 20 batches of F₂ have been produced from matings between wild broodstock from Tigbauan, Antique, and Negros. The number of eggs, nauplii, and hatching rate did not show increasing or decreasing trends with rematuration. In another experiment, *P. indicus* F₂ postlarvae were stocked in the pond to determine if harvesting the stock after 2 months (short term) will be economically feasible.

Marine annelids (polychaetes) have been shown to improve the reproductive performance of crustacean broodstock. Techniques for breeding and culture of these organisms is being developed to ascertain a sustainable supply of live food for shrimp and mud crab adults. The growth and survival of annelids were higher in gravel and sand substrates.

P. quatrefagesi was used as an ingredient to replace a mixture of fish meal, shrimp meal and squid liver meal in the diets of shrimp and mud crab. At 1.5-4.5% level in the diet, *Perinereis* meal, squid meal and their 1:1 combination promoted higher growth in shrimp and mud crab juveniles than the control diet (no annelid and squid meal). Survival was not affected by diet.

Mud Crab

For this year, activities on mud crab, *S. serrata*, have been directed towards production of seeds and improvement of rearing techniques (for instance, refinement of feeding and water management strategies).

To determine the level of commonly used antibiotics that could improve survival and result in least morphological abnormalities, different doses of Oxytetracycline or OTC (0, 3.0, 6.0 and 9 ppm) and furazolidone (0, 0.5, 1.0 and 1.5 ppm) were tested during the rearing of *Scylla serrata* zoea to the megalopa stage. Growth was significantly faster and occurrence of abnormalities was lesser in crabs previously exposed to lower concentrations of either OTC or furazolidone. Meanwhile, the use of high temperature to enhance molting of zoea 5 to megalopa was also tested to reduce the molt death syndrome that occurs at Z5 to megalopa stage, and improve survival at the hatchery phase. None survived at 31°C while 17.5% and 40.0% survived at 29°C and 27°C, respectively.

In another experiment, zoea 3 were fed different diets to test the efficiency of formulated feeds as a supplement or partial substitute for *Artemia* and to reduce mortalities attributed to the molt death syndrome. Zoea 3 fed egg yolk exhibited the poorest performance while the other treatments gave similar survival and molting rates at the megalopa stage.

Cannibalism has been identified as one of the main causes of mortality in mud crab culture. Previous studies showed that incorporating specific levels of tryptophan (TRP) significantly reduced agonistic behavior of juvenile mud crab *S. serrata* and improved survival. To verify the results, the diet containing 0.75% TRP was used for nursery rearing in cages installed in a pond. After 30 days rearing, crablets fed mussel meat + artificial diet containing 0.75% TRP attained the highest survival (56.9%).

Reduction in the use of fish by-catch remains to be one of the high priority areas toward attaining sustainability in aquaculture. A relatively cheap source of plant protein, coconut meal, as a component of the artificial diet for mud crab grow-out was tested.

1.3 Marine Fish

The Program aims to continually improve the technologies for the culture of marine fishes for sustainable aquaculture development, poverty alleviation in the countryside, and reinforcement of aquatic resources and food security in the Southeast Asian region. Marine fishes such as milkfish, grouper, sea bass, mangrove red snapper, rabbit fish, pompano, kikero, Napoleon wrasse, hybrid red tilapia, and seahorse are among the species being studied in the Program.

To ensure consistent supply of seeds for the species, experiments aimed at developing reliable captive breeding techniques for Pompano, Scat and Napoleon wrasse were conducted.

The seed production techniques developed for the various marine fish species are also continuously being improved to increase the survival in the hatchery and improve the quality of the fry produced. For instance, in milkfish, improving the nutritional quality of the broodstock feed by the addition of more micronutrients, and improving the quality of the live feed during the first feeding period are the approaches taken. With regard to Napoleon, research has continued to focus on ensuring the availability of live food with the appropriate size that will fit the size of the mouth of the larvae during the first feeding stage.

Experiments were conducted to improve production performance of seabass in net cages in brackishwater ponds during nursery and grow-out phases using AQD formulated feed with higher energy level. Another verification study evaluated the use of commercially available feeds and AQD feeds (with varying ratio of percent crude protein and crude fat) on pompano juveniles cultured in ponds.

Polyculture or the growing of two or more kinds of fish/organisms in a single rearing system is one way of increasing pond production and at the same time utilizing nutrient wastes. The intensive grow-out culture techniques for the polyculture of milkfish and mud crab are in its final stages of refinement. Another polyculture study done in brackishwater ponds was the intensive production of red Tilapia hybrid and siganid (*Siganus guttatus*).

Other studies

The study on the digestibility and effective level of meat and bone meal (MBM) in formulated feed for milkfish grown in freshwater and seawater was continued. The apparent digestibility of MBM in both seawater and fresh water were also determined.

The use of soybean meal and soy protein concentrate as alternatives to fishmeal in practical feeds for milkfish was also tried. With regard to seahorse, the push to develop an acceptable formulated feed for adult stage was continued. Modifications in the tank design and of the aeration system to keep the formulated feed suspended in the water column have been done. A new set of diets for the seahorse will also be formulated.

Understanding the immune system of the farmed species is crucial to develop control methods against specific pathogen infestation for a better fish health management. Preliminary intra-specific pathogen transmission trials were also conducted by artificially infecting seabass with naturally infected snapper.

Recognizing the pressing need to address the issues on climate change, the Program also initiated investigating the effects of increasing rearing water temperature and acidity on the reproductive performance in early larval development of important tropical aquaculture fish species (for instance; tilapia, rabbitfish, seabass and milkfish).

1.4 Small-holder Freshwater Aquaculture

The program aims to develop optimal breeding, seed production and grow-out culture strategies for regionally important freshwater commodities such as the giant freshwater prawn, Asiatic carps, tilapia, catfish and indigenous freshwater fish species. Apart from improved production and husbandry schemes that are packaged into aquaculture business technologies, the program also promotes the implementation of effective health management strategies for all the farmed species for their sustainable production. The activities and accomplishments are discussed below:

Development of genetically enhanced giant freshwater prawn with improved production traits

The breeding scheme, which involves the use of females from one line crossed with males of another line and vice versa was evaluated if it can help minimize any adverse effects of long-term domestication on growth and reproduction in broodstock. Preliminary results showed that Old Calumpit-OC(female) x OC(male) proved to be the best cross with 39.11% berried females/month and the shortest period to postlarval metamorphosis at 34.8 days. On the other hand, the cross that produced the highest percentage of average postlarvae was OC(female) x NC(male). Growth of the progenies produced from these crosses is currently being compared in tanks. The cross that shows the best performance shall be determined and will be compared with another scheme, which uses periodic broodstock exchange. The most effective breeding management method will be recommended to farmers/hatchery operators.

Another study on the giant freshwater prawn to improve prawn growth and reproduction focuses on nutritional intervention (*i.e.* through the development and adoption of efficient and low-pollution feeds). Preliminary trials were made to determine the effect of partial fishmeal protein replacement with cowpea meal protein in post larvae and juvenile diets. Prawn postlarvae were fed four isonitrogenous and isocaloric diets with different levels of protein substitution (0% or control, 15, 30 and 45%). After two months of culture the maximum average body weight of 0.071g was observed in prawns fed diet with 45% substitution.

Development of methods for improved seed production and lake based cage culture of the giant freshwater prawn

With regard to giant freshwater prawn, *M. rosenbergii*, a rearing trial using different stocking densities (100, 200 and 300 pcs/m²) in netcages for the nursery rearing of freshwater prawn postlarvae showed that mean weight (0.95 g) was significantly higher in the lowest stocking density. Different grow-out management strategies to improve cage-based production of marketable-sized giant freshwater prawn were also evaluated. A growth trial to determine the effect of claw ablation was also started recently.

Promotion of adoption of improved techniques for broodstock management, hatchery and nursery rearing of bighead carp

The seedstock production study also includes induced spawning of carp and the production of advanced bighead carp fingerlings. Mature bighead carp stocks were set up for artificial breeding in February, May and July. Stocks nursed to fingerlings from the first and second spawning episodes have been sold.

Improvement and promotion of production technology for tilapia

To identify which among the currently available species/strains are suitable for brackishwater culture, AQD has been conducting studies on the development of saline tolerant tilapia species or strains with enhanced traits. Results of experiments in brackishwater tanks carried out from last year to date showed that both the red and Nile tilapia species generally had better growth and morphometric traits than the Mozambique tilapia stocks. Recently, two stocks of the BEST strain Tilapia from BFAR were procured for growth comparison trials. With regard to tilapia mass seed production at AQD stations (Binangonan Freshwater Station and Tigbauan Main Station), Nile and red tilapia fry stocks were fed diets with methyltestosterone to produce sex-reversed fingerlings. An estimated 548,000 fry were collected from April to September 2011.

Co-culture of tilapia and giant freshwater prawn using AQD formulated diets is being verified in cages in a freshwater reservoir in Dingle, Iloilo. Results showed that tilapia stocks fed the AQD formulated diet grew better than those fed the commercial diet.

Development of culture techniques for indigenous freshwater species in the region

Domestication and evaluation of the culture potential of an indigenous freshwater prawn species known as *Macrobrachium lar* were continued. Newly hatched larvae from wild-sourced berried females collected from Sorsogon and reared at different salinities (6, 12, 18 and 24 ppt) had poor survival although larvae reared in 24 ppt survived until the zoea IV stage.

The breeding and larval rearing methods for several locally important fish species that could have aquaculture potential are currently being studied for propagation. The reproductive biology of silver perch collected from selected habitats in Luzon was also studied. The larval rearing requirements for the silver perch, *Leiopotherapon plumbeus* are being determined. Newly hatched larvae were fed with different combination of live foods for the feeding trials. Meanwhile, samples of the larvae were brought to Japan for morphometric examination to generate baseline information for the feeding biology of silver perch.

Development and implementation of business packages for freshwater aquaculture

AQD promotes business packages for freshwater aquaculture through Agree-Built-Operate-Transfer (ABOT) AquaNegosyo, capacity building programs and information dissemination. In 2011, giant freshwater prawn farming in cages in Laguna de Bay was promoted as part of a livelihood development project for local water cooperative in Binangonan, Rizal. AQD also participated in AQUATECH, an aquaculture forum cum exhibit held in Clark Field Pampanga. During this forum, AQD's technology extension programs were presented and publications in freshwater and marine aquaculture were sold. Increased visibility through the television media was also done to promote AQD's prawn culture and hatchery technology on a national scale.

Finally, two new manuals on the giant freshwater prawn and a new tilapia manual have been published.

1.5 Seaweed Strain Improvement

The Program is being carried out with the following objectives: (i) develop 'new' and improved varieties of *Kappaphycus* through tissue culture, sporulation, and protoplast fusion techniques, (ii) improve the efficiency of *Gracilaria* (other seaweeds) as biofilter, and (iii) explore the microbial properties of commercially important seaweeds against common fish (and humans) pathogens. The progress is outlined below:

Development of new strain through tissue culture, sporulation and protoplast fusion techniques

Conditions for protoplast isolation were optimized for *K. alvarezii* and *K. striatum*. The effects of plant growth regulators are also tested for the regeneration of protoplasts. Unsuccessful runs were experienced due to ciliates contamination in liquid medium.

Different mannitol concentrations, use of PGR (plant growth regulator) and fertilizers were tested in newly isolated protoplasts. The use of PGR resulted in higher survival after 2 weeks of protoplast culture. Observation is still on-going for the regeneration experiment.

In another study, pre-treatment of fresh and powdered seaweed samples with cellulase or a combination of cellulase and carrageenase have been tested to determine if degradation of cell wall by polysaccharidases will result to higher total cellular DNA yield that is amenable to PCR amplification.

Improving the efficiency of Gracilaria (other seaweeds) as biofilter

G. bailinae can take up as much as 80% of total ammonia and ammonium in the water after 1 hour and almost 95% after 2 hours. Total ammonia and ammonium in the water remained low or below determinable value after 6 hours. A second run using *Caulerpa lentillifera* showed erratic results. Experiments were also done to determine the uptake rate of *G. bailinae* of the dissolved nutrients present in an intensive shrimp culture.

Kappaphycus was grown in a net cage using different fertilizers (Acadian seaplant, sodium nitrate and without fertilizer) along fish cages in Igang Marine Station. Results showed that fertilization could affect the quantity of semi-refined carrageenan of *Kappaphycus*.

Exploring the anti-microbial property of seaweeds

A total of 14 and 10 crude ethanol and water extracts, respectively, from seven varieties of *Kappaphycus* and *Eucheuma* species have been screened for antibacterial activities against four fish and three human bacterial pathogens. Of these, one preparation of the crude ethanol extract of *K. alvarezii*-Vanguard variety showed promising antimicrobial activity against the human bacteria *S. aureus* and its multidrug-resistant strain, MRSA.

1.6 Aquatic Ecology

The Program aims to generate aquaculture technologies with the least possible negative impact on the environment. The Program focuses on assessing the impacts of aquaculture on the environment, including different pond practices on biodiversity in ponds and adjoining mangroves and shores, and developing bioremediation measures to mitigate negative impacts of aquaculture to the environment. The progress is discussed below:

Assessment of biodiversity in marine cages and platforms for aquaculture in Igang, Guimaras

This project seeks to establish biodiversity baselines around AQD's own research stations for comparison with later time periods when environmental conditions change for better or worse. Visits were made to the Igang Marine Station and Igang Mariculture Park to see and sample the flora and fauna in, on, and around the cages and in the adjoining seagrass beds and rocky islets. Some 422 species in 172 families in 13 major taxa have been collected or photographed so far.

Anodontia philippiana and Holothuria scabra as bioremediators in an intensive cage culture system

Experiment was initiated to identify invertebrate species which may be used in an integrated multitrophic aquaculture (IMTA) system. Initial findings on using sandfish and clams as bioremediators in fish cages showed that sandfish can't tolerate sulfide and therefore could not be used as a bioremediator in fish cages.

Determination of optimal conditions for growth and survival of sandfish juveniles for culture

Using findings from previous experiments on substrate preference of sandfish juveniles, results of field experiments showed that pond with sandy substrate gave the best potential for sandfish culture. To evaluate further the effects of substrate and water conditions and to compare the performance of ponds versus open sea pens, a trial culture run of sandfish juveniles in pens was conducted. Results showed that food in ponds were readily available but were easily consumed by the sandfish within 2 weeks even at the very low stocking density of 35g/m², while natural food supply in the open sea pen can sustain sandfish population longer (6 weeks). These have practical implications in terms of feeding management in future studies.

In the stocking density experiment, results showed that stocking density of more than 200g/m² is not ideal for culture when depending on natural food alone.

Identification of finfish species suitable for polyculture with sea cucumber

The fish: sandfish ratio and size at stocking studies with snapper (*Lutjanus argentimaculatus*) were successfully completed. If one were to culture sandfish with snapper, it seems possible, as long as the snapper are maintained at the proper stocking density and graded routinely. *Lates calcarifer*, seabass and sandfish were stocked for pen culture study and using three treatments (fish only, sandfish only, and fish and sandfish). This study is still on-going.

Establishment of poly-culture system of tiger prawn *Penaeus monodon* and sandfish *Holothuria scabra*

An experiment was conducted to establish the polyculture system of tiger prawn, *Penaeus monodon* and sandfish, *Holothuria scabra*. Results showed that neither growth rate nor survival rate of the shrimp was significantly affected by the presence of sandfish. The presence of sandfish did not affect the organic matter content in the sediment.

Development and extension of integrated multi-trophic aquaculture techniques for improvement of livelihood

The experiment to assess the combined culture of *Holothuria scabra*, *Penaeus monodon* and *Caulerpa lenterifera* showed that while *H. scabra* may reduce organic matter in the sediment, water and sediment qualities are better without *H. scabra*. There is a possibility that increased dissolved inorganic nitrogen provision by *H. scabra* triggered microalgal bloom, resulting in decreased growth of *C. lenterifera*.

Other R&D Activities

Institutional Capacity Development on Sustainable Aquaculture (ICDSA): To complement the research activities, AQD continued providing greater focus on initiatives that would facilitate the transfer of viable technologies. The project ICDSA which is being implemented in partnerships with local government units and other stakeholder groups serves as R&D platform for the demonstration of the technical and economic feasibility of aquaculture technologies developed by AQD.

In 2010, ICDSA completed two projects namely; i) Enhancing Adoption of Improved Grouper Production Technologies in Misamis Occidental; and ii) Enhancing Adoption of Mudcrab Production Technologies in Northern Samar, both funded by ACIAR Community Agricultural Technologies Program. Both projects are still being monitored. In 2011, qualitative impact assessments were done for both projects. In the Freshwater cage Culture in Dumarao, technology adoption has spread not only among the original target beneficiaries but other individuals from nearby villages. This can be attributed to the initial success of the first technology adopters who were able to show that tilapia farming can be a good course of additional income for the household. On the Petron project in milkfish cage culture for Guimaras fisherfolk, the fishing communities from four villages have undergone community and enterprise development training.

ABOT AquaNegosyo. The ABOT (Agree-Build-Operate-Transfer) AquaNegosyo is a program that aims to disseminate AQD's science-based aquaculture technologies to encourage private sector investments in aquafarming for livelihood generation and food security.

For 2011, the ABOT AquaNegosyo Program served several clients on different activities/projects. These various activities were undertaken in 42.5 man-days and earned for AQD a gross income of PhP 197,481.70 or \$4,701.94 (\$1 = PhP42).

ABOT has also responded to queries on AQD's packaged aquaculture technologies. Numerous inquiries on species such as mudcrab, marine fish (seabass, grouper, and pompano), tiger prawn and seaweeds have been received mostly by email.

Training and Information: Significant efforts were made to facilitate the transfer of viable technologies to various stakeholder groups through training and information dissemination.

From January to September 2011, AQD has conducted a total of 18 local and international training courses under various thematic areas and has trained a total of 222 participants. AQD also organized internship programs for 22 foreign and local interns and supervised the on- the job training of 167 students from 22 schools.

To enhance its visibility and disseminate viable technologies, AQD has participated in four exhibits/fairs in the Philippines. Moreover, AQD had three press releases and 22 media appearances in local and national leading magazines, newspapers and television networks. In terms of publication, apart from scientific papers published in peer-reviewed journals, AQD produced two farmer-friendly how-to manuals, one textbook, one proceeding and two flyers.

Significant efforts were also made to improve the AQD website. A new AQD website was uploaded on 21 August 2011 with 4,323 unique visitors during the first 23 days.

Plans in 2012:

While most of the projects/studies under the above-mentioned Programs will continue in 2012, AQD's approach and focus on implementation of AQD's Departmental Programs in the coming year will change from commodity-based to thematic-based. This is to enable AQD to better address the issues and recommendations formulated during the ASEAN-SEAFDEC Conference on Sustainable Fisheries (Fish for the People 2020) held last June 2011 in Thailand and to ensure that its program thrusts are aligned with the adopted *Resolution and Plan on Action for Sustainable Fisheries (aquaculture component) for Food Security in Southeast Asia towards 2020*. AQD's Departmental Programs in 2012 will therefore comprise the following: (i) Meeting Socio-economic Challenges in Aquaculture; (ii) Quality Seed for Sustainable Aquaculture; (iii) Healthy and Wholesome Aquaculture; (iii) Maintaining Environmental Integrity through Responsible Aquaculture; and (iv) Adapting to Climate Change Impacts.

2. LIST OF PROGRAMS

Departmental Programs Implemented by AQD in 2011:

- 1) Integrated Mollusk Production;
- 2) Mud Crab and Shrimp Domestication;
- 3) Marine Fish;
- 4) Small-holder Freshwater Aquaculture;
- 5) Seaweed Strain Improvement; and
- 6) Aquatic Ecology.

Proposed Departmental Programs of AQD for the Year 2012:

- 1) Meeting Social and Economic Challenges in Aquaculture;
- 2) Quality Seed for Sustainable Aquaculture;
- 3) Healthy and Wholesome Aquaculture;
- 4) Maintaining Environmental Integrity through Responsible Aquaculture; and
- 5) Adapting to Climate Change Impacts.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Aquatic Ecology
Responsible Department: SEAFDEC Aquaculture Department
Duration of the Program: 2008-2011

1. INTRODUCTION

The extensive use of estuarine and coastal waters for aquaculture has contributed to the degradation of water and soil quality. There is a need for aquaculture technologies that recognize the importance of ecosystem approaches and suitable operating procedures. The concept of carrying capacity of the aquatic environment can be used as a strategy to alleviate, if not prevent coastal pollution brought by aquaculture activities.

2. PROGRAM

2.1 Objectives

To generate aquaculture technologies with the least possible negative impact on the environment.

2.2 Program Description

The aquatic ecology program continuously monitor the impacts of aquaculture activities on the environment, establish information on interactions and the balance between farmed species and natural diversities, and make use of bioremediators to lessen aquaculture wastes.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Assessment of biodiversity in marine cages and platforms for aquaculture in Igang, Guimaras

This project seeks to establish biodiversity baselines around AQD's own research stations for comparison with later time periods when environmental conditions change for better or worse. The Igang Mariculture Park (IMP) was set up near IMS to anchor commercial marine cages of private operators. It was always obvious that a large number of marine animals and seaweeds grew in, on, and around the net cages and the supporting frames and floats, but no biodiversity inventory has been done until this year.

Visits were made to the IMS and IMP to see and sample the flora and fauna in, on, and around the cages and in the adjoining seagrass beds and rocky islets. Some 422 species in 172 families in 13 major taxa have been collected or photographed so far.

Anodontia philippiana and Holothuria scabra as bioremediators in an intensive cage culture system

Due to the unavailability of cages to conduct simultaneous runs following proposed treatments in the proposal, experiment was designed to identify invertebrate species, which may be used in an integrated multitrophic aquaculture (IMTA) system. For the first run, sandfish *Holothuria scabra*, imbao *Anodontia philippiana* and lampirong *Placuna placenta* were reared as follows: Treatment 1 = Sandfish + imbao + lampirong reared in an open area without cage (no feeding); Treatment 2 = Sandfish + imbao + lampirong beneath a fish cage right after harvesting milkfish *Chanos chanos* (no feeding); and Treatment 3 = Sandfish + imbao + lampirong beneath a fish cage rearing snapper *Lutjanus argentimaculatus* (with feeding).

Initial findings on using sandfish and clams as bioremediators in fish cages showed that sandfish can't tolerate sulfide and therefore could not be used as a bioremediator in fish cages. Also, temperature,

salinity and D.O. did not significantly differ between treatments. An increasing trend in sulfide levels was also observed in Treatment 3 but constantly low in the other treatments. Sulfide erratically decreased from day 125 due to the movement of cages and the changes in stocks and feeding regimes.

Determination of optimal conditions for growth and survival of sandfish juveniles for culture

Using results from previous experiments on substrate preference of sandfish juveniles, field experiments were conducted in 4 sites namely; (i) sandy-muddy substrate at a coastal mudflat in Brgy. Igang; (ii) coral-shell rubble at Igang Marine Station (IMS); (iii) silty-mud at Dumangas Brackishwater pond (DBS); (iv) sandy-mud at same DBS pond; and (v) a control without substrate in Tigbauan Main Station tanks. Results showed that pond with sandy substrate gave the best potential for sandfish culture.

To evaluate further the effects of substrate and water conditions, a trial culture run of sandfish juveniles in pens was conducted to compare performance of ponds (DBS) versus open sea pens (IMS). Results indicate that food in ponds (DBS) were readily available but were easily consumed by the sandfish within 2 weeks even at the very low stocking density of 35 g/m², while natural food supply in the open sea pen can sustain sandfish population longer (6 weeks). These have practical implications in terms of feeding management in future studies.

In the stocking density experiment, results indicate that stocking density of more than 200g/m² is not ideal for culture when depending on natural food alone. The decline in growth even for lower densities further indicate the need for efficient feeding schemes after 2 or 4 weeks of culture of juvenile sandfish.

Identification of finfish species suitable for polyculture with sea cucumber

The fish: sandfish ratio and size at stocking studies with snapper (*Lutjanus argentimaculatus*) were successfully completed between January and February. Although the growth and survival of the sandfish was good, the stocking density of the fish was too low, resulting in territorial behavior and fighting among the fish causing many injuries and mortalities. The fish however seems compatible with sandfish as the sandfish were in good condition at the end of the study. If one were to culture sandfish with snapper, it seems possible, as long as the snapper are maintained at the proper stocking density and graded routinely. A suitable site for pen culture study was identified at the Igang Marine Station in March. *Lates calcarifer*, seabass and sandfish were stocked in three treatments (fish only, sandfish only, and fish and sandfish) at three replicates. This study is ongoing, though mortalities were observed in seabass (initially diagnosed as a bacterial and parasite infestation), and amongst the sandfish in the sandfish only controls.

Establishment of poly-culture system of tiger prawn *Penaeus monodon* and sandfish *Holothuria scabra*

An experiment was conducted to establish the polyculture system of tiger prawn *Penaeus monodon* and sandfish *Holothuria scabra*. Results showed that neither growth rate nor survival rate of the shrimp was significantly affected by the presence of sandfish. Dissolved inorganic nitrogen levels, DO level, pH and salinity of the rearing water were not affected by the presence of sandfish. The presence of sandfish did not affect the organic matter (OM) content in the sediment. While sandfish may cause bio-deposition of sulfur to the sediment, they may serve to maintain the sediment quality in better condition.

Development and extension of integrated multi-trophic aquaculture techniques for improvement of livelihood

Co-culture trial of *Holothuria scabra*, *Penaeus monodon* and *Caulerpa lenterifera* was conducted at Tigbauan Main Station for 49 days. Results collectively indicate that while *H. scabra* may reduce organic matter in the sediment, water and sediment qualities are better without *H. scabra*. *P. monodon* feed seems to be less decomposable than feces of *P. monodon* and *H. scabra*. There is a possibility

that increased dissolved inorganic nitrogen provision by *H. scabra* triggered microalgal bloom (indicated by sudden DO rise), resulting in decreased growth of *C. lenterifera*. The mean acid volatile sulfur of more than 0.01 mg/g seems to have adverse effects on *H. scabra*.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Aquatic Ecology will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Marine Fish
Responsible Department: Aquaculture Department
Total Duration: 2009-2011

1. INTRODUCTION

SEAFDEC AQD has developed several technologies for breeding, seed production, nursery and grow-out culture of various marine fish species that are already adopted by the fish farmers. Although these technologies are already working, they are continuously refined for further improvement. It is the aim of the Marine Fish Program to continually improve the existing technologies for the culture of various marine fish species and develop new technologies for the culture of new and economically important marine fish. The various research studies conducted under the Program are in support of the mandate of the Department, which is for sustainable aquaculture development, poverty alleviation in the countryside, conservation and reinforcement of aquatic resources, and ensuring food security in the Southeast Asian region.

2. PROGRAM

2.1 Objectives

The objectives of the program are: (i) to improve the technologies for broodstock management, seed production, nursery, and grow-out culture of important marine fishes such as milkfish (*Chanos chanos*), groupers (*Epinephelus coioides*, *E. fuscoguttatus*), Asian sea bass (*Lates calcarifer*), mangrove red snapper (*Lutjanus argentimaculatus*) and rabbitfish (*Siganus guttatus*); (ii) to develop breeding, seed production, nursery and grow-out techniques for new fish species of high economic value like snubnose pompano (*Trachinotus blochii*), scat (*Scatophagus argus*) and Napoleon wrasse (*Cheilinus undulatus*); (iii) to develop polyculture techniques in ponds for saline-tolerant hybrid red tilapia (*O. mossambicus-hornorum* hybrid x *O. niloticus*) with other appropriate fish species, and polyculture of milkfish with crustaceans such as crabs; and (iv) to develop practical feed for Barbour's seahorse (*Hippocampus barbouri*) broodstock.

2.2 Program Description

The program comprises the studies under Research and Technology Verification and Demonstration Divisions. Spanning the various stages in culture involving, broodstock, seed production, nursery, and grow-out culture of marine fishes, the studies also involve the hatchery production of various marine fishes and the production of marine fishes in brackish water ponds and in floating net cages. The studies are being done in laboratory, broodstock, and hatchery/nursery facilities at the Tigbauan Main Station (TMS), brackish water ponds in Dumangas Brackishwater Station (DBS), and in floating net cages at the Igang Marine Station (IMS).

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Broodstock Development and Management

Pompano is a new marine fish species for aquaculture with high economic value. To ensure consistent supply of seeds for the species, development of a reliable captive breeding technique is a priority. In the previous year, successful spawning of pompano in captivity has been observed but this was not consistent. During hormone-induced spawning, the response of both sexes to the hormone is variable and many times the egg fertilization rates are low indicating that the present hormonal therapy used for induced spawning needs improvement. The low fertilization rates observed was probably due to the quality of the sperms released by the male fish. To induce maturation of male fish and improve the

quality of the sperms, 10 male fish were implanted with 3 mg/kg methyl testosterone. These males will be used for spawning induction in the coming months.

Scat is another new omnivore fish species for aquaculture with high economic value. Very little is known about the reproductive biology of this species. As such, developing a captive breeding technology is the primary objective for the work on scat. Immature stocks taken from the wild are presently stocked in brackishwater pond and are periodically sampled to check for sexual maturity. From the latest sampling, 7 maturing females having oocytes with diameter of 0.1-0.21 mm were already observed. However, no milting males were observed.

Another new species with high economic value where its culture technology is being developed is the Napoleon wrasse. This species is also listed under CITES as “threatened” because of the dwindling population in the wild. The development of culture technology for this species is largely for stock enhancement. Napoleon wrasse spawns spontaneously in captivity. The problem, however, is in the very low fertilization and hatching rates of eggs. The current sex ratio of 7:1 (female:male) is probably one of the causes of the low fertilization and hatching rates of eggs observed. More males have to be collected to increase the number of males in the broodstock tank. Broodstock nutrition also affects the quality of the eggs and sperms produced. Towards this, nutritional supplements (combination of vitamin C, beta-carotene, arachidonic acid) were given to the broodstock to improve egg fertilization and hatching rates.

Seed Production

The seed production techniques developed in SEAFDEC/AQD for the various marine fish species are continuously being improved to increase the survival in the hatchery and improve the quality of the fry produced. Disinfection of grouper eggs prior to incubation was one of the approaches done to improve the survival of larvae. During incubation, eggs were either treated with 25 ppm of 10% Povidone iodine or not treated at all. The resulting larvae were reared and after 45 days of culture, the mean survival rate in the iodine-treated group was significantly higher than the untreated group.

Although milkfish fry production in the hatchery has significantly improved over the years, SEAFDEC/ AQD still continues to refine the hatchery technology for milkfish to further improve milkfish fry production in the hatchery. Improving the nutritional quality of the broodstock feed by the addition of more micronutrients, and improving the quality of the live feed during the first feeding period are the approaches taken to achieve the objective. Micronutrients like phospholipids, beta-carotene, vitamins E and C are added to the broodstock feed and their effects on the quality of the eggs and fry are evaluated. In milkfish broodstock (big hatchery stocks) that were fed fortified diet containing beta carotene, ARA and Vitamin C, the eggs had slightly better fertilization rate compared to those broodstock fed the control diet. The percentage normal larvae was also slightly better in the broodstock fed the fortified diet (92.6%) compared to the broodstock fed the control diet (90.6%). During larval rearing, larvae fed rotifers enriched with AQD-formulated emulsions survived better (41%) than those fed un-enriched rotifers (33.0%).

Larval rearing of Napoleon wrasse is difficult due to the small size of the mouth of the larvae upon hatching. The availability of live food with the appropriate size that will fit the size of the mouth of the larvae during the first feeding stage is therefore a problem. To address this problem, a larval feed (mix of egg proteins, infant formula, squid meal, *Spirulina* and beta-carotene) will be tested in a feeding experiment when enough quantity of larvae will be available.

Nursery culture

Nursery culture of Asian sea bass can also be done in ponds because of the availability of natural food, especially zooplankton. This culture system is pursued for fingerling production of Asian sea bass. Asian sea bass juveniles were stocked in net cages in ponds and fed commercial feeds (46-48% CP, 12-14% Crude Fat). When the experiment was terminated after 4.5 months of culture, survival was 30% and the final weight and length were 59 g and 16 cm, respectively.

The nursery culture techniques for grouper *Epinephelus sp.* in net cages in ponds were further refined by testing two artificial feeds containing 47% and 53% crude protein during the culture period. In the first trial, survival after 2 months of culture, average body weights and lengths of stocks that received both feeds were not significantly different. In the second trial, average body weight and average body length of stocks given 47% protein were 29.9 g and 11.5 cm, respectively, and 32.6 g and 11.8 cm in those stocks given 53% protein. Mortality was minimal after average body weight reached greater than 10 g, indicating that the cannibalistic behaviour of the fish was reduced when it reached this size.

The use of formulated diets with varying levels of lipids in the nursery culture of pompano in brackishwater ponds was also verified.

Grow-out culture

The intensive grow-out culture technology for Asian sea bass in brackishwater ponds is further improved. In the present study, the use of SEAFDEC/AQD formulated feed with higher energy level was investigated. However, slower growth of the stocks was observed in the present run compared to the previous runs because of viral VNN infection. The growth data from the present run clearly indicate that growth of Asian sea bass is significantly reduced in VNN-positive fish. Heavy mortalities were also observed during the early stage of culture.

The grow-out feed formulated by SEAFDEC/AQD for pompano was compared with commercially available feeds in a verification study in ponds. After 45 days, pompano juveniles given Diet A (46-47% crude protein; 12% crude fat), Diet B (41-42% crude protein, 12% crude fat) and Diet C (commercial diet) reached the average body weights of 141.5 g, 140.1 g and 153 g, and average total lengths of 21 cm, 20.9 cm and 21.1 cm, respectively.

Polyculture or the growing of two or more kinds of fish/organisms in a single rearing system is one way of increasing pond production and at the same time utilizing nutrient wastes. The intensive grow-out culture techniques for the polyculture of milkfish and mud crab are in its final stages of refinement. Another polyculture study done in brackishwater ponds was the intensive production of red Tilapia hybrid (*O. mossambicus-hornorum hybrid* x *O. niloticus*) and siganid (*Siganus guttatus*). After 4.5 months culture, survival ranged from 48% to 83%. In another experiment, siganid fingerlings were fed either a combination of 80% AQD formulated feed and 20% veggie scraps or AQD formulated feed only. After 4.5 months, fish fed AQD formulated feed only had better growth (average body weight of 183.0 g and average total length of 18.9 cm) than those given formulated feed with veggie scraps (average body weight of 178.1 g and average total length of 18.0 cm). However, survival rate was higher in siganid stocks given feed with veggie scraps.

Other studies

The study on the digestibility and effective level of meat and bone meal (MBM) in formulated feed for milkfish grown in freshwater and seawater was continued. The optimum level of MBM for good growth and survival of milkfish fingerlings without histological changes in the liver, muscle and intestine was also verified in fish grown in freshwater. Survival in all treatments was 100% until termination of feeding on the 12th week. Milkfish fed the highest level of MBM (37.5%) had significantly low % weight gain (WG=353%) and specific growth rate (SGR=3.2) compared with the control feed (WG=669%). Milkfish given Feed with 15% MBM and Feed with 30% MBM have weight gain and specific growth rate that were similar with control feed.

The apparent digestibility of MBM in both seawater and fresh water were also determined in sub-adult milkfish (60-90g). Preliminary results showed that MBM protein was more digestible in seawater (94-98%) than in freshwater (70-61%). The assimilation efficiencies of diets with different levels of MBM in both freshwater and seawater were similar and seemed to decrease as dietary MBM increased. The control diet, however, was assimilated by milkfish in freshwater at 94% while it was only 67% in seawater. Dietary crude fat was highly assimilated in freshwater.

The use of soybean meal and soy protein concentrate as alternatives to fishmeal in practical feeds for milkfish was also tried. Experiment 1 for this phase has just been started.

The push to develop an acceptable formulated feed for adult seahorses is continued. The modifications in the tank design and of the aeration system to keep the formulated feed suspended in the water column have been done. A new set of diets that will have more corn starch aside from the other binders to make a gummy consistency will be formulated and will be fed to seahorse.

During the past year, parasite outbreaks specifically of *Amyloodinium* were observed in some of AQD's seed production facilities, particularly the marine fish hatchery. To help prevent this from happening again in the future, the water filtration system in the marine fish hatchery was improved. But in the long term, understanding the immune system of the farmed species is crucial to develop control methods against specific pathogen infestation for a better fish health management. This is the thrust of the present investigation on Asian sea bass and *Amyloodinium*, the objectives of which are to evaluate the immune response of sea bass to *Amyloodinium* and to assess the expression of immune-related genes induced by *Amyloodinium* in sea bass.

Healthy sea bass fry from AQD's marine fish hatchery are being maintained in parasite-free condition in a bio-secure facility. Preliminary intra-specific pathogen transmission trials were conducted by artificially infecting seabass with naturally infected snapper. In a separate experiment, the number of inoculated dinospore, will be quantified to determine the 50% endpoint and host response parameters.

Climate change will certainly have an impact on fisheries and aquaculture but specifically how this will affect aquaculture and impact on the fish farmers are still unclear. Cognizant of the seriousness of the problem, AQD now initiates an investigation that looks at the effect of increasing rearing water temperature and acidity on the reproductive performance of some important tropical aquaculture fish species. Tilapia and rabbitfish are first in the priority for investigation. The sub-adult rabbitfish that will be used for the study have not reached sexual maturity. Likewise, the effect of increasing seawater temperature and acidity on embryonic development, larval survival and subsequent performance in the hatchery of important tropical marine fish species is now being looked into. The effect of higher water temperatures (29, 31, 33°C) on embryonic development was examined in newly-fertilized sea bass and milkfish eggs. Furthermore, the effect of higher water temperature on early larval development was also examined. Results from preliminary runs on sea bass showed that sea bass larvae may survive rearing temperature of 33°C.

Remarks:

A number of activities done under the Program are verification studies involving various aspects of nursery and grow-out culture of marine fishes. Many of these studies are in the final stages of implementation having been done repeatedly during the last 2 or 3 years. Results from these verification studies will soon be incorporated in a manual that will become a guide for the farmers and certainly will be of great help to the industry. There were some studies, however, that did not commence as planned since experimental fish were not yet available especially for those requiring a specific size for the stocks.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Marine Fish will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Mud Crab and Shrimp Domestication
Responsible Department: SEAFDEC Aquaculture Department
Total Duration: Since 2003

1. INTRODUCTION

Shrimps and mud crabs support one of the most valuable fisheries in the region. However, the culture of *Penaeus monodon* has continued to rely totally on the use of wild-caught broodstock and spawners, resulting in unpredictable production outcomes attributable to inconsistent quality of the spawner. Similarly, mud crab culture has relied on wild seeds resulting in overexploitation and habitat losses. This has led to the inadequate supply of nauplii source in *P. monodon* and to both reduced landings and smaller mean size of *Scylla* spp. collected from the wild. The significant decrease highlights the need to manage the resources and develop seed production techniques. The life cycle of both *P. monodon* and *Scylla serrata* has been completed in captivity, a prerequisite to domestication. All phases of shrimp and crab culture (broodstock, hatchery, nursery and grow-out) have been done, and can be integrated to produce domesticated broodstock. Domestication of shrimp and mud crab is a prerequisite to selective breeding program, which allows for the strict disease prevention and control, and present other opportunities for the improvement of farmed stock.

In the process of developing techniques for the production of broodstock and spawners, optimal nutrition will also be considered. Although the grow-out technique of crab has been established for decades, a formulated diet for the various phases of culture has not been developed to reduce dependence on the more expensive live food such as fish and mollusks.

2. PROGRAM

2.1 Objectives

The main goal of the Program is to develop a technology for the sustainable production of good quality seed and captive broodstock of commercially important crustacean species particularly, *P. monodon*, *P. indicus* and *P. merguensis* for shrimps and *Scylla* spp. for crabs, that can be genetically selected for desired heritable characteristics, particularly disease resistance and/or fast growth.

For shrimps, more specific objectives are: i) to generate baseline information on the genetic diversity of shrimp stocks; ii) to develop the technology on producing good quality captive broodstock of *P. monodon*, *P. indicus* and *P. merguensis*; iii) to develop or improve diets for captive broodstock; iv) to verify use of white shrimp grow-out diet using environment-friendly schemes; and v) to characterize IHHNV infecting both *P. vannamei* and *P. monodon*.

For mud crabs, the specific objectives are: i) to generate baseline information on the genetic diversity of mud crab species from various sources; ii) to use molecular genetic tools in effective management and in selective breeding; iii) to develop technology for domestication of *S. serrata*; iv) to mass produce seeds and juveniles of *Scylla* spp. and further improve survival and hatchery/ nursery rearing techniques; v) to reduce cannibalism of crab juveniles through physiological, nutritional and environmental approaches; vi) to reduce the use of fish by-catch in the nursery, grow-out and fattening through development of suitable diets; vii) to accelerate the adoption of improved mud crab technologies; and viii) to assess the the seasonal and long-term trend in seed stock in natural habitat.

2.2 Program Description

The program consists of studies that address the problem on declining supply of good quality broodstock and seed of indigenous species of shrimp and mud crab. Domestication, a prerequisite to selective breeding programs, is pursued by monitoring the genetic structure of base populations of target species, establishing husbandry techniques, developing suitable diets for the different life stages, and culture of live food necessary for good reproductive performance. Studies on husbandry, which includes all phases of culture such as broodstock management, larval rearing, nursery and grow-out, will focus on strategies to improve reproductive performance, survival, growth, and prevention of disease. Stock assessment and socio-economics of each culture phase are included to evaluate impacts of adoption of generated technologies. The activities are linked with the regional programs under the ASEAN-SEAFDEC Fisheries Consultative Group such as Sustainable Aquaculture.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Shrimps

Efforts on selective breeding and production of captive broodstock have been initiated to produce good quality captive spawners of *Penaeus monodon*. Genetic characterization of populations from some areas of the Philippines has been undertaken. However, more sites will be sampled to identify which populations are suitable for breeding.

Domestication and selective breeding efforts are also being undertaken for *P. indicus*. About 20 batches of F₂ have been produced from matings between wild broodstock from Tigbauan, Antique, and Negros. Hatching rates greatly varied and ranged from 23 to 92%. The number of eggs, nauplii, and hatching rate did not show increasing or decreasing trends with rematuration. Some of the F₂ stocks have grown to broodstock size (10-15g) and are now being prepared for stocking with other families.

P. indicus F₂ postlarvae were stocked in the pond to determine if harvesting the stock after 2 months (short term) will be economically feasible. Sampling after a month revealed that mean body weights of 5.14 ± 0.135 and 4.30 ± 0.99 g for 1 ind/m² and 2 individuals/m² stocking were attained, respectively.

Marine annelids (polychaetes) have been shown to improve the reproductive performance of crustacean broodstock. Techniques for breeding and culture of these organisms are being developed to ascertain a sustainable supply of live food for shrimp and mud crab adults. Wild-sourced *Perinereis quatrefagesi*, a species of marine annelid, was cultured in tanks and fed with either minced fish, hatchery waste, feed mill sweepings/artificial diet or decomposed seaweeds. These feeds contained 13-72% crude protein that increased the worm's protein content from the initial 53% to 56-59%. *Perinereis* oil has a high potential to replace fish oil in feeds as this was found to contain relatively good HUFA profile. Results showed that those fed seaweeds had the lowest fat (0.2%) and artificial diet, the highest (8.2%) fat.

P. quatrefagesi survived better in tanks provided with biofilters with high-tide and low-tide seawater level fluctuations simulated daily than in tanks with biofilters but with constant water level and minimal water change. Various substrates (stones, gravel, sand, plastic corrugated sheets, cheese cloth,) and a control (no substrate) were tested and compared. The gravel and sand substrates produced higher survival than the other treatments.

P. quatrefagesi was used as an ingredient to replace a mixture of fish meal, shrimp meal and squid liver meal in the diets of shrimp and mud crab. Annelid replacement higher than 20% for *Penaeus indicus* and *Scylla serrata* did not enhance growth. At 1.5-4.5% level in the diet, *Perinereis* meal, squid meal and their 1:1 combination promoted higher growth in shrimp and mud crab juveniles than the control diet (no annelid and squid meal). Survival was not affected by diet.

Mud Crab

For this year, activities on mud crab, *S. serrata*, have been directed towards production of seeds and improvement of rearing techniques (for instance, refinement of feeding and water management strategies).

Larval rearing of mud crab oftentimes involves the use of antibiotics; however, deformities have been observed in the crab instars and juveniles that are produced. To determine which levels of commonly used antibiotics could improve survival and result in least morphological abnormalities, different doses of Oxytetracycline or OTC (0, 3.0, 6.0 and 9 ppm) and furazolidone (0, 0.5, 1.0 and 1.5 ppm) were used separately during the rearing of *Scylla serrata* zoea to the megalopa stage. Larvae did not survive until megalopa stage at 0 to 9 ppm OTC. Growth index was obtained only in larvae exposed to 3 ppm and 6.0 ppm. The survival of megalopa was significantly higher when treated with 0.5 ppm than when treated with 1.0 ppm furazolidone. Growth index was obtained only in larvae exposed to 0.5 ppm and 1.0 ppm. However, morphological deformities were also observed in larvae exposed to both OTC and furazolidone.

Crab instar, previously exposed to antibiotics at the larval stage and grown for one more month showed that survival rates did not differ significantly between crabs treated with 3 ppm (69.0%) and 6 ppm (70.7%) OTC and between crabs treated with 0.5 ppm and 1.0 furazolidone. Growth was significantly faster in crabs previously exposed to lower concentrations of either OTC or furazolidone. Moreover, a higher percentage occurrence of abnormalities was observed in crabs previously treated with higher concentrations of either OTC or furazolidone.

The use of high temperature to enhance molting of zoea 5 to megalopa was tested to reduce the molt death syndrome that occurs at Z5 to megalopa stage, and improve survival at the hatchery phase. Survival rates at different temperatures (27, 29, and 31°C) were significantly different from each other. None survived at 31°C while 17.5% and 40.0% survived at 29 °C and 27°C, respectively.

In another experiment, zoea 3 were fed either of the following to test the efficiency of formulated feeds (FF) as a supplement or partial substitute for *Artemia* and to reduce mortalities attributed to the molt death syndrome: 1) egg yolk; 2) FF + 2 *Artemia* nauplii/ml; 3) FF + 1 *Artemia* nauplii/ml; and 4) 2 *Artemia* nauplii/ml (control). Zoea 3 fed egg yolk exhibited the poorest performance while the other treatments gave similar survival and molting rates at the megalopa stage.

Cannibalism has been identified as one of the main causes of mortality in mud crab culture. Previous studies showed that incorporating specific levels of tryptophan (TRP) significantly reduced agonistic behavior of juvenile mud crab *S. serrata* and improved survival.

To verify the results of the study on the use of TRP in reducing cannibalism, the diet containing 0.75% TRP was used for nursery rearing in cages installed in a pond. After 30 days in the nursery cages, crablets fed mussel meat + artificial diet containing 0.75% TRP attained the highest survival (56.9%).

Reduction in the use of fish by-catch remains to be one of the high priority areas toward attaining sustainability in aquaculture. Soybean meal is the most commonly used plant protein ingredient to replace fish meal but it is costly. A relatively cheap source of plant protein is coconut meal. The use of coconut meal as a component of the artificial diet for mud crab grow-out was tested. Newly-molted crabs (Molt-0) were fed test diets containing 0, 20, 40, 60, 80 and 100% of coconut meal protein that replaced the soybean meal protein. Body weight and carapace width at Molt-1 were not significantly different among dietary treatments.

The formulated diet that gave best survival and growth during the grow-out culture of mud crab conducted last year was used during the polyculture of mud crab with milkfish. This was in line with the aim of verifying experimental results and accelerating adoption of new technologies through demonstration of its feasibility. Survival rate of mud crab after 190 days of culture was 13%, resulting in a total yield of 50 kg and an average body weight of 430 grams. Milkfish exhibited a survival rate of 100%, a total biomass of 82 kg and an average body weight of 205 grams.

Remarks

Many of the studies encountered problems related to occurrence of disease and effects of erratic temperature levels and fluctuations. Implementation of some studies at the Dumangas Brackishwater Station was delayed due to the impending repair of the flume.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Shrimps and Mud Crab will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Programs
Program Title: Integrated Mollusk Production
Responsible Department: SEAFDEC Aquaculture Department
Total Duration: 2005-2011

1. INTRODUCTION

In recent years, there was a fast decline of mollusk population from the natural fishery due to heavy exploitation of the resource coupled with habitat destructions and loss of the ecological niche. To address this problem, stock enhancement program of threatened species was developed. As part of the program, there is a need to develop breeding and seed production technologies of the appropriate species.

The increasing demand for abalone (*Haliotis asinina*) in both domestic and international market led also to the creation of science-based and economically-viable technologies for breeding, seed production, and farming of commercially important marine mollusk. In addition to abalone, other marine mollusk of interest to the region include the window-pane oyster *Placuna placenta*, top shell *Trochus niloticus*, turban shell *Turbo marmoratus*, angelwing clam *Pholas orientalis*, and venus clam, *Paphia undulata*.

2. PROGRAM

2.1 Objectives

The program aims to develop and demonstrate economically-viable mollusk production technologies suitable for coastal communities. Specifically, the Program will: (i) produce seed stocks for stock enhancement and abalone grow-out aquaculture; (ii) create a science-based technology that is economically-viable and appropriate to the region; (iii) demonstrate developed technologies for seed production and culture; and (iv) disseminate information on SEAFDEC/AQD developed technologies.

2.2 Program Description

The program is designed to generate, package, demonstrate, and promote science-based and economically-viable technologies for breeding, seed production, and farming of commercially important marine mollusks. To implement the program, studies are focused on understanding the biology, breeding and seed production of mollusk species.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

The program's focus is on donkey's ear abalone, *Haliotis asinina* and is aimed at addressing the following specific objectives: (i) produce seed stocks for stock enhancement and abalone grow-out aquaculture; (ii) create a science-based technology that is economically-viable and appropriate to the region; (iii) demonstrate developed technologies for seed production and culture; and (iv) disseminate information on SEAFDEC/AQD developed technologies. The progress of activities in pursuit of meeting these objectives are discussed below:

In 2011, three studies under the hatchery systems have been continued to refine culture techniques. One of these is the study on the mass production and utilization of diatom diets (*Cocconeis* sp./*Nitzschia* sp.) to improve the settlement rate and growth of abalone postlarvae.

To reduce dependence on diatoms and to provide a more balanced diet for the young postlarvae, a microparticulate diet was also developed. The newly-developed microparticulate diet for abalone larvae has shown promising results (*i.e.* higher settlement rate of 24-32% in larvae fed the diet compared to larvae fed natural food). Results also showed that daily feeding of the larvae with

microparticulate diet is best in terms of larval settlement. However, these results need further verification before these can be applied to commercial hatchery runs.

To improve the quality of seeds and to develop a strategy for genetic management of abalone, a new set of breeders were collected from other places in the Philippines (Palawan/ Masbate). These are being conditioned in land-based tanks and have been producing the F₁ cohorts. The growth of these new cohorts was monitored and compared with the progenies of old breeders being maintained in the hatchery. Also, the spawning performance of the new breeders as well as growth performance of their progenies was compared with those of the existing hatchery-bred breeders and their progenies. Preliminary results showed that the cohorts of the existing hatchery-bred (HB- F₁) breeders (progenies of breeders originally sourced from Concepcion, Iloilo) grew better than the cohorts of the newly obtained breeders from Palawan and Masbate. This means that the several years (or generations) of domestication had no adverse effect on the performance of the HB-F₁ hatchery stocks since their growth is better than the cohorts of the newly domesticated breeders from Masbate and Palawan.

In another experiment, the role of the microbial biota in the abalone hatchery was further studied. Samples from biofilms of settlement plates were monitored throughout the rearing cycle and in both dry and wet seasons for analysis.

Under the nursery and broodstock systems, seven continuing studies have been implemented with the addition of finding other suitable macroalgae as alternative feed to abalone juveniles and breeders, besides *Gracilaria bailinae* which is limiting. After 90 days of culture, highest daily increase in shell length and body weight in both juvenile and adult were still attained by *G. bailinae*-fed abalones. Meanwhile, the culture conditions of the marine thraustochytrid *Schizochytrium* sp. was optimized and will be used as lipid/DHA source for the artificial diet of abalone juveniles. In 2010, the use of recirculating system for the intermediate nursery with the use of *G. bailinae* as biofilters was shown to be doable. This system is now being tested for broodstock maintenance.

To improve the spawning frequency and the quality of larvae, broodstock diets were developed and feeding trials of four kinds of diets with varying protein/energy ratios are on-going. Results obtained so far indicated that the reproductive performance of wild-sourced abalone broodstock was improved with an increase in dietary protein/energy levels. Spawn frequency and the total number of spawns were highest in breeders fed the formulated diet containing 37% crude protein/3,570kcal/kg energy and lowest with abalone fed the natural diet (*G. bailinae*), which contained 17% crude protein/2,200 kcal energy.

The financial viability of using four types of nursery cages (black box; round mesh cage, prefabricated, black plastic tray and blue box) and stocking densities of 500 and 1,000 pieces m⁻² shelter surface area in the nursery rearing of abalone was assessed and verified. After 90 days of culture, abalone juveniles reared in black boxes had the highest average body weight (8.3g) and lowest, in blue boxes (6.9 g). Survival rate was lowest (51.9%) in stocks reared in black boxes and highest (68.4%) in stocks reared in blue boxes. Results also showed that feed conversion ratio was highest (11.4) for abalone reared in round mesh cages and lowest (7.0), in black prefab plastic trays.

To demonstrate AQD's developed technologies for seed production and culture, the large-scale production of *H. asinina* juveniles was continued. A total of 242,017 juveniles were produced from January to August with a survival rate of 0.21-1.39% from veliger larvae to 90 days of rearing. Also, the successful seed production and economic feasibility of using low-cost hatchery facility was demonstrated. About 103, 835 pieces of abalone juveniles were produced from the hatchery during this period.

Concerning the grow-out studies for abalone, hybridization runs were continued to test the performance of hybrids in sea-based cages and to evaluate the quality of meat in comparison with the pure *H. asinina*. The F₁ cohorts of HAFGM (*H. asinina* female x *H. glabra* male) presumptive hybrids grew better than the pure *H. asinina* strain. Also, there was a significant difference in the preference and overall acceptability (taste) showing that pure *H. asinina* was superior in taste compared to the two presumptive hybrids (HAFGM and HAFPM- *H. asinina* female x *H. planata* male).

Sea-based grow-out system is vulnerable to extreme environmental changes. To answer this problem, land-based grow-out system using the practical diet of SEAFDEC/AQD will be implemented within this year. This study will also solve the problem of using seaweeds which is limiting. To further determine the financial feasibility of culturing abalone juveniles using black pre-fabricated plastic trays, abalone juveniles will be stocked in a new study site at Brgy. Igang, Nueva Valencia, Guimaras (a semi-exposed area which is free from high organic load). The newly developed formulated diet for abalone juveniles which was based on the results of nutrient requirement studies will be tested in land-based grow-out system using prefabricated black plastic trays in comparison with *G. bailinae*.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Mollusks will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Small-holder Freshwater Aquaculture
Responsible Department: SEAFDEC Aquaculture Department
Total Duration: 2009-2011

1. INTRODUCTION

In developing countries in Southeast Asia, the indigenous freshwater species abound in vast areas of inland waters. Proper utilization and management of these resources for mankind's sustenance will definitely provide solutions not only to food security but also to poverty alleviation, which is another basic regional concern. Thus, marginalized fisherfolk from rural communities who engage in backyard fishfarming, if given proper training on fundamental aquaculture concepts, shall be able to provide their families food on the table and alternative livelihood opportunities.

SEAFDEC/AQD, through its Small Holder Freshwater Aquaculture Program conducts scientific research to generate verified farming and seed production technologies on selected freshwater aquaculture species. These technology packages are disseminated through training and extension activities that respond to the needs of AQD's numerous stakeholders, particularly the small-scale fishfarmers. On the whole, the program is geared towards the adoption of these technologies for sustainable aquaculture development and livelihood improvement in the region.

2. PROGRAM

2.1 Objectives

To generate and transfer science-based technologies for breeding, hatchery and farming of selected freshwater aquaculture commodities for rural development and improved livelihood.

2.2 Program Description

The program involves research, technology verification/demonstration and training activities that are focused on the development of optimal breeding, seed production and grow-out culture strategies for regionally important freshwater commodities such as the giant freshwater prawn, Asiatic carps, tilapia, catfish and indigenous freshwater fish species. Apart from improved production and husbandry schemes that are packaged into aquaculture business technologies, the program also promotes the implementation of effective health management strategies for all the farmed species for their sustainable production. The activities done in pursuit of these objectives are discussed below:

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Development of genetically enhanced giant freshwater prawn (GFP) with improved production traits

Similarly aged Old Calumpit (OC F₆) and New Calumpit (NC F₂) giant freshwater prawn *Macrobrachium rosenbergii* stocks were stocked separately in concrete tanks for spawning. The breeding scheme, which involves the use of females from one line crossed with males of another line and vice versa was evaluated if it can help minimize any adverse effects of long-term domestication on growth and reproduction in broodstock. Preliminary results show that OC(female) x OC(male) proved to be the best cross with 39.11% berried females/month and the shortest period to postlarval metamorphosis at 34.8 days. On the other hand, the cross that produced the highest percentage of average postlarvae was OC (female) x NC (male). Growth of the progenies produced from these crosses is currently being compared in tanks. The cross that shows the best performance in terms of seedstock production and subsequent growth in tested progenies shall be determined and will be

compared with another scheme which uses periodic broodstock exchange. The most effective breeding management method will be recommended to farmers/hatchery operators.

Another study on the giant freshwater prawn to improve prawn growth and reproduction focuses on nutritional intervention (*i.e.* through the development and adoption of efficient and low-pollution feeds). Preliminary trials were made to determine the effect of partial fishmeal protein replacement with cowpea meal protein in post larvae and juvenile diets. Prawn postlarvae were fed four isonitrogenous and isocaloric diets with different levels of protein substitution (0% or control, 15, 30 and 45%). After two months of culture the maximum average body weight of 0.071g was observed in prawns fed diet 4 (45% substitution). In another experiment, highest body weight was recorded in juveniles fed diet 4 and the lowest was in the unfed group. Survival was best with diet 1 while poorest survival was noted in diet 4. A confirmatory growth trial in cages is in progress.

Development of methods for improved seed production and lake based cage culture of the giant freshwater prawn

Seedstock production for selected freshwater aquaculture species started early this year and includes the production of giant freshwater prawn juveniles. *M. rosenbergii* postlarvae were stocked in tanks and lake-based hapa net cages for secondary nursery rearing to juvenile stage. A rearing trial using different stocking densities (100, 200 and 300 pcs/m²) in netcages was conducted for 52 days to determine the ideal stocking density for the nursery rearing of prawn postlarvae. Results showed that mean weight (0.95 g) was significantly higher in the lowest stocking density. No significant differences among the three densities were noted in terms of survival (65 to 69%) and FCR (1.4 to 1.9). In another experiment, juveniles stocked in hapa net cages in tanks with a total substrate area of 5m² per cage at 200, 400, and 600pcs per m² were examined to determine if increased substrate area will allow for higher survival at high stocking densities in the secondary nursery.

Different grow-out management strategies to improve cage-based production of marketable-sized giant freshwater prawn were evaluated. The treatments used were: HS16 (with 16 m² additional substrate), HS 32 (with 32 m²), NS (no substrate) and NSH (no substrate and half of the stocking density of the other 3 treatments). The 16 m² and 32 m² substrate area are equivalent to 100% and 200% of the cage bottom area respectively. Prawns reared in cages with no substrate and half the stocking density (NSH) had the best growth. Survival did not differ among all treatments. Meanwhile a growth trial to determine the effect of claw ablation was started recently.

Promotion of adoption of improved techniques for broodstock management, hatchery and nursery rearing of bighead carp

The seedstock production study also includes induced spawning of carp the production of advanced bighead carp fingerlings. Mature bighead carp stocks were set up for artificial breeding in February, May and July. Stocks nursed to fingerlings from the first and second spawning episodes have been sold. Fry from the July spawning were sold immediately.

Improvement and promotion of production technology for tilapia

The Philippine Bureau of Fisheries and Aquatic Resources (BFAR) has been promoting the culture of saline tolerant tilapia particularly in the Visayas and Mindanao in ponds originally used for shrimp culture. AQD, in an effort to identify which among the currently available species/strains are suitable for brackishwater culture, is conducting studies on the development of saline tolerant tilapia species or strains with enhanced traits (good survival, growth and fillet yield). Results of experiments in brackishwater tanks carried out from last year to date showed that both the red and Nile tilapia species generally had better growth and morphometric traits than the Mozambique tilapia stocks. Mozambique tilapias, known to be the most saline tolerant, had the highest survival in brackishwater (100% and 90% for runs 1 and 2 respectively). Similar trends were observed when the same species were reared in cages within a brackishwater pond. Recently, two stocks of the BEST strain Tilapia from BFAR were procured for growth comparison trials.

Tilapia seedstock production is being conducted in two AQD stations, namely; the Binangonan Freshwater Station (BFS) and the Tigbauan Main Station. Fingerlings produced from BFS are sold to Luzon-based farmers while TMS-produced tilapia fingerlings are meant for Visayas-based farmers.

Meanwhile, the TMS tilapia hatchery produces both Nile and red tilapia in tanks and earthen ponds. Both Nile and red tilapia fry stocks were fed diets with methyltestosterone to produce sex-reversed fingerlings. An estimated 548,000 fry were collected during the period April to September 2011.

Co-culture of tilapia and giant freshwater prawn using AQD formulated diets are being verified in cages in a freshwater reservoir in Dingle, Iloilo. Results showed that tilapia stocks fed the AQD formulated diet grew better than those fed the commercial diet. A confirmatory run is on-going.

Development of culture techniques for indigenous freshwater species in the region

Domestication and evaluation of the culture potential of an indigenous freshwater prawn species known as *Macrobrachium lar* is being conducted. Newly hatched larvae from wild-sourced berried females collected from Sorsogon were reared at 6, 12, 18 and 24 ppt to determine the ideal larval rearing salinity. Poor survival was noted in all salinities although larvae reared in 24 ppt were noted to have survived until the zoea IV stage. In another experiment, two types of artificial seawater were used in larval rearing. The commercial formulation Biomix (30 ppt) was compared against CAUNESP (Centro Aquicultura de Universidade Estadual Paulista, Sao Paulo, Brazil) formulation for seawater. Larvae reared in Biomix water survived only until day 3 while the CAUNESP formulation allowed post larval production after 48 days. Low survival of hatchlings from lake-based broodstock was also noted. More refinements are needed.

The breeding and larval rearing methods for several locally important fish species that could have aquaculture potential are currently being studied for propagation. A study on the reproductive biology of silver perch collected from selected habitats in Luzon, Philippines commenced in January. Wild and tank-reared silver perch were injected at mid-day with either saline (control) or 1-2 doses (10 IU and 50IU) of human chorionic gonadotropin (HCG). Forty to eighty percent of vitellogenic females with tertiary yolk stage oocytes and paired with milting males spawned 18-27 hours post-injection. The control fish failed to spawn. Eggs had mean fertilization rates of 53-86% and a hatching rate of 23%. Eggs in mildly aerated water at 28-30C hatched earlier at 11-13h post-fertilization.

In a related study, the larval rearing requirements for the silver perch, *Leiopotherapon plumbeus* are being determined. With regard to spawning trials, spawning occurred 24 hours post-injection only in two out of five groups injected with HCG. Another spawning trial was conducted in March when spawning was successful in five out of ten breeding groups. Newly hatched larvae were fed with different combination of live foods (protozoans, rotifer, *Artemia* cyst and small algal species *Glenodinium* sp) for the feeding trials. Larvae survived only until day 5. Another trial will soon be conducted. Meanwhile, samples of the larvae were brought to Japan where data on mouth gape and other morphometric characteristics (important in determining the ideal larval food size and preference) shall be taken to generate baseline information for the feeding biology of silver perch.

Implementation of health management strategies for cultured freshwater species

Studies on freshwater fish/prawn health management are being conducted by TMS-based researchers. Progress on their research activities are part of the report of the regional research program funded by the GOJ TF.

Development and implementation of business packages for freshwater aquaculture

AQD promotes business packages for freshwater aquaculture through ABOT, capacity building programs, publication of manuals, media appearances, and participation in trade fairs.

This year, giant freshwater prawn farming in cages in Laguna de Bay was conducted as part of a livelihood development project for local water cooperative in Binangonan, Rizal. BFS researchers

gave technical support and were involved in training of local farmers in prawn farming particularly during monthly on-farm monitoring as part of the Institutional Capacity Development for Sustainable Aquaculture program of AQD.

Last March 23, AQD participated in AQUATECH, an aquaculture forum cum exhibit held in Clark Field Pampanga. Here AQD's technology extension programs were promoted and publications particularly extension manuals in freshwater and marine aquaculture were sold to local farmers and aquaculture investors. Two resource persons from AQD were invited to share updates particularly in genetic improvement as applied in aquaculture and in the breeding and farming of high value marine species.

To further promote the aquaculture business packages developed by AQD, AQD has recently forged an agreement with a local television production company that will feature all mature technologies that can be adopted by prospective investors. Prior to the MOA, the technologies on giant freshwater prawn were featured in several segments of the show. Increased visibility through the television media has helped promote the prawn culture and hatchery technology and AQD on a national scale owing to the increased inquiries on training, ABOT assistance and information materials after the features were shown.

Finally, two new manuals on the giant freshwater prawn, one on the hatchery and the other on the grow-out technology, and a new tilapia manual focusing on the modular farming technology were also produced and are currently available.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Small-holder Freshwater Aquaculture will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Seaweed Strain Improvement
Responsible Department: SEAFDEC Aquaculture Department
Total Duration: 2008-2011

1. INTRODUCTION

Seaweed industry gives high revenue to the national economy and also provides livelihood to marginal fisherfolks. However, problems of the industry at the production level, mainly, the decreasing seaweed production, should be addressed to make seaweed farming sustainable. This problem is due to poor quality seeds stocks.

Seaweeds nourish by absorbing nutrient from the environment. Nutrients *i.e.* nitrogen compounds, that are toxic at certain levels to animals, are beneficial to seaweeds. *Gracilaria* thrives in conditions that are high in organic load. Thus the *Gracilaria* is used as biofilter. The use of *Gracilaria* as biofilter will be tested with shrimp.

Seaweeds as source of natural products as nutraceuticals, pharmaceuticals, for biomedical and food products (binder, stabilizers etc.) is being studied here and other parts of the globe. In aquaculture, the use of seaweeds as an antimicrobial for fish will be explored.

2. PROGEAM

2.1 Objectives

- 1) Develop new strains of *Kappaphycus*
 - Strains that are fast growing, with good quality carrageenan, and less susceptible to diseases
 - Establish genetic markers of stocks and releases.
 - Mass produce good quality seedlings
- 2) Improve the efficiency of *Gracilaria* (other seaweeds) as biofilter
 - Determine the nutrient uptake kinetics and assimilation of *Gracilaria*
 - Determine the output of shrimp (excreta, urine, uneaten feeds etc.) at different stages
 - Determine efficiency of *Gracilaria* as biofilter in the shrimp tank and pond culture
- 3) Explore antimicrobial properties of seaweeds of commercially-important seaweeds against common fish (and human) pathogens
 - Identify seaweed strains that have antibacterial or antiviral activity against pathogenic microorganisms of fish
 - To test the toxicity of crude seaweed extracts in fish cell lines

2.2 Program Description

The Program deals primarily with the problem of deteriorating quality of cultivars consequently resulting to a reduced production and productivity of the seaweed farmers. Two strategies are done to address this problem, these are: (i) tissue culture and mutagenesis; and (ii) natural sporulation.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

The progress in pursuit of these objectives is outlined below:

Development of new strain through tissue culture, sporulation and protoplast fusion techniques

Isolation conditions were optimized for *K. alvarezii* and *K. striatum*. The effects of plant growth regulators are also tested for the regeneration of protoplasts. Unsuccessful runs were experienced due to ciliates contamination in liquid medium.

Bacterial and ciliates contamination were eliminated. Different mannitol concentrations, use of PGR (plant growth regulator) and fertilizers were tested in newly isolated protoplasts. Higher concentration of mannitol was more effective in maintaining stability of the cell membrane. The use of PGR showed higher survival after 2 weeks of protoplast culture. Observation is still on-going for the regeneration experiment.

In another study, pre-treatment of fresh and powdered seaweed samples with cellulase or a combination of cellulase and carrageenase have been tested to determine if degradation of cell wall by polysaccharidases will result to higher total cellular DNA yield that is amenable to PCR amplification. No significant increase in DNA yield was observed with this additional enzymatic pre-treatment.

Improving the efficiency of Gracilaria (other seaweeds) as biofilter

A second run using *G. bailinae* showed that seaweeds can take up as much as 80% of total ammonia and ammonium in the water after 1 hour and almost 95% after 2 hours. Total ammonia and ammonium in the water remained low or below determinable value after 6 hours. A second run using *Caulerpa lentillifera* showed erratic results.

Experiments were also done to determine the uptake rate of *G. bailinae* of the dissolved nutrients present in an intensive shrimp culture. Total dissolved nitrogen (ammonia, ammonium, nitrate and nitrite) in the inlet ranged from 4.65-5.92 ppm, while total phosphate ranged from 1.04-1.43 ppm. Total dissolved nitrogen in the outlet ranged from 0.45-1.37 ppm, while total phosphate ranged from 0.10-0.69 ppm.

Kappaphycus was also grown in a net cage using different fertilizers (Acadian seaplant, sodium nitrate and without fertilizer) along fish cages in Igang Marine Station. The total nitrogen in the thallus of *K. alvarezii* without fertilizer is significantly different to the total nitrogen of content of seaweeds treated with different fertilizers after 12 hours. This showed that seaweeds absorbed the nutrient after 12 hour soaking.

After 45 days of culture in net cages at Igang Marine Station, there is no significant difference in the total nitrogen content of *K. alvarezii* with or without initial fertilization.

There is significant difference in the % recovery of semi-refined carrageenan (alkaline treated chips) of *K. alvarezii* with and without fertilization (by immersion). Fertilization could affect the quantity of semi-refined carrageenan of *Kappaphycus*.

Exploring the anti-microbial property of seaweeds

To date, a total of 14 and 10 crude ethanol and water extracts, respectively, from seven varieties of *Kappaphycus* and *Eucheuma* species have been screened for antibacterial activities against four fish and three human bacterial pathogens. Of these, one preparation of the crude ethanol extract of *K. alvarezii* – Vanguard variety showed promising antimicrobial activity against the human bacteria *S. aureus* and its multidrug-resistant strain, MRSA. So far, none of the extracts exhibited significant antimicrobial activity against the four fish pathogens tested.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

The Departmental Program on Seaweeds will be completed in December 2011. However, most of the activities under this Program will be continued in 2012 under different Program themes. The details of these are discussed under new Departmental Programs, which are thematic.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Adapting to Climate Change Impacts
Responsible Department: Aquaculture Department
Total Duration: 2012-2016

1. INTRODUCTION

Climate change is already happening. There is little doubt that global warming is occurring and at a greater rate than previously predicted (IPCC, 2007). The recent extreme weather disturbances like more frequent and stronger typhoons, long dry spells resulting to droughts, frequent heavy rains resulting to severe flooding are some of the phenomena that are linked to climate change. These changes are projected to impact broadly across ecosystems and economies, increasing pressures on all livelihoods and food supply chains, including those in the fisheries and aquaculture sector. The future food supply will be a central issue as food resources come under greater pressure, and the availability and access to fish supplies will become an increasingly critical development issue.

Climate change is a compounding threat to the sustainability of aquaculture development. Impacts occur as a result of gradual warming, the increasing acidity of the oceans and associated physical and chemical changes as well as from frequency, intensity and location of extreme climatic events. How these changes affect 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 are largely vulnerable since they are dependent on their aquaculture operations for food and income. Urgent adaptation measures are required in response to the threats to food and livelihood provision due to climatic variations.

2. PROGRAM

2.1 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(s) of climate change in aquaculture, and ensure the continued operation of all aquaculture production systems under changing climatic conditions.

The specific objectives are (i) to gather scientific information on the susceptibilities of various aquaculture species to the combined effects of increasing seawater temperature and acidity; (ii) to gather scientific data on the effects of climate change to production of natural live food organism for hatcheries and for pond culture systems; (iii) to promote public awareness on the possible effects of climate change to aquaculture activities and to the fish farmers; (iv) to assist other government agencies in the country and in the region in gathering baseline information on aquaculture areas/sites that are vulnerable to climate change effects; (v) to gather scientific information that will serve as basis for the formulation/design of alternative aquaculture systems that are adaptive to climate change; (vi) 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; (vii) to explore potential adaptive measures to mitigate the impact(s) of climate change to the different aquatic farming systems.

2.2 Program Description

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, important data on this aspect will be generated to 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. How climate change affects important related ecosystems like the mangrove and coral reef ecosystems will be ascertained as well.

3. PLANNED ACTIVITIES

Nothing is known on the combined effects of increasing seawater temperature and acidity on the reproductive performance of the various aquaculture species farmed at present. To address this concern, initial studies will be done on this aspect starting 2012.

Gonadal maturation, spawning success and the quality of gametes will be investigated in representative model species like tilapia (for Freshwater fish); rabbitfish (for marine fish) and mud crab (for crustaceans). Similarly, the combined effects of increasing seawater temperature and pH on spore shedding and development of seaweeds, *Kappaphycus* and *Gracilaria*, will be investigated. Whether the embryos and the larvae of important aquaculture species will develop normally and survive under the combined effects of increasing seawater temperature and acidity is likewise unknown. For this, studies will be initiated to look at the combined effects of higher seawater temperature and lower pH on embryo survival, embryonic development and survival of fry in the hatchery of important marine fish species. Initial studies on this will be done on Asian sea bass and milkfish. The same investigations will also be initiated on abalone, mud crab and shrimps (*P. monodon*). Similarly, the same investigation will be done on species of microalgae (*Nannochlorum*, *Isochrysis*, *Tetraselmis*, *Chaetoceros*) and zooplankton (rotifer, *Brachionus plicatilis*) that are commonly used in hatcheries. Specifically, the reproduction and the nutritional value of these microalgae and rotifer will be studied if affected when exposed to the combined factors of increasing seawater temperature and acidity. The production of lablab, the natural food of milkfish in brackishwater ponds, will also be investigated whether affected with the changing climatic conditions.

4. EXPECTED OUTPUTS

Scientific data are largely the expected outputs of the above activities. Information on whether rabbitfish and mud crab will continue spawning in higher SW temperature (31 and 33°C) will be generated. Whether *Kappaphycus* or *Gracilaria* will continue shedding spores and develop normally with higher SW temperature and lower acidity will also be known. Data will also be available on whether Asian sea bass, milkfish, abalone, mud crab and shrimp embryonic and larval development will proceed normally, and if fry of these species will survive in the hatchery when exposed to the combined effects of increasing seawater temperature and acidity. Similarly, the effect of these combined factors on reproduction and nutritional quality of microalgae (*Nannochlorum*, *Isochrysis*, *Tetraselmis*, *Isochrysis*) and rotifers for used in hatcheries will be known. Likewise, the effects of these factors on lablab production in ponds will be generated.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Healthy and Wholesome Aquaculture
Responsible Department: Aquaculture Department
Total Duration: 2012-2016

1. INTRODUCTION

The concept of healthy and wholesome aquaculture is an integral component in improving and sustaining aquaculture production to provide the protein needs of an escalating human population. Research and development efforts in aquaculture have resulted in phenomenal growth of the sector in the last four decades, but more problems need to be studied and solved to attain significant improvements and assure sustainability for future generations in the face of many challenges posed by ecological, economic, and climatic changes, among others, happening in our world today. Healthy and wholesome aquaculture will invoke improvements in nutrition and feeding and health management to promote healthy farmed aquatic animals as well as preserve the environmental integrity of aquaculture systems and ensure the safety of aquaculture food products. Yield optimization from various production systems with least impact on the environment shall be based on Best Management and Good Aquaculture Practices.

2. PROGRAM

2.1 Objectives

The Healthy and Wholesome Aquaculture Program aims to improve aquaculture production through innovations in nutrition and feeding and fish health management in aquaculture and in preserving the environmental integrity of aquaculture systems.

Specifically it aims to:

- 1) Find different sources of fish meal substitutes and develop effective feed management schemes that incorporate sound environmental management;
- 2) Develop aquafeeds for selected species at specific growth stages especially for species or stages for which no artificial feed has been formulated;
- 3) Promote the better understanding of the concept of feed conversion ratio (FCR) and adequate nutrition and efficient feeding practices among fish farmers to promote fish health;
- 4) 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 trans-boundary pathogens;
- 5) Promote the wider use of conventional diagnostic as well as new methods especially for newly reported, emerging diseases;
- 6) Find effective alternative safe drugs/chemicals (including natural products) to manage aquaculture diseases in lieu of harmful chemicals and drugs whose use has been discouraged or banned due to quality and safety issues and to develop marker-assisted breeding programs to address disease issues;
- 7) Re-educate stakeholders and train fish health specialists in developing the capability for fish disease diagnosis through application of Level 1 and 2 techniques, and enhance their understanding and interpretation of Level 3 techniques and to develop healthy broodstock through pathogen exclusion;
- 8) Promote group implementation of BMP/GAP and certification of small-scale farmers in the region and incorporate FAO Technical Guidelines to Aquaculture Certification into national aquaculture certification schemes and development of regional standards as well as promotion of global standard for responsible supply certification system; and
- 9) Rationalize the competing use of critical water resources so that small-scale fishers are afforded access to zoned areas.

2.2 Program Description

The Healthy and Wholesome Aquaculture 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 nutrition 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. PROPOSED ACTIVITIES FOR THE YEAR 2012

The activities proposed for 2012 include:

- Research on fish meal substitutes for feed formulations;
- Studies on effective feeding management and strategies for milkfish and other species;
- Studies on feed formulation refinements;
- Transfer of technology package of available feed formulations through on-line course on aquaculture nutrition;
- Development and evaluation of compound feeds for specific species and growth stages (*i.e.* seahorse, pompano, mudcrab, abalone, grouper, tilapia, freshwater prawn, *P. monodon* and *P. vannamei*);
- Development of shrimp probiotics;
- Investigation of causative agents of mortality syndrome affecting *P. monodon*;
- Investigation of annelids as carrier of viral pathogens;
- Investigation on the health status of wild shrimp stocks using levels 1,2 and 3 techniques;
- Development of control methods for *Vibriosis* and *Amyloodiniosis* in grouper and seabass including the use of immunostimulants and endogenous antimicrobial peptide;
- Training of fish health specialists on fish disease and diagnostics; and
- Development of vaccines against important bacterial and viral pathogens for the grow-out of freshwater and marine species and crustaceans.

4. EXPECTED OUTPUTS

The expected outputs include:

- Effective grow-out and broodstock feed for Pompano developed;
- Effective grow-out feed for abalone developed and verified;
- Grow-out culture of grouper in brackishwater ponds with practical feed demonstrated;
- In-situ training on nutrition and feed formulations conducted and manual published;
- Feeding management for milkfish and other species improved;
- Application of *Bacillus* species in larval rearing of *Peneaus*;
- Identified causative agent for the two months mortality syndrome including way to prevent or control disease occurrence/outbreak;
- Prevalence of WSSV and other viral pathogens in annelids known;
- Zoonotic bacteria and parasites from cultured organisms identified;
- Health status of wild shrimp stocks (primarily WSSV and other potential pathogens) updated;
- Field tested immunostimulants for important marine species;
- Bacterial and viral vaccines for the grow out of fish and crustaceans developed; and
- Fish health specialists from member countries trained on fish disease diagnostics (through Government of Japan trust funds).

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Maintaining Environmental Integrity through Responsible Aquaculture
Responsible Department: Aquaculture Department
Total Duration: 2012-2016

1. INTRODUCTION

The thematic program Maintaining Environmental Integrity through Responsible Aquaculture 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 Aquaculture Department 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. PROGRAM

2.1 Objectives

The goal of the program is to develop environment-based aquaculture technology by integrating environmental factors in SEAFDEC/AQD research activities and to maintain environmental integrity by promoting responsible aquaculture. Specifically, the program aims to:

- 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 Program Description

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. PROPOSED ACTIVITIES FOR THE YEAR 2012

The activities proposed for 2012 include:

- 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. This will involve determining the carrying capacity, decision support tools for freshwater aquatic systems in the Philippines and assessing the biodiversity (aquatic flora and fauna) in marine cages and other platforms for aquaculture (also includes profiling of AQD stations).
- Identification of appropriate extractive species that may be used in integrated multi-trophic aquaculture (IMTA). This will involve: (i) polyculture of suitable finfish species with sandfish *Holothuria scabra* and mangrove clam *Anodontia philippiana* as bioremediators in an intensive pond/pen culture system; (ii) determination of optimal conditions for growth and survival of sandfish juveniles for culture; (iii) evaluation of seaweed *Gracilaria bailinae* as bioremediator in intensive shrimp *P. monodon* culture; (iv) development and extension of integrated multi-trophic aquaculture techniques for improvement of livelihood; and (v) studies on physiology of sandfish and other IMTA species.
- Development and promotion of efficient and suitable environment-friendly culture systems. The Program will investigate the feasibility of IMTA methods to small-scale farmers in the Philippines.
- Conduct of biological and ecological studies on species with potentials for resource enhancement. This will involve stock enhancement studies of giant clams in San Joaquin, Iloilo, abalone in Sagay Marine Reserve and mud crabs in Panay; sandfish sea ranching; coastal resource stock enhancement in Batan Estuary and application of molecular genetic markers in the conservation and management of marine genetic resources in Asia.

4. EXPECTED OUTPUTS

The expected outputs include:

- A database of water quality parameters of the different stations of SEAFDEC/AQD;
- A list of flora and fauna in Igang Marine Station and Tigbauan Main Station;
- Information on the carrying capacity of some freshwater systems in the country;
- Information on species and combination of species suitable for developing integrated multi-trophic aquaculture technology in tropical areas;
- Initial data or information on different environment-friendly culture systems suitable to various grow out systems; and
- Established strategies for stock enhancement, restocking or sea ranching of species SEAFDEC/AQD is working on.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Meeting Socio-economic Challenges in Aquaculture
Responsible Department: Aquaculture Department
Total Duration: 2012-2016

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 aquaculturist; 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. However, the present and future role of aquaculture in the region offer optimism since its population is projected to remain as fish-eating with estimated consumption at 16.7 million mt while the regional fish production is estimated to enable global export of over 1 million mt to deficit regions in 2020.

2. PROGRAM

2.1 Objectives

MSECAP aims to develop and implement social and economic strategies in aquaculture and resource management to secure food and income through stakeholder collaboration.

The Program aims to respond to the specific recommendations for meeting social and economic challenges in aquaculture identified and adopted during the *ASEAN-SEAFDEC Fish for the People 2020 Conference* in June 2011 which include: 1) prioritizing collaborative R&D in aquaculture in the region in order 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 Program Description

In response to the persistent and emerging social and economic issues in aquaculture in Southeast Asia, the research and development (R&D) activities of the MSECAP intends to address the five categories of problems discussed and adopted for development of action plans during the *ASEAN-SEAFDEC Fish for the People 2020 Conference* held in Bangkok in June 2011. These issues define the scope and coverage of the MSECAP as follows: 1) enhancing the role of aquaculture in addressing food, income and livelihood security through improved governance, multi-agency collaboration, and comprehensive and inter-disciplinary approaches; 2) promoting sustainable aquaculture through enabling polices that support the management of natural and environmental resources; 3) enabling mechanisms, institutions and infrastructure to encourage adoption of better aquaculture practices; 4) understanding and improving linkages from production to marketing and trade of fishery products to support small and medium enterprise (SME) development; and 5) 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. PROPOSED ACTIVITIES FOR THE YEAR 2012

To address the above issues, MSECAP has prioritized the following action-oriented R&D activities at SEAFDEC/AQD from 2012-16:

- Continuation of activities on the adoption of sustainable aquaculture in Dumarao, Iloilo which represent inland areas faced by multi-use irrigated agriculture issues; and in Guimaras province which represent coastal areas faced by oil-spill incidents that require alternative jobs for affected fishers;
- Continuation of activities on the identification of socioeconomics and governance strategies to sustain resource enhancement of threatened species in Sagay Marine Reserve, Negros Occidental;
- Inception of activities on promotion of full-cycle aquaculture of selected species, initially of freshwater prawn grow-out, followed by promotion of its hatchery and nursery technology in communities in a selected lake;
- Inception of activities towards culture-based fisheries of indigenous species in selected fresh and marine waters beginning with development and promotion of hatchery protocol for such species, together with the Quality Seed for Sustainable Aquaculture Program, partner agencies and communities in the study site;
- Inception of activities that enhance the development of peri-urban aquaculture by mainstreaming culture of appropriate species (*e.g.* goby in Vietnam) in peri-urban environment and the development of its market participated by small and medium aquaculture enterprises; and
- Continued implementation of the Agree-Build-Operate-Transfer *AquaNegosyo* (ABOT AquaBusiness) and Institutional Capacity Development for Sustainable Aquaculture (ICDSA), based on request of local and international clients.

4. EXPECTED OUTPUTS

The expected outputs include:

- Adoption pathways for aquaculture technologies to guide MSECAP technology demonstration, implementation and adoption studies/activities: Summary of lessons learned in inland (Dumarao experience) and coastal communities (Guimaras experience);
- Up-scaled ordinance (from barangay to city level) on abalone and sea cucumber catch size regulation as one of the strategies for managing enhanced stocks (Sagay experience);
- Baseline information for designing the demonstration activities for promoting freshwater prawn grow-out technology in inland communities; and
- Continuing support for ABOT AquaNegosyo and ICDSA clients as appropriate.

PROGRAM DOCUMENT

Program Category: Departmental Program
Program Title: Quality Seed for Sustainable Aquaculture
Responsible Department: Aquaculture Department
Total Duration: 2012-2016

1. INTRODUCTION

For years, Southeast Asia has been known as a major contributor to world aquaculture production. This can be attributed to the fact that most Asian countries have developed refined seed production and farming techniques for major commercially important aquaculture species and are now more aware of the merits of using quality seeds in aquaculture. Good quality seedstock means fit, 'clean', uniformly-sized fry, fingerlings, or juveniles (and for seaweeds, plantlets) that subsequently express good performance attributes during culture. These beneficial traits are desirable color, shape, good growth, health, efficient feed conversion, high reproduction, tolerance to and survival in poor and/or extreme environmental conditions. Success in the sustainable production of aquatic species for human consumption depends primarily on the availability of such good quality seedstock apart from the adoption of optimal husbandry techniques. With the intensification of aquaculture systems 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.

2. PROGRAM

2.1 Objectives

Overall objective:

To generate, verify and promote technologies to ensure the sustainable production of quality seedstock for aquaculture as well as for stock enhancement.

Specific Objectives:

- 1) To develop good quality broodstock for both traditional and emerging species through domestication, genetic and nutritional intervention, and the implementation of proper stock management protocols;
- 2) To improve quality and production of seedstock through the refinement of hatchery and nursery management methods;
- 3) To develop schemes for the production, management, maintenance and dissemination of genetically selected and improved stocks;
- 4) To produce sufficient seedstock through the adoption of economically viable seed production systems; and
- 5) To build the capability of fishfarmers and other industry stakeholders in appropriate breeding and larval rearing technologies through training, extension and information dissemination.

2.2 Program Description

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 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.

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. PROPOSED ACTIVITIES FOR THE YEAR 2012

Most of the studies under this program are on-going researches that shall be continued and completed in 2012 and 2013.

The studies/activities that will be pursued to effectively achieve the program aims will focus on: (i) development of good quality broodstock for both traditional and emerging species through domestication, genetic and nutritional intervention and the implementation of proper stock management protocols; (ii) improvement of quality and quantity of seedstock through the development and refinement of hatchery and nursery management methods; (iii) development of schemes for the production, management, maintenance and dissemination of genetically selected and improved stocks; (iv) production of sufficient seedstock through the adoption of economically viable seed production systems; and (v) building the capacity of fishfarmers and other industry stakeholders in appropriate breeding and larval rearing technologies through training, extension and information dissemination.

4. EXPECTED OUTPUTS

The expected outputs include:

- Stocks of *Macrobrachium lar* surveyed, evaluated and larval rearing requirements of this indigenous prawn species determined;
- Potential sources of good quality broodstock surveyed in several sites in the Philippines, stocks collected for genetic documentation and genetic variability determined;
- Captive stocks of climbing perch bred and produced;
- Best genetic stock of abalone defined and used in selective breeding;
- Effects of dietary protein: energy levels on breeding known and broodstock diet produced;
- Some aspects in the reproductive biology and breeding requirements of the Napoleon wrasse elucidated;
- Improved and efficient low pollution prawn broodstock diet developed;
- Improved milkfish maturation diet available;
- The efficiency of commercially available maturation diet known;
- Mass production method for producing polychaetes established;
- Genetic status of hatchery stocks of bighead carps in the Philippines known;
- Optimal conditions and natural food requirements for larval rearing in silver perch known;
- Larval rearing protocol for grouper refined;
- Cultivation methods for *Cocconeis* sp for the settlement, growth and survival of post larval abalone *H. asinina* known;
- Conditions for mass production of marine traustochytrids known and traustochytrid strains tested as enrichment for larval live feed;
- Optimal conditions for the larval rearing of emerging marine species determined;
- Bacterial and viral vaccines for broodstock and seed production of fish and crustaceans developed;
- Suitable formulated diet (based on lipid level) evaluated and nursery culture techniques for pompano in brackishwater ponds known;
- Fingerling production for seabass, snapper, and grouper in cages in pond and in tanks determined
- Strategies to reduce cannibalism in mudcrabs during the nursery phase developed;
- Use of tryptophan in larval food evaluated as effective in reducing cannibalism in carnivorous finfishes;

- Microparticulate diet for feeding postlarval abalone developed and its effect on the onset of larval settlement and metamorphosis known;
- Best saline-tolerant tilapia stock known and produced;
- Stocks of donkey's ear abalone evaluated in the growth phase and the best stock identified;
- Methods to improve growth and reproductive efficiency in giant freshwater prawn stocks developed;
- Best strategy to minimize inbreeding in giant freshwater prawn stocks determined;
- Improved growth, breeding performance in tiger shrimp and white shrimp; healthy broodstock produced and inbreeding minimized;
- Hybridization protocols established for the abalone; hybrids produced;
- Protocols for the seed production of *Kappaphycus* hybrids developed; hybrids produced and evaluated;
- Molecular markers to aid selection in *Kappaphycus* developed;
- Genome of milkfish, *Chanos chanos* determined;
- Economically viable methods for the production of seeds of freshwater fish, prawns, abalone and marine fish species established;
- Seahorse juveniles consistently produced for stock enhancement;
- Training courses on fish/crustacean/mollusk breeding and hatchery operations conducted;
- RFTC staff trained and AQD and RFTC-assisted demonstration farms established;
- Institutional Capacity Building for Sustainable Aquaculture for several local government technology recipients conducted;
- Clients under the Agree-build-operate-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; and
- Information disseminated through popular and scientific publications and through participation in fairs and exhibits.

Annex 8

**PROGRAMS UNDER THE FISHERIES CONSULTATIVE GROUP
OF THE ASEAN-SEAFDEC STRATEGIC PARTNERSHIP (FCG/ASSP) MECHANISM
IN THE YEAR 2011-2012**

Project Titles	Lead Department	2011	2012
1. Assistance for Capacity Building in the Region to Address International Trade-related Issues	SEC	Y	Y
2. Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region	SEC	Y	Y
3. Activities related to Climate Change and Adaptation in Southeast Asia with Special Focus on the Andaman Sea	SEC	Y	Y ¹⁴
4. ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020	All Dept	Y	N ¹⁵
5. Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing Related Countermeasures	SEC	Y	Y
6. Responsible Fishing Technologies and Practices (Fishing in Harmony with Nature)	TD	Y	Y
7. Sustainable Utilization of Potential Fisheries Resources and Reduction of Post-harvest Losses	TD	Y	Y
8. Fisheries Resource Survey and Operational Plan for M.V. SEAFDEC 2	TD	Y	Y
9. Information Collection of Highly Migratory Species in Southeast Asian Waters	TD	Y	Y
10. Deep Sea Fisheries Resources Exploration in the Southeast Asia	TD	Y	Y
11. Development of Regional Database for Fishery Management	TD	Y	Y
12. Promotion of Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management	TD	Y	Y
13. Rehabilitation of Fisheries Resources and Habitats/Fishing Grounds through Resource Enhancement	TD	Y	Y
14. Improvement of Information Gathering System for IUU Fishing Related Countermeasures in the Southeast Asia	TD	Y	Y
15. Promotion on Fishing License, Boats Registration, and Port State Measures	TD (MFRDMD)	Y	Y
16. Human Resource Development for Sustainable Fisheries	TD	Y	Y
17. Chemical and Drug Residues in Fish and Fish Products in Southeast Asia: Biotoxins Monitoring in ASEAN	MFRD	Y	Y
18. Traceability Systems for Aquaculture Products in the ASEAN Region	MFRD	Y	Y
19. Utilization of Freshwater Fish for Value-added Products	MFRD	Y	Y
20. Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea	MFRDMD	Y	Y
21. Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asia Waters	MFRDMD (TD)	Y	Y
22. Promotion of Sustainable and Region-oriented Aquaculture	AQD	Y	Y
23. Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release	AQD	Y	Y
24. Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia	AQD	Y	Y
25. Food Safety of Aquaculture Products in Southeast Asia	AQD (MFRD)	Y	Y

¹⁴ The Program was completed in 2011, but extended until mid of 2012

¹⁵ The Program was completed in 2011

List of Non-Funded Programs	Lead Department	2011	2012
1. The Use of Indicators for Sustainable Development and Management of Capture Fisheries in the ASEAN Region	MFRDMD	N	X
2. Development of Integrated Inland Fisheries Management in ASEAN Countries	MFRDMD	N	X
3. Capacity Improvement of Fisheries Community for Fisheries Management and Alleviation of Poverty ¹⁶	TD/SEC	N	X

Y = Program implemented during the year

N = Program not implemented during the year

X = The 19th ASWGFi recommended the program to be removed from the list of 2012 programs

¹⁶ This program will be linked with the pipeline project on “Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management” prepared by TD in collaboration with SEC.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Assistance for Capacity Building in the Region to Address International Trade-related Issues
Lead Department:	SEAFDEC Secretariat
Lead Country:	Thailand
Total Duration:	2010-2012
Proposed Budget:	67,000 USD (tentative)

1. INTRODUCTION

This project is linkage to the 2011 Resolution No. 18 and Plan of Action No. 67, 69 and 76 as follows:

RES18: Promote joint ASEAN approaches and positions in international trade in fish and fishery products indigenous to the region by harmonizing the standards, criteria and guidelines and developing mutually-recognized agreements on sustainability and safety management systems;

PoA67: Strengthen cooperation among Member Countries to implement international standards with regards to trade on fish and fishery products within the ASEAN region;

PoA69: Strengthen cooperation and mechanisms among Member Countries to work towards common positions that could be reflected in international fish trade related fora,

PoA76: Increase participation and involvement of Member Countries in international fora and technical committees such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); *Codex Alimentarius* Commission; Food and Agriculture Organization of the United Nations (FAO); Office International des Epizooties (OIE); Regional Fisheries Bodies (RFBs); and World Trade Organization (WTO); and promote ASEAN interest, recognizing that fisheries policies of relevance to the ASEAN region are increasingly discussed and agreed upon at the global level.

Recognizing the issues on trade in fish and fish products are greatly discussed and driven by international market and by various organizations, which rarely involve from fisheries authorities and sometimes lack of contribution to sustainable fisheries development and management aspects. 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, particularly developing countries and small-scale fisheries sub-sector. In accordance to this, it is important to reconcile the international driven issues with the promotion on sustainable fisheries development.

2. PROGRAM

2.1 Objectives

The overall objectives of the projects are as follows:

- 1) Monitor and review potential international fish trade related issues, environment related task and implementation of responsible fisheries;
- 2) Identify and analyze the priority of international fish trade related issues and environment related task including the CITES related issues; and
- 3) Developing the regional policy recommendation on international fisheries related issues for ASEAN-SEAFDEC member countries.

2.2 Program Description

Past to present, SEAFDEC has monitored the potential international issues on fish and fish products and provided regional consultative forum to the ASEAN-SEAFDEC Member Countries, through this

mechanism SEAFDEC provides fisheries authority of Member Countries with necessary information of the trade related issues and environment related task on international concern such as the issues under UN General Assembly, WTO, FAO and CITES as well as large group of importer like EC. The outcomes of regional discussions and conclusion were analyzed and came up with future regional action plan as well as common/coordinated position to safeguard the interests of ASEAN-SEAFDEC Member Countries at the global fora. Therefore, it is crucial that SEAFDEC should keep monitoring the emerging international fish trade-related issues, environment related task and implementing of responsible fisheries, while providing support to the Member Countries through appropriate channels in order to reflect the regional collaborative efforts in managing fisheries and assist the Member Countries in developing regional common/coordinated positions, as well as push forward integration of views from fisheries agencies into those international instruments.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

There are two main components under this project namely 1) International Fisheries Trade-related Issues and 2) Environment Task-related Issues. The activities achievements in 2011 can be summarized as follows:

Activity 1: International Fisheries Trade-related Issues

The in-depth study on the international fisheries trade-related issues particularly was conducted based on the requests and suggestions by the member countries, the priority issues are identified as follows: 1) Technical Guideline on Aquaculture Certification; 2) Catch certification/Catch documentation scheme; 3) Quality and safety issues in international fisheries trade-related issues; 4) Small Scale Fisheries; 5) Legally-binding Instruments on Port State Measures for Combating Illegal, Unreported and Unregulated (IUU) fishing; 6) Subsidies; 7) CITES; and 8) global records.

The outcomes under this activity are as follows:

- Review of Issues Related to FAO Aquaculture Certification
- Review on Aquaculture Certification
- Overviews of Measures against the IUU Fishing
- Review of the FAO Legally-Binding Instrument on Port State Measures for Combating IUU Fishing
- Catch Certification-Documentations
- Global record of fishing vessels
- Quality and safety issues
- Review on Fisheries Subsidies
- CITES issue
- Climate Change
- Ecosystem Approach to Fisheries

The Regional Technical Consultation on International Fisheries-related Issues (2011) was organized from 18-20 January 2011 in Bangkok, Thailand. The Consultation was attended by national delegates from the ASEAN and SEAFDEC Member Countries, ASEAN Secretariat. The outputs are as follows:

- The Executive Report on International Fisheries-related Issues (2010-2011) was prepared based on the identified issues and the recommendations obtaining from the 13th Meeting of the FCG/ASSP held in Bangkok from 3-4 December 2010 and the ASEAN-SEAFDEC regional Technical Consultation on International Fisheries-related Issues (2011) held in Bangkok, Thailand from 18 to 20 January 2011. This paper intends to provide comprehensive information and regional perspectives on substantive issues for submission to the 44th Meeting of SEAFDEC Council in April 2011, and the 19th Meeting of the ASEAN Sectoral Working Group on Fisheries (ASWGF_i) in late April 2011, respectively.
- Brief Fisheries Management practices in the region was developed as requested by MCs while asking Malaysia to coordinate with the “Friends of the Chair” on behalf of the ASEAN countries for negotiation process of the Fisheries Subsidies.

- Updating information on the International fish trade related issues namely EC-Regulation, Port State Measure, Fishery subsidies, FAO Guideline for aquaculture certification, etc. which may affect to country on fishery sector.
- SG accompany with PPC participate to the FAO-COFI in Rome from 31 Jan.- 4 Feb. 2011, SEAFDEC statements based on the Recommendations from the RTC on International Related Issues such as Aquaculture guidelines, Global records, SSF were delivery to FAO.
- Publications on the Executive Report on International Fisheries-Related Issues (2010-2011).

Activity 2: Environment Task Related Issues

Participate to the 8th Meeting of the ASEAN Expert Group on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES)' from 8 to 10 February 2011, in Bandar Seri Begawan, Brunei Darussalam. (using funding support from other sources). The 8th Meeting was organized by the Department of Forestry and the Department of Agriculture and Agrifood of the Ministry of Industry and Primary Resources, in collaboration with ASEAN Secretariat. Two group of exploited aquatic species were discussed s follows:

- Napoleon wrasse, the Meeting was informed that SEAFDEC/AQD under the program on "Resource Enhancement of International Threatened and Over-exploited Species in Southeast Asia through Stock Release" have been conducting the study on the stock enhancement of napoleon wrasse and the additional information on the study would be provided upon requested.
- The representative from Indonesia informed the Meeting that the inclusion of sharks into CITES Appendices was not of the highest priority and the country is focusing the conservation and management of sharks though the implementation of NPOA-shark.

In depth Study on the commercially exploited Aquatic Marine Species such as Sharks, tuna, sea cucumber, seahorse, Napoleon wrasse, etc.

- Regional views of elasmobranchs fisheries as an input for the Special Meeting on Shark.
- Regional views on the status of tunas resources in the WCP area.

The RTC on identification of Technical Problem on Selected Commercially Exploited Aquatic species will be held from 18-20 October 2011. The outcomes of the RTC will be updated later.

Production and Dissemination

- The awareness/technical recommendation on the CITES related issues.

Activity Title	Duration	Remarks
1) International Fisheries, Trade Related Issues <ul style="list-style-type: none"> • In depth Study on the International Fish Trade-related issues for Inputs at the RTC • Organized the RTC on International Fish Trade-related issues with the main aims to develop the Regional recommendations • Information Dissemination from the outcome activities 	Nov.2010 – Feb. 2011 18-20 Jan. 2011 Whole period of 2011	
2) Environment Related Task <ul style="list-style-type: none"> • In depth Study on the commercially exploited Aquatic Marine Species such as Sharks, tuna, sea cucumber, sea horse and Napoleon wrasse for Inputs at the adhoc RTC on CITES related issues • Organized the RTC on Improvement of Technical issues of the selected commercially exploited aquatic marine species at Bangkok, Thailand, The outcomes/recommendation will be reported later. • Participated to the 8th Meeting of the ASEAN Expert Group on the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in Bandar Seri Begawan, Brunei Darussalam. • Information Dissemination 	Sept. – Oct. 2011 18-20 Oct. 2011 8 to 10 Feb. 2011 Will be updated	

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Addressing the International Fish Trade and Environmental Task-related Issues
(2) Issues in the region at the beginning of the study: <ul style="list-style-type: none"> • Several International measures/ pressures impact to policy management of fisheries and aquaculture in the Region • Needs of the Capacity Building of ASEAN country to address the International fish trade and environmental task related issues • Information sharing on the issues • Adaptation of the fishery policy/management to dealing with International measure • ASEAN-SEAFDEC Common Positions or Coordinated Positions dealing with International measures

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Capability to involve and to address the country voice/opinion on the International fish trade and environmental task-related issues at the international forum • To develop the ASEAN-SEAFDEC Common Positions or Coordinated Positions on specific issues dealing with international / regional measures related to fishery • To participate to the International Fish Trade and Environmental Task related issues • To support MCs on addressing and developing any NPOAs related to International measures

3.2.3 “Steps” toward achieving final goals:

Step 1: In-depth study on the Fish-trade and environmental task related issues
Step 2: Organizing the Regional Technical Consultation or Expert meeting to develop the Regional recommendation or ASEAN-SEAFDEC Coordinated positions
Step 3: Participation to the International/Regional and National forum to promote, update, and share the Regional views related to Sustainability of Fisheries and Aquaculture in the Region.
Step 4: Information Production and Dissemination

3.2.4 Activities in the current program:

(1) Current position of the program: One year cycle
(2) Program duration: 2010-2012 <under the new framework from 2010>
(3) Main activities: -

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program <ul style="list-style-type: none"> • In depth Study on the International Fish Trade-related issues for Inputs at the RTC • Organized the RTC on International Fish Trade-related issues with the main aims to develop the ASEAN-SEAFDEC Coordinated Positions • In depth Study on the selected commercially exploited Aquatic Marine Species such as Sharks, • Assisting/Organizing the Ad-hoc Meeting on selected commercially exploited Aquatic Marine Species • Participated to the AEG CITES meeting for information exchange and enhance cooperation • Information production and dissemination
(2) Main achievements till the end of 2011 (tentative) <ul style="list-style-type: none"> • Policy Recommendations on Technical problems of the selected commercially exploited aquatic marine species • Recommendations for improvement of information collection and initiatives works to support management and assessment of selected commercially exploited aquatic marine species in the region

(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcomes	Achievement rate (%)
<ul style="list-style-type: none"> • Capability to involve and to address the country voice/opinion on the International fish trade and environmental task related issues at the international forum 	100
<ul style="list-style-type: none"> • To develop the ASEAN-SEAFDEC Common Positions or Coordinated Positions or Regional recommendations on specific issues dealing with international /regional trade-related issues and CITES related issues 	100
<ul style="list-style-type: none"> • To participate to the International Fish Trade and Environmental Task related issues 	50

3.2.6 Evaluation of program activities in 2011

<ul style="list-style-type: none"> • SEAFDEC policy on the International Fish Trade and Environmental task-related issues should be strengthened, as it is a ways to update and involve in the process of any development of measures, which are concerned to the Regional development of fisheries. In additional, the information sharing can be given to all member countries for further discussion dealing with any new emerging issues/measures. • To support MCs on addressing and developing any NPOAs related to International measures, SEAFDEC need to play more important role on this matter based on the request from MCs.
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4. PROPOSED ACTIVITIES FOR THE YEAR 2012

Planning for the project and activities (project/activity title and its short description) to be implemented as well as expected outcomes in the year 2012. In case that there are linkages among programs, the linkages and coordination mechanism among concerned programs should be provided.

4.1 Planning of the Project Activities

Project/Activity Title	Duration
Activity 1: International Fisheries, Trade-related Issues	
1.1 Regional Technical Consultation on International Fish Trade-related issues held in Chiang Mai	Feb. 2012 (3 rd week)
1.2 In Depth Study on the Issues Identified by the RTC	Nov. 2011- Feb.2012
1.3 Participation to Relevant International Fora;	Jan-Dec 2012
1.4 Production of Promotional Brochure and materials for Support the Member Countries	Jan-Dec 2012
Activity 2: Environmental Task related Issues	
2.1 Monitoring and Participation to ASEAN-CITE Participation to other International for a related to CITES	Jan-Dec 2012
2.2 Regional Expert Meeting on CITES species Regional Expert Meeting: preparation for the CITES-COP16	October 2012
2.3 Regional Synthesis on concerned species < CITES> In-Depth Study on the Issues Identified by the RTC,	May-October 2012
2.4 Production of Promotional Brochure and materials for Support the Member Countries	July-Dec 2012

4.2 Expected Outcomes in the Year 2012

<ul style="list-style-type: none"> • To update and coordinate with the international organization related to fisheries to address the regional interest or regional position on sustainable fisheries development; • To develop the ASEAN-SEAFDEC Common Positions or Coordinated Positions on specific issues dealing with international /regional fish trade-related issues and CITES related issues; • To update and monitor on the International Fish Trade and Environmental Task-related issues; • To enhance the awareness building on the fish trade and CITES related issues; and • To identify the technical problems on the study of the Selected commercially-exploited aquatic species.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region: Towards Better Utilization and Harmonized Information for Fisheries Management in Southeast Asia
Lead Department:	SEAFDEC Secretariat
Lead Country:	Thailand
Total Duration:	2007-2012
Budget:	approximately 10,380 USD

1. INTRODUCTION

Fishery statistics, data and information- which generally include registration, records, reporting, census and surveys, and other data and information including indicators that are derived either from routine and non-routine systems-are widely accepted as basis and being crucial for determination/development of national fisheries policies, formulation of national management frameworks and actions, or even basis for understanding the status and condition of fisheries resources..Since 1978, SEAFDEC plays a prominent role in compilation of regional fishery statistics in the form of Fishery Statistics Bulletin for the South China Sea Area. In addition to fishery statistics, SEAFDEC through its technical departments have also been implementing projects on collection of various fisheries data and information, *i.e.* fisheries resources surveys in the Southeast Asian waters, information collection of highly migratory species, deep sea fishery resources exploration, tagging of sea turtles and research study on their habitats, tagging of economically-important pelagic species, development and usage of practical indicators for sustainable development and management of capture fisheries, supporting vessel registration and licensing, etc. However, the outputs from different initiatives are rather scattered and haven't been integrated/digested to come up with information that could be used as a basis to support development and management for sustainable fisheries of the region.

To facilitate improvement of fishery statistics and information in the region, SEAFDEC, throughout the past decade has implemented a series of activities. From 2002-2005, the program on "Capacity Building on the Improvement of Fishery Statistical Systems in the ASEAN Region" were implemented focusing on enhancing the national capacity of the CLMV countries in the collection of national fishery statistics and development of the Handbook on Collecting Fishery Statistics for Inland and Coastal Fisheries. From 2007-2009, the program on "Improvement of Statistics and Information for Planning and Management of Fisheries in the ASEAN Region" was proposed and implemented with the major achievement in developing a Regional Framework for Fishery Statistics of Southeast Asia with harmonized standard definitions, and classification of fishery statistics; streamlining reporting of fishery statistics from the Member Countries to FAO and SEAFDEC; and supporting Member countries in the development of National Status and Trends (STF) of Fisheries and Aquaculture.

After the completion of the program in 2009, this program was extended (upon the request by the PCM at its 32nd Meeting) until 2012. Activities to be undertaken during the extension period focus mainly on supporting further coordination and communication with Member Countries, SEAFDEC departments and relevant organizations, particularly to enhance linkage between SEAFDEC programs relevant to information/data collection and maximize the use of data collected through SEAFDEC programs; further enhance the compatibility of fishery statistics within the region and with the global level based on the harmonized definitions, standards, and classification of fishery statistics; and maximize the utilization of fishery statistics data and information for the preparation of SEASOFIA, which is expected to serve as a basis for policy, planning and management for sustainable fisheries in the region.

2. PROGRAM

2.1 Objectives

The objectives of this program are:

- 1) To enhance linkage between SEAFDEC programs relevant to information/data collection, and the use of data collected through SEAFDEC programs to support policy planning and management of fisheries;
- 2) To enhance the compatibility of fishery statistics within the region and with the global level by harmonizing standards, definitions, and classification of fishery statistics with those adopted at the global level; and
- 3) To maximize the utilization of fishery statistics and information in order to obtain better understanding on status and trends of fisheries and aquaculture in order to serve as a basis for policy, planning and management of fisheries in the region.

2.2 Program Description

This program was formulated to continue providing support and assistance to the Member Countries to address requirements for better harmonization and utilization of fishery statistics, data and information to support development planning and management of fisheries. To harmonize data and information, the program would maintain the linkages and cooperation in the harmonization of norms/standards definitions and classifications of fishery statistics and information at regional and international levels. The program will also build on top from the past achievement, and further develop linkages/coordination and integration of existing data and information from various sources including from the projects undertaken by SEAFDEC in order to maximize its utilization for planning and management of fisheries at national and regional levels.

Activity 1: Improve better utilization and harmonize information from projects/initiatives implemented by SEAFDEC for fisheries management in Southeast Asia

The planning and implementation of collaborative SEAFDEC programs/projects and initiatives related to data and information on fisheries in the region were undertaken in rather isolation manner, resulted in inadequacy of focus in the improvement of data and information collection, analysis and presentation that could be used to serve planning and management for sustainable fisheries. This activity therefore aims to enhance linkage and coordination of data and information collected through various SEAFDEC programs; and support the development of interface for databases generated by SEAFDEC programs/projects to enhance accessibility and usage of the data and information; as well as the mobilization of such data and information as input for better understanding on status and trends of fisheries of the region.

Activity 2: Harmonization of Standards/Norms, Classifications and Definitions of Fishery Statistics and Information in the Region

The activity aims to support harmonization of standards/norms, classifications and definitions of fishery statistics in line with those adopted at the international level in order to facilitate the compatibility of data for compilation at regional/global levels, as well as further analysis, presentation and interpretation. The activity also aims to reflect the regional uniqueness and specificity of fisheries in the region in the development of standards/norms, classification and definition for fishery statistics and information for fisheries management at the international level (*e.g.* CWP, FIRMS) in order that the regional specificity be properly addressed and taken into account.

Activity 3: Development of the Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA)

This activity aimed to maximize the use of available statistics, data and information from different available sources to enhance better understanding on the status and trends of fisheries and aquaculture in the region (both at the national and regional levels). Three pilot countries, namely Philippines, Thailand and Indonesia, undertook the preparation of National Status and Trends of Fisheries and

Aquaculture. The initiative is to be further applied at the regional level through the pilot case by SEAFDEC, making full use of fishery statistics, existing data and information generated from SEAFDEC programs/projects as well as from other available sources, in the preparation of the Southeast Asian Status and Trends of Fisheries and Aquaculture (SEASOFIA).

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Progress/Achievements
1. Improve better utilization and harmonize information from projects/initiatives implemented by SEAFDEC for fisheries management in Southeast Asia	Jan – Dec.	<ul style="list-style-type: none"> • Provision of inputs/views on data collection based on regional statistics perspective in order to enhance linkage between statistics and other projects relevant to data/information collection, specifically during: the special Meeting on Improvement of Tuna Information Collection in Southeast Asia (7-9 Sep. 2011, Songkhla, Thailand); the Special Meeting on Shark Utilization in Southeast Asia (15-17 Sep. 2011, Bangkok, Thailand); and the Regional Technical Consultation on Improvement of Technical Issues Related to CITES and Commercially-Exploited Aquatic Species (18-20 Oct., Thailand). • Continue coordination to support development and improvement of regional database on fishery statistics, and provide link interface to other databases. • Mobilizing available fisheries data and information generated from SEAFDEC programs/projects as inputs for the preparation of SEASOFIA.
2. Harmonization of Standards/Norms, Classifications and Definitions of Fishery Statistics and Information in the Region	Jan – Dec.	<ul style="list-style-type: none"> • Coordination with Member Countries and FAO on compilation of fishery statistics based on the harmonized framework of fishery statistics in Southeast Asia; • Communicate with CWP on possible areas for further harmonization of fishery statistics, <i>e.g.</i> on aquaculture statistics based on CWP handbook on aquaculture statistics recently endorsed by COFI
3. Development of the Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA)	Jul. – Dec.	<ul style="list-style-type: none"> • Preparation of the draft SEASOFIA with inputs provided by SEAFDEC Secretariat and Departments based on their technical competent (link to activity 1). The publication is to be submitted to the 34th PCM for consideration and further directives; and possible published by the end of 2011.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Towards Better Utilization and Harmonized Information for Fisheries Management in Southeast Asia</p>
<p>(2) Issues in the region at the beginning of the study: The program started in 2007. Considering international and regional initiatives and concerns which also having impact to sustainable development of fisheries in Southeast Asia, this program then formulated to continue providing assistance to the Member Countries to address these issues to better utilization and harmonized information to support development planning and management of fisheries through facilitating cooperation in the region both at national and regional levels by mobilizing data and information from various sources. The project then developed new approach that build on top based on past achievement and experiences in supporting member countries and develop the linkage/coordination and integration of existing data and information, including SEAFDEC's projects for maximizing its utilization for planning and management of fisheries at national and regional level.</p>

3.2.2 Expected final goals of the program:

<p>Overall object of the project is to improve better understanding and knowledge of fisheries and aquaculture in the region by maximizing usage of data and information for fisheries management through:</p> <ul style="list-style-type: none"> • Improve utilization and harmonized information from projects implemented by SEAFDEC relevant to fisheries management in Southeast Asia; • Norms/standards definitions and classifications of fishery statistics and information better harmonized, and issues/areas of regional uniqueness and specification harmonized at regional and international levels; and • Develop the Status and Trends (STF) of Fisheries and Aquaculture in Southeast Asia.
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3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Review existing available and on-going development of data and information, and databases from SEAFDEC projects relevant to fisheries management</p> <ul style="list-style-type: none"> • To clarify and identify problem and constraints and recommend areas need to develop the linkage and coordination and find ways and means to utilization of data and information in harmonized/integrated ways for management purposes. • To coordinate participate in the Consultations/Meeting of SEAFDEC Projects relevant to data and information for fisheries management for providing inputs and framework for developing the linkage and coordination for better utilization of data and information in harmonized/integrated ways for management purposes.
<p>Step 2: Harmonize definitions, standards, and classification of fishery statistics, data and information to facilitate data sharing and exchange in the region, coordination with relevant Global and Regional initiatives/fora</p> <ul style="list-style-type: none"> • Review data and information to support fisheries management relevant to Global and Regional Initiatives/fora • To coordinate and participate in the international development of standards/norms, classification and definition for fishery statistics and information, and fisheries information system at the international level <i>i.e.</i> Meeting of the Coordinating Working Party on Fishery Statistics (CWP) and Meeting of the Fisheries Resources Monitoring System (FIRMS) Steering Committee in order to reflect regional requirement, uniqueness and specificity of fisheries in the region, as well as to harmonize with on-going and development of regional and national development.
<p>Step 3: Development of the Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA)</p> <ul style="list-style-type: none"> • Publish the Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA) mobilizing inputs and outputs from Step 1 and Step 2.

3.2.4 Activities in the current program:

<p>(1) Current position of the program: Step 1, 2 and 3</p>
<p>(2) Project duration: 2007-2012</p>
<p>(3) Main activities:</p> <ul style="list-style-type: none"> • Improve better utilization and harmonized information from projects implemented by SEAFDEC for fisheries management in Southeast Asia • Harmonization of Standards/Norms, Classification and Definition of Fishery Statistics and Information in the Region • Develop the Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA)

3.2.5 Progress and achievements of the current program:

<p>(1) Main activities conducted in the current program</p> <ul style="list-style-type: none"> • Development of National Status and trends of Fisheries and Aquaculture in 3 pilot countries (Philippines, Thailand and Indonesia) • Streamlined Reporting of Fisheries Statistics from the Member Countries to SEAFDEC and FAO • Development of the new Framework for Fishery Statistics and Information of Southeast Asia

(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> Enhanced capacity of the member countries in development, integration and maximizing usage of data and information for development planning and management of fisheries through the process, mechanism and outputs to promote in country coordination and inter-countries coordination based on dialogues among agencies and countries concerned in the development of national Status and Trends of Fisheries and Aquaculture. Streamlined line Reporting of Fisheries Statistics from the Member Countries to SEAFDEC and FAO Framework for Fishery Statistics and Information of Southeast Asia 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
<ul style="list-style-type: none"> Improve utilization and harmonized information from projects implemented by SEAFDEC relevant to fisheries management in Southeast Asia 	50%
<ul style="list-style-type: none"> Norms/standards definitions and classifications of fishery statistics and information better harmonized, and issues/areas of regional uniqueness and specification harmonized at regional and international levels; and 	70%
<ul style="list-style-type: none"> Support the development/improvement of regional database for fishery statistics for Southeast Asia 	70%
<ul style="list-style-type: none"> Interface of SEAFDEC database for fisheries management; and 	30%
<ul style="list-style-type: none"> Develop the Status and Trends (STF) of Fisheries and Aquaculture in Southeast Asia 	70%

3.2.6 Evaluation of program activities in 2011

<p>Activity1: The program has enhanced linkages/coordination and integration of data/information generated from existing activities of SEAFDEC, as well as the use of such data/information to support policy planning and management of fisheries.</p> <p>Activity2: The program has further enhanced the harmonization of norms/ standards definitions and classification of fishery statistics and information at regional and international levels, and support member countries in the provision of their national fishery statistics for regional compilation based on the new statistics framework.</p> <p>Activity3: The program has maximize the use of fishery statistics, data and information available in the region, including those from SEAFDEC, to serve as a basis for development planning and management of fisheries in the region through the development of SEASOFIA.</p>

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Improve better utilization and harmonized information from projects implemented by SEAFDEC for fisheries management in Southeast Asia	Jan – Dec	<ul style="list-style-type: none"> Continue coordination and participation to relevant meetings to enhance linkages among various SEAFDEC programs relevant to data and information; share views on the data collection based on statistical perspective to enhance the compatibility and compilation of data and information from various programs and projects undertaken by SEAFDEC, where applicable; and maximize the use of data and information for fisheries management; Continue to coordinate on development and improvement of the regional fishery statistics database and provide interface for other databases.

2. Harmonization of Standards/Norms, Classification and Definition of Fishery Statistics and Information in the Region	Jan – Dec	<ul style="list-style-type: none"> • Continue coordination and participation to meetings relevant to harmonization of Standards/Norms, Classification and Definition of Fishery Statistics and Information in order to provide inputs and properly reflect regional specificity of fisheries of the region; • Look into further harmonization of fisheries statistics and information in the new areas <i>e.g.</i> aquaculture statistics (of which the standards, classification and definition has recently been endorsed by FAO); • Look into the possibility of SEAFDEC to be a member of ASFA in order to enhance dissemination of SEAFDEC published materials to wide public.
3. Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA)	Jan – Dec	<ul style="list-style-type: none"> • Continue with production and dissemination of SEASOFIA to target groups to enhance the use of information for policy planning and management for sustainable fisheries of the region.

4.2 Expected Outcomes in the Year 2012

Expected outcomes from this program include:

1. Data and information derived from various programs implemented by SEAFDEC were integrated and used to support policy planning and management of fisheries;
2. Improvement of database on fishery statistics in Southeast Asia and interface of databases relevant to fisheries information for fisheries management developed from SEAFDEC projects/initiatives at the homepage as tool for fisheries management;
3. Norms/standards definitions and classifications of fishery statistics and information better harmonized, and issues/areas of regional uniqueness and specification be properly reflected at international levels; and
4. Status and Trends of Fisheries and Aquaculture in Southeast Asia (SEASOFIA) developed and used as a basis for policy planning and management of fisheries.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020
Lead Department:	SEAFDEC Secretariat in collaboration with all Departments
Lead Country:	Thailand

1. INTRODUCTION

The fisheries sector has been widely recognized as an important sector providing substantial contributions to food security for countries in the Southeast Asian region. With the objective of addressing important issues pertaining to the sustainable development of fisheries, ASEAN and SEAFDEC co-organized in November 2001, the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People”. During that time, the “Resolution” and “Plan of Action” on Sustainable Fisheries for Food Security for the ASEAN Region were adopted by the ministers responsible for fisheries of the ASEAN-SEAFDEC Member Countries. Guided by the 2001 Resolution and Plan of Action, for almost ten years, ASEAN Member Countries had been implementing activities that address the various issues towards attaining sustainable development of fisheries with the technical support of SEAFDEC.

During the 31st Meeting of the SEAFDEC Program Committee held in Singapore in November 2008, the PCM discussed and supported SEAFDEC to organize a special event in 2011, with consideration given to review of the progress and achievements made by countries in the implementation of the 2001 Resolution and Plan of Action. The concept proposal for the planning and conduct of the Conference was subsequently formulated by the SEAFDEC Secretariat and submitted to the 41st Meeting of the SEAFDEC Council held in Fukuoka in April 2009, where the Council endorsed the concept proposal on the conduct of the said Conference to review the progress in the implementation of the Resolution and Plan of Action as well as to develop the next decade regional policy direction and plan of action for sustainable fisheries development in the ASEAN region towards the year 2020.

For the ASEAN side, the concept proposal was discussed and endorsed by the 17th Meeting of the ASWGF held in June 2009 in Vietnam. The proposal was subsequently submitted through the ASEAN channel and eventually endorsed by the 31st AMAF Meeting held in Brunei Darussalam in November 2009. The AMAF also endorsed the proposal for the conduct of the Ministerial Meeting and the participation of the ASEAN Senior Officials and Ministers responsible for fisheries at the Conference; and agreed to provide necessary supports to the preparatory processes and conduct of the Conference.

With the full support from both the ASEAN and SEAFDEC, the required preparatory processes were undertaken by ASEAN, SEAFDEC, the Member Countries and several partner organizations for the ASEAN-SEAFDEC Conference; and the conference was successfully conducted from 13 to 17 June 2011 in Bangkok, Thailand, with Thailand as the host of the Conference.

2. OBJECTIVES AND EXPECTED OUTPUTS

2.1 Objectives of the Conference

The Conference aims to address the concerns on the current fisheries situation and emerging issues that may impede the sustainable development and the contribution of fisheries to food security in the Southeast Asian region. Through a series of preparatory processes and technical consultations, the “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020”, would be developed for consideration and adoption by the ASEAN-SEAFDEC Senior Officials and Ministers responsible for fisheries during the Conference.

2.2 Expected Outputs

It is expected that the following outputs could be achieved from the preparation and the conduct of the Conference:

- 1) “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020”, which will be used as policy principle by the ASEAN countries in achieving sustainable fisheries for food security in the coming decade;
- 2) Concept Notes on the Conference Follow-up Program (5-year plan) in line with the Decade Resolution and Plan of Action;
- 3) Awareness building of the ASEAN-SEAFDEC Member Countries and the Conference participants on issues related to sustainable fisheries and food security; and
- 4) Reinforced ASEAN solidarity and closer cooperation in the field of fisheries in accordance with the implementation of ASEAN Charter in realization of the ASEAN Community by 2015.

3. PROGRESS OF ACTIVITIES

3.1 Conference Preparatory Works

During the 31st Meeting of the SEAFDEC Program Committee in 2008, the PCM supported SEAFDEC to organize a special event with consideration on review of the progress and achievements made by countries in the implementation of the 2001 Resolution and Plan of Action. SEAFDEC Secretariat therefore developed the proposal for the conduct of the Conference to review such progress as well as to develop the next decade regional policy direction and plan of action for sustainable fisheries development. The proposal was supported by SEAFDEC Council during its 41st Meeting, and ASEAN during the 31st AMAF Meeting in 2009. After that, several preparatory processes had been undertaken.

Several technical consultations were conducted at the regional, sub-regional and national levels, involving fisheries-related organizations/agencies and stakeholders, of which the outputs had serve as technical inputs for the planning and conduct of the Technical Session of the Conference, as well as for the development of the Draft Resolution and Plan of Action for further consideration by the ASEAN-SEAFDEC Member Countries. In addition to technical preparatory works, several administrative preparatory works were also undertaken by SEAFDEC, ASEAN and the ASEAN-SEAFDEC Member Countries in preparation and conduct of the Conference. The important events/discussions related to the preparatory works for the Conference is shown in **Appendix 1**.

3.2 The Conference Proper

Based on the preparatory works undertaken by SEAFDEC, ASEAN and the Member Countries; the ASEAN-SEAFDEC Conference was successfully organized on 13-17 June 2011 at the Sofitel Centara Grand Bangkok Hotel, Thailand, with the Department of Fisheries, Thailand as host of the Conference. The Inaugural and Technical Sessions of the Conference was attended by more than 500 participants and fisheries experts from the ASEAN-SEAFDEC Member Countries as well as from other parts of the world, regional and international organizations, and the senior officials and ministers responsible for fisheries of the ASEANSEAFDEC Member Countries.

The detailed Conference Program appears as **Appendix 2**. The major sessions/events include:

a) Inaugural Session

The Inaugural Session was organized in the morning of 13 June 2011. The Session was attended by national delegates and representatives from the ASEAN-SEAFDEC Member Countries, officials of ASEAN, SEAFDEC and partner organizations, resource persons for the Technical Session, the Conference participants and invited guests. The Opening Ceremony was presided over by H.E. the Minister of Agriculture and Cooperatives of Thailand, *Mr. Theera Wongsamut*. Also presented during the opening ceremony were the Director-General of the Department of Fisheries of Thailand, the Secretary-General of SEAFDEC, and the representative of the Secretary-General of the ASEAN Secretariat. After the opening of the Conference by H.E. Mr. Theera, keynote addresses were provided

by ASEAN, DOF Thailand and FAO in order to provide participants the background picture on various aspects relevant to sustainable development of fisheries of the region.

b) Technical Session

The Technical Session was organized under full responsibility of SEAFDEC in the afternoon of 13 June until morning of 16 June 2011. The participation of 5 representatives from each ASEAN-SEAFDEC Member Countries, plus additional 5 more from each CLMV countries was supported by SEAFDEC to attend in the Technical Session of the Conference (using the ASEAN Foundation and Japanese Trust Fund budgets, respectively). Several regional/international organizations including SEAFDEC and other partner organizations also supported the participation of approximately hundred resource persons to provide technical inputs under this Session. The Session comprises:

Plenary I: Challenges and Vision on Sustainable Fisheries for Food Security in the ASEAN Region

Thematic Panel Sessions

- i) Enhancing Governance in Fishery Management (led by MFRDMD)
- ii) Sustainable Aquaculture Development (led by AQD)
- iii) Ecosystem Approach to Fisheries (led by TD)
- iv) Post-harvest and Safety of Fish and Fisheries Products (led by MFRD)
- v) Emerging Requirements for Trade in Fish and Fisheries Products (led by Secretariat)
- vi) Climate Change Adaptation and Mitigation Towards Food Security (led by TD)
- vii) Livelihood among Fishing Communities and Prospects of Employment in Fisheries-related Activities (led by TD)
- viii) Sustaining Food Supply from Inland Fisheries (led by MFRDMD)

Plenary II: Overview of Sustainable Fisheries for Food Security Towards 2020

Plenary III: Fisheries Cooperation in the ASEAN Region -Vision of Cooperation in the Region Towards 2020

The Session deliberately discussed several fisheries-related issues/challenges and successfully come up with conclusion and recommendations, which were summarized as appears as **Appendix 3**. This was reported to the subsequent Senior Officials Session in order to serve as a basis for the adoption of the Plan of Action, as well as to serve as reference for future implementation of the Resolution and Plan of Action by Member Countries and relevant institutions.

c) Senior Officials Session

The Senior Officials Session for the ASEAN-SEAFDEC Conference was held on 16 June 2011 in Bangkok, Thailand, comprising the Meeting of the Senior Officials Plus Three, and the Senior Officials Meetings. The Session was attended by the Senior Officials responsible for fisheries of the ASEAN-SEAFDEC Member Countries, and representative from the Plus Three countries (only Japan attended), as well as representatives from the ASEAN Secretariat and SEAFDEC. After thoroughly reviewing the draft Plan of Action, the SOM endorsed the “Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” (**Appendix 4**). The SOM then reviewed and supported the ASEAN Programme Concept Note on Sustainable Fisheries for Food Security: 2011-2015 (**Appendix 5**) to support the future implementation of the Plan of Action. In addition, The SOM also considered the draft “Resolution” for further endorsement by the ASEAN-SEAFDEC Ministers responsible for fisheries at the subsequent Ministerial Session.

d) Ministerial Session

The Ministerial Session for the ASEAN-SEAFDEC Conference was held on 17 June 2011. While recognizing the importance of the fisheries sector in the ASEAN region and the role it plays in building the ASEAN Community, and having considered the conclusions and recommendations developed through a series of preparatory processes and during the Conference proper, and Senior Officials Meetings, the Ministers adopted the “Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” (**Appendix 6**). After endorsing the Resolution, the ASEAN-

SEAFDEC Ministers and Representatives at the Ministerial Meeting expressed their commitment of support to the implementation of the Resolution and Plan of Action in the ASEAN region. Then, representatives from SEAFDEC, FAO, Private Sector and Civil Society Organization also delivered Statement with regards to future cooperation on sustainable fisheries for food security for the ASEAN region.

e) Technical Exhibitions

The SEAFDEC Member Countries took part in arranging their respective Technical Exhibition to showcase their respective activities and achievements towards enhancing the contribution of fisheries to food security and poverty alleviation. SEAFDEC also had a booth which displayed its achievements and activities implemented by the SEAFDEC Secretariat and four Technical Departments, specifically those in line with the thematic areas of the Conference.

f) Display of Best Drawings

As part of the Conference, national drawing contests were held by the respective SEAFDEC Member Countries, for children under 15 years old, under the broad theme of “Fisheries for Food Security: Adaptation to a Changing Environment”. The main objective of the drawing contest is to raise awareness among the youth on the current deteriorating state of the resources as well as the impact of the changing environment and the need to conserve the fishery resources for this and future generations. The four best drawings from each Member Country were also displayed during the Conference.

g) Side Meetings

Several side meetings were conducted by a number of institutions/organizations in conjunction with the Thematic Panel Sessions as shown below:

- i) Global Food Production and Aquaculture including the launching of the Report on Blue Frontiers: Managing the Environmental Costs of Aquaculture (WorldFish Center, 14 June 2011);
- ii) International Cooperation on Sustainable Fisheries for Food Security - a practical value chain approach (Marine Institute (MI) of the Memorial University of Newfoundland (Canada), 14 June 2011);
- iii) Area Capability Approach for Harmonizing Ecosystem Health and Rural Development (Tokai University (Japan), 14 June 2011);
- iv) European Union Research Funding Opportunities in Fisheries and Aquaculture: FP7 Information and Matchmaking Session (European Commission and the SEA-EU-NET Project, 14 June 2011);
- v) Private Sector Roles on Sustainable Fisheries for Food Security (ASEAN-US Technical Assistance and Training Facility (AU-TATF), 15 June 2011); and
- vi) Small-scale Fisheries Guidelines Development Process (FAO, 15 June 2011).

h) Excursion Programs

Post-Conference Study Tour Program was also arranged for interested participants and their accompanying guests for a minimal fee as shown below:

- i) Pomprachul, Samut Prakan Province (*half-day on 16 June 2011*) – observing traditional shrimp processing, mangrove forests, and eco-friendly shrimp farming;
- ii) Ayothaya Floating Market, Ayutthaya Province (*half-day on 16 June 2011*)- sightseeing/shopping and watching Thai traditional shows;
- iii) Petchburi Province (*full-day on 17 June 2011*) – observing small-scale traditional fishing in the mouth of Bang Taboon River, and activities in One Tambon One Product or OTOP; and
- iv) Ratchaburi Province (*full-day on 17 June 2011*) – observing Damnoen Saduak Floating Market, “Phra Pathom Chedi” (biggest Pagoda in Thailand), and watching Thai cultural shows and elephant demonstration.

3.3 Post-Conference Activities

After the completion of the Conference, relevant activities have been undertaken by SEAFDEC aiming to widen the awareness and follow-up the outputs of the Conference, as follows:

- 1) ***Organization of the Inception Workshop*** on Follow-up Activities to the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020. The Inception Workshop

was organized on 4-5 July 2011, Bangkok, Thailand to: i) enhance the awareness of ASEAN-SEAFDEC Member Countries, relevant agencies/institutions/organizations and donor agencies on the Resolution and Plan adopted at the Conference; ii) Review the existing activities/initiatives undertaken in the Southeast Asian region in line with the Resolution and Plan of Action; and iii) Facilitate the planning and implementation of activities by relevant agencies, institutions and organizations at various levels in line with the Resolution and Plan of Action in coordinated and harmonized manner.

- 2) ***Production/dissemination of publications*** to promote and enhance the implementation of the outputs from the Conference, namely:
 - i) Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 (*completed*);
 - ii) Proceedings Volume I: The Conference Proceedings – publishes the summary outputs from the Conference together with all annexes, except technical papers that were presented during the Thematic Panel Sessions of the Conference; and
 - iii) Proceedings Volume II: Thematic Panel Sessions – publishes the Conference outputs together with the papers presented during the Panel Sessions.

4. OUTPUTS AND ACHIEVEMENTS

Through the technical preparatory process and the conduct of the ASEAN-SEAFDEC Conference, the Conference has successfully addressed the concerns on the current fisheries situation and emerging issues/challenges that may impede the sustainable development and the contribution of fisheries to food security in the Southeast Asian region. The Conference has also successfully come up with conclusion and recommendations from the Technical Session; adoption of the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020, and the Concept Notes on the Conference Follow-up Program (5-year plan) by the Senior Official Session; and adoption of the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 by the Ministerial Session of the Conference.

Through the preparatory processes and the Conference proper, awareness has been raised among ASEAN Member Countries and participants on the important fisheries-related issues/challenges that may impact sustainable development of fisheries of the region. The Conference also successfully paved the way for enhancing of closer cooperation and partnership among the ASEAN countries, relevant regional/international organizations and stakeholders in the future implementation of activities to support sustainable development of fisheries and food security for the ASEAN region.

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**IMPORTANT EVENTS/DISCUSSIONS RELATED TO
THE PREPARATORY WORKS FOR THE CONFERENCE**

Box 1. Chronology of Activities Related to the Conference		
Date	Activities/Events	By
November 2008	The PCM supported SEAFDEC to conduct a special event in 2011, and recommended SEAFDEC Secretariat to prepare more detailed proposal for further discussion.	31 st SEAFDEC PCM in Singapore
April 2009	The SEAFDEC Council endorsed the proposal to organize the ASEAN-SEAFDEC Conference on Sustainable Fisheries Development Towards 2020, and requested that the proposal also be submitted to the 17 th ASWGF ⁱ for consideration and support from ASEAN side.	41 st SEAFDEC Council Meeting in Fukuoka, Japan
June 2009	The ASWGF ⁱ supported the proposal of SEAFDEC for the conduct of the Conference.	17 th ASWGF ⁱ Meeting in Vietnam
November 2009	The AMAF endorsed the proposal of SEAFDEC for the conduct of the Conference including the program and preparatory works and the plan for conduct of Ministerial Session and the participation of Senior Officials and Ministers responsible for fisheries of the ASEAN Member Countries to the Conference.	Prep SOM 31 st AMAF, SOM-9 th AMAF Plus Three, and 31 st AMAF in Brunei Darussalam
November 2009	The Conference Organizing Committee discussed the detailed structure, work plan, date and venue, required technical and administrative preparatory works for the Conference, and other related matters.	1 st Meeting of the Organizing Committee for the Conference
November 2009	The PCM endorsed the plans and progress in the preparation of the Conference.	32 nd SEAFDEC PCM in Kota Kinabalu, Malaysia
November 2009	The FCG/ASSP endorsed the plans and progress of the preparation of the Conference including the date and venue to be on 13-17 June 2011 in Bangkok, Thailand, the Conference logo, the work plan and the required administrative and technical preparatory works. The Meeting further discussed the detailed structure, required preparatory works by Member Countries, and financial resources to support the preparation and conduct of the Conference.	12 th FCG/ASSP Meeting in Kota Kinabalu, Malaysia
January 2010	First Press Conference for the ASEAN-SEAFDEC Conference was organized in Bangkok, Thailand.	SEAFDEC Secretariat
February 2010	Regional Technical Consultation on International Fisheries-related Issues was organized in Bangkok, Thailand.	SEAFDEC Secretariat
February 2010	The Technical Sub-Committee Meeting for the ASEAN-SEAFDEC Conference discussed technical programs (inaugural session and technical plenary/panel sessions) and technical preparatory works to be undertaken by SEAFDEC Secretariat, Departments and Member Countries.	SEAFDEC Secretariat
March 2010	Regional Technical Consultation on Sustainable Aquaculture in Southeast Asia Towards 2020 was organized in Bangkok, Thailand.	SEAFDEC/AQD
April 2010	The SEAFDEC Council endorsed the plan and progress in the preparations for the Conference.	42 nd SEAFDEC Council Meeting in Luang Prabang, Lao PDR

Box 1. Chronology of Activities Related to the Conference		
Date	Activities/Events	By
June 2010	The ASWGFi endorsed the plan and progress in the preparations for the Conference and requested SEAFDEC to prepare Conference promotional video to be launched at the 32 nd AMAF Meeting. The ASWGFi also discussed and agreed that drafting of the Resolution and Plan of Action to be adopted by the ASEAN-SEAFDEC Ministers should be undertaken by the ASEAN Member Countries through the ASEAN mechanism of ASWGFi with SEAFDEC providing the technical support if required.	18 th ASWGFi Meeting in Vietnam
July 2010	Regional Technical Consultation on Issues Related to Post-harvest and Safety of Fish and Fishery Products was organized in Singapore.	SEAFDEC/MFRD
August 2010	2 nd Press Conference for the ASEAN-SEAFDEC Conference was organized in Bangkok, Thailand.	SEAFDEC Secretariat
September 2010	Regional Expert Consultation on Managing Fishing Capacity to Combat IUU Fishing was organized in Bangkok, Thailand.	SEAFDEC-Sida Project
October 2010	Regional Technical Consultation on Sustainable Fisheries Management was organized in Samut Prakan, Thailand.	SEAFDEC/TD and MFRDMD
October 2010	Regional Technical Consultation on Traceability Systems for Aquaculture Products in the ASEAN Region was organized in Singapore.	SEAFDEC/MFRD
October 2010	The AMAF endorsed the plan and progress in the preparations for the Conference; the revision of the Conference sub-title to “Fish for the People 2020: Adaptation to a Changing Environment”; the Conference structure and program including the conduct of FSOM and FSOM+3 Meeting; and the promotional video for the Conference.	Prep SOM 32 nd AMAF, SOM-10 th AMAF Plus Three, and 32 nd AMAF In Cambodia
November 2010	Regional Technical Consultation on Adaptation to a Changing of Environment was organized in Bangkok, Thailand.	SEAFDEC Secretariat
November 2010	First Sub-regional Public-Private Sector Dialogue on Sustainable Fisheries and Aquaculture was organized in Bali, Indonesia.	ASEAN
November 2010	Second Sub-regional Public-Private Sector Dialogue on Sustainable Fisheries and Aquaculture was organized in Bangkok, Thailand.	ASEAN
November 2010	The PCM requested SEAFDEC to provide the ASEAN Secretariat and Member Countries the outputs from the Regional Technical Consultations and Sub-regional Public/Private Sector Dialogues, the analysis of the progress and achievements of implementation by the Member Countries of the 2001 Resolution and Plan of Action, as well as outputs from National Seminars conducted by the respective countries. This is in order to provide a basis for the development of the Resolution and Plan of Action by countries as agreed at the 18 th ASWGFi Meeting.	33 rd SEAFDEC PCM in Bangkok, Thailand
December 2010	The FCG/ASSP endorsed the plans and progress of the preparation of the Conference, including the revision of the Conference sub-title to “Fish for the People 2020: Adaptation to a Changing Environment”. To support the drafting of Resolution and Plan of Action by countries as agreed at the 18 th ASWGFi, the FCG/ASSP requested Brunei as the Chairperson of the ASWGFi to issue letter request SEAFDEC to support in the preparation of the First Draft Resolution and Plan of Action. The Meeting also requested ASEAN to support resource person; and further discuss the process/timeframe in the preparation of the Resolution and Plan of Action.	13 th FCG/ASSP Meeting in Bangkok, Thailand
January 2011	Regional Technical Consultation on International Fisheries-related Issues was organized in Bangkok, Thailand.	SEAFDEC Secretariat

Box 1. Chronology of Activities Related to the Conference		
Date	Activities/Events	By
February 2011	ASEAN-SEAFDEC Consultation on Drafting the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region was organized in Bangkok, Thailand.	SEAFDEC and ASEAN
Early March 2011	SEAFDEC circulated the Draft Resolution and Plan of Action for consideration by Member Countries.	SEAFDEC Secretariat
April 2011	The Council endorsed the plans and progress of the preparation of the Conference. The Council provided amendments and the comments on the Resolution and Plan of Action to be conveyed to the 19 th ASWGFi.	43 rd SEAFDEC Council Meeting in Malacca, Malaysia
April 2011	The Preparatory Meeting for the ASEAN-SEAFDEC Conference was organized to discuss the progress of the preparation of the Conference, and to finalize the Draft Resolution and Plan of Action before further consideration by the ASWGFi.	ASEAN, Siem Reap, Cambodia
April 2011	The ASWGFi endorsed the plans and progress of the preparation of the Conference. The ASWGFi also discussed and endorsed the Final Draft Resolution and Plan of Action to be considered by the ASEAN-SEAFDEC SOM and Ministers during the Conference.	19 th ASWGFi Meeting in Seam Reap, Cambodia
June 2011	Final Press Conference for the ASEAN-SEAFDEC Conference was organized in Bangkok, Thailand.	SEAFDEC Secretariat
13-17 June 2011	The ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment” organized in Bangkok, Thailand.	SEAFDEC, ASEAN and DOF Thailand

THE CONFERENCE PROGRAM

13 June 2011				
09.00-10.30	INAUGURAL SESSION <ul style="list-style-type: none"> Opening of the Conference <ul style="list-style-type: none"> Introductory Remarks by <i>Dr. Chumnarn Pongsri</i>, the Secretary-General of SEAFDEC Introductory Remarks by <i>Mr. Suriyan Vichitlekarn</i>, on behalf of the Secretary-General of ASEAN Welcome Remarks by <i>Dr. Somying Piumsombun</i>, the Director-General of the Department of Fisheries of Thailand Opening Address by His Excellency <i>Mr. Theera Wongsamut</i>, the Minister of Agriculture and Cooperatives of Thailand Photography Session 			
10.30-11.00	<i>Coffee/Tea Break</i>			
11.00-12.00	<ul style="list-style-type: none"> Keynote Speeches <ul style="list-style-type: none"> Fisheries and ASEAN Community Building, by <i>Mr. Suriyan Vichitlekarn</i> from ASEAN Secretariat Fisheries for Poverty Alleviation and Socio-economic Well-being of Fishers, by <i>Dr. Somying Piumsombun</i>, Director-General, Department of Fisheries, Thailand Fisheries and New Emerging Issues, by <i>Dr. Lahsen Ababouch</i>, FAO Introduction of the framework and arrangements of the Technical Session 			
12.00-14.00	<i>Lunch Break</i>			
14.00-17.00	TECHNICAL SESSION Plenary I: <ul style="list-style-type: none"> ASEAN Fisheries: Status, Trends, and Vision and Challenges by <i>Dato' Ahamad Subki bin Mahmood</i>, Chairperson of SEAFDEC Council for 2011-2012 ASEAN Fisheries Towards 2020: Challenges and Vision, by <i>Dr. Simon Funge-Smith</i>, FAO/APFIC Open Forum for Plenary Discussion 			
19.00-22.00	Reception Dinner			
14 June 2011 (four panels run simultaneously)				
09.00-17.30	Theme 1: Enhancing Governance in Fishery Management	Theme 2: Sustainable Aquaculture Development	Theme 3: Ecosystem Approach to Fisheries	Theme 4: Post-harvest and Safety of Fish and Fisheries Products
17.30-20.00		Side Meeting By WorldFish Center	Side Meeting By MI, Canada; Tokai Univ., Japan; and EC & SEA-EU-NET Project	
15 June 2011 (four panels run simultaneously)				
09.00-17.30	Theme 5: Emerging Requirements for Trade in Fish and Fisheries Products	Theme 6: Climate Change Adaptation and Mitigation Towards Food Security	Theme 7: Livelihood among Fishing Communities and Prospects of Employment in Fisheries-related Activities	Theme 8: Sustaining Food Supply from Inland Fisheries

17.30-20.00	Side Meeting By AU-TATF II		Side Meeting By FAO, Rome	
16 June 2011				
09.00-12.00	<p>Plenary II: Overview of Sustainable Fisheries for Food Security Towards 2020</p> <ul style="list-style-type: none"> • Summary of Outputs – Sustainable Aquaculture Development (AQD Chief) • Summary of Outputs – Marine Fisheries Management (MFRDMD Chief) • Summary of Outputs – Post-harvest and Safety of Fish and Fisheries Products (MFRD Chief) • Summary of Outputs – Planning and Information, and Regional and International Policy Formulation (SEAFDEC/TD) • Summary of Outputs – Emerging Requirements for Trade of Fish and Fishery Products (SEAFDEC Policy and Program Coordinator) • Summary of Outputs – Inland Fisheries Management (MRC Fisheries Programme) <p>Plenary III: Fisheries Cooperation in the ASEAN Region - Vision of Cooperation in the Region Towards 2020</p> <ul style="list-style-type: none"> • The Government of Japan • ASEAN Foundation • United States Agency for International Development (USAID) • Asia-Pacific Fisheries Commission (APFIC) • The WorldFish Center • Mekong River Commission (MRC) Fisheries Programme • Bay of Bengal Large Marine Ecosystem (BOBLME) Project • Asian Institute of Technology (AIT) 			
13.30-14.30	<p>SENIOR OFFICIALS SESSION</p> <ul style="list-style-type: none"> • Senior Officials Plus Three Meeting for the ASEAN-SEAFDEC Conference (Closed Session) 	Half-day Excursion Programs		
14.30-17.00	<ul style="list-style-type: none"> • Senior Officials Meeting for the ASEAN-SEAFDEC Conference (Closed Session) 			
17 June 2011				
09.00-10.00	<p>MINISTERIAL SESSION</p> <ul style="list-style-type: none"> • Inauguration Session (By Invitation) 	Full-day Excursion Programs		
10.00-12.00	<ul style="list-style-type: none"> • Ministerial Meeting for the ASEAN-SEAFDEC Conference (Closed Session) 			
13.30-15.00	<ul style="list-style-type: none"> • Joint Press Statement for the ASEAN-SEAFDEC Ministerial Session (By Invitation) • Statement by Stakeholders (By Invitation) • Press Conference (By Invitation) 			

SUMMARY OF THE CONCLUSION OF THE TECHNICAL SESSION

(Presented by SEAFDEC to the Senior Officials Session on 16 June 2011)

The Technical Sessions were organized with the objective of reviewing the fisheries situation and emerging issues that could impede sustainable fisheries development and tend to hinder the contribution of fisheries to food security and affect the well-being of people in the Southeast Asian region as well as identifying the key conclusions and recommendations that could address those issues and concerns. More than 530 participants and resource persons including those from international, regional organizations, institutions, government agencies, and stakeholders from 23 countries around the world attended to the Technical Sessions. With sustainability of fisheries for food security in the ASEAN region as the main focus of the discussions and deliberations, the outputs of the technical sessions which could be grouped into 8 thematic areas, are summarized as follows:

1) ENHANCING GOVERNANCE IN FISHERY MANAGEMENT

In order to strengthen the capacity of ASEAN countries to achieve sustainable fisheries over the next decade it has become necessary for the countries to strengthen their fisheries governance by evaluating the current constraints and accommodating international concerns. Governments should therefore address the priority issues in fisheries governance such as over-capacity and effective governance arrangement that support the coexistence of small-scale and large-scale fisheries taking into consideration the fact that governance of these two types of fisheries should be approached from the holistic point of view and going beyond management of fisheries but other livelihood opportunities and calling for a broad framework like integrated coastal. Co-management is necessary as the common focus of management to ensure wider participation and increase the potential ability of the resource utilization, where the development of new institutional and organizational arrangements for co-management is necessary. The movement of the ASEAN towards a building single ASEAN community further necessitates the strengthening of governance mechanisms within the fisheries sector in the ASEAN countries. Thus, governments should move away from directive-based management to consultative management leading to a more open, accountable, transparent and autonomous management process.

2) SUSTAINABLE AQUACULTURE DEVELOPMENT

Aquaculture production has grown progressively over the last two decades while at the same time capture fisheries production has declined or stagnated, but the inter-dependence of these two fisheries sectors is further illustrated by the growing demand for fish meal and fish oil in the production of aquafeeds. This demand issue could be addressed by implementing efficient feed management to reduce feed cost by as much as 50% and consequently reduce environmental impact. Thus, there is the need for enabling policies for aquaculture operations especially those by the small-holder farmers to adopt better aquaculture practices. Governments should also be engaged in the development of high health and diseases resistant broodstock to facilitate access of good quality seeds by small-scale farmers. The countries should also support the coordinated regional initiatives that will continuously monitor new and emerging diseases in order to prevent and control serious disease outbreaks.

3) ECOSYSTEM APPROACH TO FISHERIES

There has been a growing awareness of the need for fisheries related activities to be undertaken in a more environmental sensitive manner that minimizes the undesirable environmental consequences of fishing practices. Ecosystem approach to fisheries management has been seen as means to minimize habitat damage, changes in food chains in natural ecosystems, and loss of biological diversity. Governments should therefore integrate ecosystem approach in the management of the fisheries sector, promote networking and develop plans of action on the reduction of impacts of fishing on the environment, and develop and establish inter-agency collaboration (fisheries, environment, tourism) as well as within fisheries agency cooperation to promote the concept of ecosystem approach to fisheries

in the ASEAN region. Recognize the value of “local commons” to work towards improving habitat and fish production where “front of sea is one’s own garden under one’s responsibility, and fish is one’s own property to be conserved for next generation”.

4) POST-HARVEST AND SAFETY OF FISH AND FISHERIES PRODUCTS

To ensure the optimal utilization of fish catch and the safety of fish and fisheries products for consumers and for export, all countries would have to invest in the development of appropriate infrastructure as well as safe and wholesome fish and fisheries production based on the application of effective control and production procedures at all levels along the chain of production from catch to the consumer. This would involve cooperation among all relevant government authorities and working with producers at all levels from small-scale fishers to large-scale commercial enterprises.

5) EMERGING REQUIREMENTS FOR TRADE OF FISH AND FISHERY PRODUCTS

The emerging issues that affect international fish trade had been increasing. These include globalization of trade with focus on consumer protection considering the much greater movement of goods and services both within the region and globally, requirements of sustainability of fisheries and aquaculture production considering the adverse environmental impacts of fisheries related activities and the quality of food and food products derived from the fisheries sector, and effects of climate change. Compliance to the quality and safety standards and requirements with consistency becomes an obligation to be able continue trading fish and fish products. For the ASEAN region, such standards and requirements should be harmonized considering equivalence, including equal application of tariffs to all ASEAN countries in order that the countries in the ASEAN region could continue providing huge quantity of fish and fisheries products in the world market as well as sustain the competitive position of ASEAN fish and fishery products in the world markets.

6) ADAPTATION TO CLIMATE CHANGE

Considerable international attention has focused on the potential impacts of climate change and the need for countries to adapt to changing climates in the future. Despite such attention the scientific ability to predict future changes in weather, climate and ocean circulation is limited and the nature of potential impacts on fish stocks and the ecosystems upon which they depend is thus even more difficult to foresee. Governments should therefore address the need to ensure that fisheries aspects are incorporated in the national action plans on response to climate change and integrate climate change into fisheries policy and habitat management program framework, and build up adaptive capacity of people dependent and involved in fisheries-related activities to cope with changing environment, including effects caused by climate change.

7) LIVELIHOOD AMONG FISHING COMMUNITIES AND PROSPECTS OF EMPLOYMENT IN FISHERIES RELATED ACTIVITIES

The decreasing trends of catch in many small scale fisheries and overcapacity of the fishing fleet, would oblige the ASEAN governments to integrate policy for livelihood improvement at the local (households) to national levels with overall water resource planning strategy and development programs, and support directions for diversification of community-based livelihoods in fishing communities within (fish processing) and outside fisheries (textile/batik, local business, microfinance) while maintaining sustainable use of resources. Governments should also recognize and improve the social aspect of fishery modernization (choice of technology, labor access to capital and credit access to fishing ground), and promote equity including gender equity, sustainability of human well being, respect for human rights, welfare those who are dependent on fisheries. Thus, the regional guidelines on decent work in fisheries sector as well as on labor standards and practices should be formulated to manage both national and migrant workers working onboard vessels. There is also the need to promote and ensure that safety at sea aspects are addressed by governments and incorporated in policies while monitoring and control of the status and use of small scale fishing vessels should be improved.

8) SUSTAINING FOOD SUPPLY FROM INLAND FISHERIES

Inland capture fisheries play a significant role in food security both in urban and rural areas of ASEAN countries and these resources are likely to come under increasing pressure in the future due to the increasing population in the region. Inland fisheries should therefore be given more attention to ensure local food security in the rural areas. Governments should therefore identify appropriate management strategies for inland fisheries development and align these with national poverty alleviation approaches, strengthen collaboration among concerned agencies to maintain the ecological health of water bodies and the connectivity of the habitats, and promote alternative livelihood especially during seasonal flooding/drought. Promote, in policy development as well as in practice, the rights-based approach in fisheries that goes beyond mere access limits, basing development strategies on peoples' claims to their basic entitlements, such as enough food, decent work, freedom from oppression and the right to a dignified life.

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**PLAN OF ACTION ON SUSTAINABLE FISHERIES FOR
FOOD SECURITY FOR THE ASEAN REGION TOWARDS 2020**
(Adopted by the ASEAN-SEAFDEC Senior Officials on 16 June 2011)

On the occasion of the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”*, the Senior Officials of ASEAN-SEAFDEC Member Countries met in Bangkok, Thailand on 16 June 2011.

Guided by the Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020, and the need to enhance collaboration among government agencies that have responsibility for fisheries and fisheries-related issues in order to harmonize policies, plans and activities that support sustainable fisheries, food security and safety at the national and regional levels, the Senior Officials adopted the following Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 to be used as a guideline to develop programs, projects and activities for the implementation of the Resolution.

A. PLANNING AND INFORMATION

1. Integrate the planning of marine capture fisheries, inland capture fisheries and the aquaculture sub-sectors to promote the sustainable development of the fisheries sector, including harvesting and post-harvest in both capture fisheries and aquaculture;
2. Strengthen the capacity to plan for sustainable fisheries in the context of changing socio-economic and ecological environments through the mobilization of the most up-to-date data and information and the provision of appropriate policy summaries for decision makers;
3. Strengthen national statistical mechanisms for fisheries and aquaculture and the exchange of statistical data and related information. Include other non-routine data and information such as fish consumption surveys as well as mobilizing local and indigenous knowledge with the aim of improving the valuation of fisheries and monitoring their performance, to address the needs of the ecosystem approach to fisheries and adaptation to climate change;
4. 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;
5. Coordinate, decentralize and enhance the sharing of relevant statistics and information of fisheries-related statistical data and information between the national fisheries and other authorities including those responsible for food security, environment, trade, aquaculture, water resources, agriculture/forestry, wetlands, migration/employment and rural development;
6. Further develop simple and practical indicators in support of planning and monitoring of sustainable fisheries;

B. FISHERIES MANAGEMENT

7. Regularly review, update and strengthen national fisheries policy, legal and institutional frameworks through consultation and engagement of government agencies, the private sector, fishers, civil society and other relevant stakeholders;
8. Accelerate the development of fisheries management plans based on an ecosystem approach, as a basis for fisheries conservation and management;

9. Take measures to prevent unauthorized fishing and eliminate the use of illegal fishing practices by building awareness of their adverse impacts, strengthening law enforcement, developing and promoting responsible and selective fishing gears and practices, enforcing regulations and encouraging alternative means of livelihoods;
10. Establish and implement comprehensive policies for an ecosystem approach to fisheries management through effective systems (i) to provide licenses to fish (boats, gear and people); (ii) for community fishing rights/rights-based fisheries; (iii) that provide for the development of supporting legal and institutional frameworks; (iv) encourage and institutional cooperation; and (v) that aid in streamlining co-management;
11. Adopt co-management at all levels and with all relevant stakeholders in the process of planning and policy formulation for management, conservation and rehabilitation of habitats and protective geographical features, as well as policy formulation on the use and management of natural and human resources to ensure that climate change responses are integrated into fisheries policy frameworks;
12. Strengthen the capacity of fisheries communities and the capability of fisheries-related organizations, NGOs and the private sector to better implement necessary actions towards enabling the communities and local organizations to increase resilience, improve livelihoods, alleviate poverty, adopt alternative livelihoods adapt to climate change in support of achieving sustainable development, and encourage the participation of women and youth groups in the process;
13. Enhance and promote the participation of local communities, fisheries associations and other stakeholders in fisheries management and co-management. In addition, communities should take part in fisheries and stock assessments by providing data, local ecological knowledge, and status of the stocks;
14. Raise awareness of the need to develop financial incentives, especially for small-scale stakeholders and cooperatives, *e.g.* micro-credit, with national and regional institutional assistance for the responsible development of fisheries enterprises and developmental activities that will optimize socio-economic returns and food security;
15. Increase the efficient use of the alternative energy sources and reduce the use of carbon fossil energy by using appropriate fishing gear and fishing boats designs in fishing operations;
16. Encourage good and appropriate employment practices in accordance with domestic laws and regulations;
17. Develop guidelines and enhance the capacity of relevant authorities and communities to collaboratively resolve conflict with other stakeholders and with other competing users of resources;
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;
19. Enhance joint ASEAN programmes to better protect the livelihoods of small-scale producers and for a more equitable distributions of benefits gained from both intra and extra regional trade of fish and fishery products;
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;

MARINE FISHERIES

21. Strengthen 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 promote the awareness and understanding of international and regional instruments and agreements through information dissemination campaigns;
22. 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;
23. Facilitate 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 implement efforts to combating IUU fishing;
24. Build 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;
25. Conduct research on the impacts of various gear types and methods, including light fishing, trawls and push nets, on ecosystems and populations of aquatic animals and also the effects of fishing vessel discharges and waste disposal on marine ecosystems, to promote the use of selective fishing gears and sustainable devices;
26. Take reference from the FAO International Guidelines on Managing By-catch and Reducing Discards, where applicable, to identify and find solutions to ASEAN by-catch problems, including the excessive catch of juvenile fish;
27. Optimize the use of inshore waters through resource enhancement programs such as promoting the installation of artificial reefs and structures, encouraging coordinated and effective planning for coastal fisheries management programs, undertaking environmental impact assessment studies, restocking of commercially important fish species, as appropriate, and give priority to human resources development for the implementation of such programs;
28. Ensure the inclusion of fisheries objectives in the management plans of future Marine Protected Areas (MPAs) and promote the adoption and use of the *refugia* concept in line with the ASEAN/SEAFDEC Regional Guideline on the use of Fisheries *Refugia* in Capture Fisheries Management, where appropriate;
29. Recognizing the different management approaches that are required, sustainably manage major critical coastal habitats, such as mangroves, coral reefs and sea grasses; and develop and disseminate information and guidance on appropriate tools and interventions;
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;
31. Assess the possible impact of government subsidies on fisheries, particularly the impact on the special requirements and the needs of small-scale fisheries in the region;

INLAND FISHERIES

32. Establish and implement comprehensive policies and supporting legal and institutional frameworks for an ecosystem approach to inland fisheries management by integrating fisheries and habitat management that devolves co-management to the local authority and stakeholders, and at the same time strengthens the rights of communities and develops rights-based fisheries;

33. Undertake campaigns to promote awareness of the importance of freshwater fisheries for local food security, and the importance of rehabilitating and restoring habitats for migratory freshwater fish, restocking indigenous fish species to enhance productivity and encouraging culture-based freshwater fisheries, where appropriate;
34. Develop inter-agency coordination (national/sub-regional) on multiple-use water resources of the wetlands/flood-plains to sustain freshwater fisheries, mitigate conflicts between users and also encourage better coordination to address trans-boundary inland fisheries management issues;
35. Ensure the sustainability of inland fisheries by maintaining ecological health of the ecosystem, particularly the inter-connectivity of habitats and the specific management needs during the dry season. Develop mitigating measures for the adverse impacts on inland fisheries that may be caused by the construction of water infrastructure and alteration of water ways;
36. Encourage coordinated planning on the use of inland rivers, water-bodies and flood plains through (i) resource enhancement programs; (ii) inland wetlands and fisheries management programs; (iii) environmental impact assessment studies with regards to structures that might impact on aquatic resources; (iv) the consideration of restocking of locally and/or commercially important inland fish species; and (v) giving priority to human resources development for the implementation of such programs;
37. Formulate guidelines to promote the use of practical and simple indicators for inland/flood-plain fisheries within the national inland fisheries management framework, to facilitate (i) timely local level fisheries management decisions with due respect to the large number of people/farmers that take part in fishing; (ii) dialogue to ensure that the inter-connectivity of fish migration path is kept as a tool for management/conservation measures; and (iii) adaptation to the effects of climate change within catchments;
38. Monitor the impact of the structures that might affect migration and spawning of fish through a consultative process that involves collaboration with the regional organizations;

C. AQUACULTURE

39. Ensure that national programs and policies on aquaculture address social, economic and environmental aspects of sustainable aquaculture to improve food security, livelihoods, employment and poverty alleviation by (i) providing the mechanisms and enabling environment for good aquaculture practices, efficient markets and fair trade; (ii) strengthening the capacity of small-holder farmers; and (iii) promoting inter-agency collaborations;
40. Develop and implement ASEAN guidelines for environment-friendly and responsible aquaculture and good aquaculture practices that cover (i) the integration of quality and safety management systems for products with significant trade potential; (ii) the harmonization for chemical use and food safety in aquaculture; (iii) the development of product traceability systems from farm to market; and (iv) harmonization of the quarantine and inspection/sampling procedure and Sanitary and Phytosanitary (SPS) measures for aquaculture products to secure food safety;
41. Integrate aquaculture into rural development activities within the context of multiple-use of land and water resources through inter-agency coordination in policy formulation, project planning and implementation, stakeholder consultation, extension services and technology transfer, participate in and provide support to regional initiatives that will assess the role of aquaculture in poverty alleviation for better policy formulation;
42. Implement measures or strategies at national and local level to (i) monitor and regulate aquaculture operations; (ii) prevent over development; and (iii) ensure that activities are carried out in an environment-friendly manner. This also includes effectively enforcing regulations to

avoid conflict in the use of common resources and adopting the concept of environmental capacity as a strategy to prevent aquatic pollution brought about by intensification of aquaculture activities;

43. Provide government support for research and development (R&D) on (i) improving existing genetic resources; (ii) assessing the impact of climate change on broodstock management; and (iii) the feeding and disease management of broodstock;
44. Promote the production and distribution of specific pathogen-free (SPF) and quality seed through the (i) establishment of certified government or private hatcheries as sources of quality seed; (ii) dissemination of new breeding technologies and techniques for the effective distribution and maintenance of genetically improved strains; and (iii) implementation of sound policies that will promote better hatchery management practices, including the responsible collection and use of wild broodstock and seed;
45. Apply the concept of aquatic biosecurity by providing support to (i) research for development of domesticated, genetically improved, specific pathogen-free (SPF) cultured species; and (ii) the small-scale hatchery operators and farmers so as to enhance their access to healthy broodstock and improve their ability to adopt, at the farm level, the established techniques for aquatic animal health care;
46. Formulate and implement complementary and supportive policies that will (i) build the capacity of small-scale farmers and hatchery operators in adopting simple broodstock and hatchery technologies and innovations; (ii) enhance small-scale farmers and hatchery operators' access to quality broodstock and SPF seeds produced through farmer-friendly broodstock management methods; and (iii) foster strong cooperation between the public and private sectors engaged in development and dissemination of quality broodstock and seed stock;
47. Encourage good and appropriate employment practices in accordance with domestic laws and regulation;
48. Raise awareness of the need to develop financial incentives and micro-credit, with national and regional institutional assistance, for the responsible development of aquaculture enterprises and developmental activities that will optimize socio-economic returns and food security;
49. Reduce the risk of negative environmental impacts, loss of biodiversity, and disease transmission by regulating the introduction and transfer of aquatic organisms in accordance with the Regional Guidelines on the Responsible Movement of Live Aquatic Animals and Plants;
50. Continue the national efforts to control serious disease outbreaks by providing government support to (i) R&D to improve the ability to handle new and emerging diseases and surveillance of transmission of diseases to wild populations; and (ii) regional initiatives on harmonization of regional disease control standards, disease reporting and implementation of contingency plans to handle new and emerging diseases;
51. Further enhance the capabilities in the diagnosis and control of fish diseases within the region through (i) continued support in development of technology and techniques for disease identification; (ii) promotion of the widespread use of affordable, field-friendly, rapid and standardized diagnostic tests; and (iii) the establishment of regional and inter-regional referral systems, including the designation of reference laboratories and timely access to disease control experts within the region;
52. Develop regional warning systems on aquatic animal health and diseases to inform other Member Countries of relevant epidemiological events and to raise awareness of new diseases that may pose risks. Build emergency preparedness capacity through rapid and timely responses to reduce potential catastrophic consequences of diseases;

53. Improve the efficient use of aquatic feeds by strictly regulating the quality of manufactured feed and feed ingredients and support continued research for developing suitable alternative protein sources that will reduce the dependence on fish meal and other fish-based products. This effort will include the consideration of ingredients not derived from wild caught fish, encouraging the culture of species requiring no or low fish meal content in their feed and applying effective feeding management practices, taking into account the need for cultural and social acceptance of alternative feed ingredients;
54. Improve human resource capabilities for responsible aquaculture through (i) closer public and private sector collaboration in R&D, paying particular attention to the need for advanced skills in biotechnology and assessment of the efficacy and economics of the use of probiotics and immunostimulants; and (ii) effectively implementing aquaculture education and extension services;
55. Formulate and implement national policies and strategies that will enable the aquaculture sector to mitigate and/or adapt better to the impacts of climate change. These strategies should include providing support to R&D on climate change, increasing resilience, and strengthening the overall capacity of various stakeholder groups and fostering cooperation within the aquaculture sector and with other sectors;
56. Where applicable, encourage good practices in aquaculture such as the FAO Technical Guidelines on Aquaculture Certification;
57. Encourage Member Countries to take a precautionary approach to safeguard the environment from the acceleration of offshore aquaculture, and to consider developing regional guidelines on responsible marine (inshore to offshore) aquaculture;

D. OPTIMAL UTILISATION OF FISH AND FISHERY PRODUCTS

58. Introduce and provide support for the development and application of technologies that optimize the utilization of catches, 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;
59. Promote the production of and preserve the diversity of traditional fish products by assisting producers to secure stable supplies of quality raw materials, meet food safety requirements and to improve product identity, nutritive value and marketing. In the process, promote One Village One Fisheries Product (FOVOP) and other initiatives to promote local fishery products;
60. 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;
61. Strengthen fish quality and safety management systems that support the competitive position of ASEAN fish products in the 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;
62. Encourage relevant control agencies at all levels in applying appropriate legislation and coordinated activities regarding the handling, processing, distribution, storage, marketing, quality and safety of fish and fishery products;

63. 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;
64. Raise awareness of the need to develop financial incentives and micro-credit, with national and regional institutional assistance for the responsible development of fisheries and aquaculture enterprises and developmental activities that will optimize socio-economic returns and food security;
65. Encourage good and appropriate employment practices in accordance with domestic laws and regulations;
66. Develop standards and guidelines for aquaculture products handling and transportation, hygienic vessel design and construction, and include training of fish handling as part of the requirement for issuance of permits at all levels for fish vessel crews, and encourage new workers to enter the industry where needed;

E. FISH TRADE

67. Strengthen cooperation among Member Countries to implement international standards with regards to trade on fish and fishery products within the ASEAN region;
68. Establish regional/ASEAN standards applicable for fishery and aquaculture products that are in line with international requirements and applicable to the region. Harmonize standards, technical regulations and conformity assessment procedures as inputs for the establishment of the ASEAN Policy Guidelines on Standards and Conformance, to increase the competitiveness of fishery products on regional and international markets;
69. Strengthen cooperation and mechanisms among Member Countries to work towards common positions that could be reflected in international fish trade related fora, such as World Trade Organization (WTO), Food and Agriculture Organization of the United Nations (FAO), Office International des Epizooties (OIE), *Codex Alimentarius* Commission, and the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES);
70. 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;
71. Assist small-scale producers to comply with standards on safety and quality of fish and fishery products by providing support programs including training;
72. Assist small-scale producers from both capture fishery and aquaculture in securing and maintaining access to markets at the national, regional and international levels, and in the process, develop marketing systems that are not capital intensive and accessible for local producers;
73. Encourage and provide guidance to develop/improve branding of fish and fishery products that demonstrate the eco-friendly and socially acceptable nature of ASEAN fish products (*e.g.* one community one fishery product), including organic standards and coordination of Halal requirements;
74. Encourage the implementation of appropriate international standards and strengthen programs relevant to Sanitary and Phytosanitary (SPS) measures, Technical Barriers to Trade (TBT) measures, R&D, as well as capacity building and awareness raising on fish trade-related issues, and information dissemination recognizing the different status of development in Member Countries;

75. Strengthen risk assessment and R&D related to the use of Genetically Modified Organism (GMO) products in fisheries and aquaculture, including food safety issues;

F. REGIONAL AND INTERNATIONAL POLICY FORMULATION

76. Increase participation and involvement of Member Countries in international fora and technical committees such as the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES); *Codex Alimentarius* Commission; Food and Agriculture Organization of the United Nations (FAO); Office International des Epizooties (OIE); Regional Fisheries Bodies (RFBs); and World Trade Organization (WTO); and promote ASEAN interest, recognizing that fisheries policies of relevance to the ASEAN region are increasingly discussed and agreed upon at the global level.

**CONCEPT NOTE: ASEAN PROGRAMME ON SUSTAINABLE FISHERIES
FOR FOOD SECURITY (2011-2015)**

(Adopted by the ASEAN-SEAFDEC Senior Officials on 16 June 2011)

BACKGROUND AND RATIONALE

As a follow-up to the adoption of the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 at the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People: Adaptation to a Changing Environment”, this Programme Concept Note describes the supporting platform to implement the Resolution and Plan of Action. The programme will be developed in two phases to cover the decade of implementation:

- Phase 1: Supporting the contribution of the fisheries sector to food security through the realisation of ASEAN Community Building (2011-2015); and
- Phase 2: Enhancing the contribution of the fisheries sector post 2015.

The supporting programme will provide a platform of cooperation and partnership among ASEAN Member States, Dialogue Partners and Development Partners to ensure their synergy and complementarity.

Programme Phase 1 (2011-2015): Supporting the Contribution of Fisheries Sector to Food Security through the Realisation of ASEAN Community Building (2011-2015)

During the 14th ASEAN Summit, the ASEAN Heads of Government signed the Cha-am Hua Hin Declaration on the Roadmap for the ASEAN Community (2009-2015), comprising three pillars - Political Security Community, Economic Community, and Socio Cultural Community.

The Leaders agreed that the blueprints for these three pillars and the Initiative for ASEAN Integration (IAI) Workplan 2 (2009-2015) shall constitute the Roadmap for an ASEAN Community (2009-2015), with each ASEAN Member State ensuring timely implementation of the Roadmap. It was also agreed that the Roadmap for an ASEAN Community (2009-2015) shall replace the Vientiane Action Programme (VAP). The Leaders tasked the ASEAN Sectoral Ministerial Bodies and the Secretary General of ASEAN to develop long-term strategies and explore ways and means to mobilize resources from Member States, Dialogue and Sectoral Development Partners, and other external parties to implement the Declaration.

Fisheries is an important sector within ASEAN, and contributes across the three pillars of the ASEAN Communities, as well as to national development and regional cooperation. Fisheries also have the potential to contribute significantly to ASEAN Community Building now and in the future. Therefore, fisheries development must enhance the contribution of the sector to the ASEAN Community Building, ensure the sustainable development of the sector, and promote better livelihoods of people involved in fisheries. There are a number of challenges that need to be considered, as guided by the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020.

OBJECTIVES

The overall objectives of the programme are:

- 1) To provide supporting initiatives for the ASEAN Member States to pursue the relevant ASEAN Community Blueprints;
- 2) To provide a platform of technical cooperation and partnership that could enhance the capacity of the ASEAN Member States in developing sustainable fisheries for food security; and

- 3) To support dialogue and cooperation on fisheries related issues both within and outside of the ASEAN context.

PROGRAMME COMPONENTS

To achieve and ensure the contribution of fisheries to food security, better livelihoods and sustainable development, as well as the realization of an integrated ASEAN Community by 2015, the priority issues and areas under Phase 1 that need to be addressed include the following:

- Safety management systems that ensure food safety and food quality standards of fish and fishery products through fish quality assurance;
- Food security and climate change impact on fisheries and aquaculture;
- Illegal fishing in marine and inland fisheries;
- Contribution of inland fisheries to food security and sustainable livelihoods;
- Effective management of fisheries through the implementation of an ecosystem approach to fisheries, especially better management of fishing capacity and use of responsible fishing technologies and practices;
- Aquaculture Development – with emphasis on
 - Contribution to food security and sustainable livelihoods
 - Mitigation of potential impacts on the environment and biodiversity including the spread of aquatic animal diseases; and
 - Development of better feeds;
- Promotion of joint ASEAN approaches and positions in international trade in fish and fishery products of the region by harmonising standards, criteria and guidelines;
- Optimum utilisation of catch from water to market by reducing post-harvest losses and waste;
- Fair and appropriate employment practices; and
- Minimising the contribution of the fisheries sector to greenhouse gas emissions, with emphasis on promoting energy efficiency and use of alternative energy sources.

Three cross-cutting themes will be emphasized throughout the implementation of the Programme - research and development (R&D), information management (collection, sharing and maximising its usage), and capacity building.

IMPLEMENTATION ARRANGEMENT

1. Phase 1 of the Programme covers the 5-year period from 2011-2015, and will be implemented by AMSs with support from the ASEAN Secretariat in consultation with relevant ASEAN stakeholders (*e.g.* Private Sector, Civil Society Organizations (CSO), and Academic Institutions) in cooperation and partnership with Dialogue Partners (*e.g.* Australia, ASEAN Plus Three, United States of America (USA), European Union (EU)); and Development Partners (*e.g.* Southeast Asia Fisheries Development Centres (SEAFDEC), Food and Agriculture of the United Nations (FAO), Mekong River Commission (MRC), the WorldFish Centre, Network of Aquaculture Centres in Asia-Pacific (NACA), Islamic Development Bank (IDB), Asian Development Bank (ADB) and the World Bank).
2. The ASEAN Secretariat will assist in facilitating technical cooperation, seeking funding support and cooperation for the implementation of Programme. Upon the approval of the Programme concept note, a full Programme proposal indicating substantial partners and cooperation arrangements will be developed for consideration and approval.
3. A review will be conducted after phase 1 in 2015 to evaluate achievements as a basis for developing Phase 2 of the Programme.

**RESOLUTION ON SUSTAINABLE FISHERIES FOR
FOOD SECURITY FOR THE ASEAN REGION TOWARDS 2020**
(Adopted by the ASEAN-SEAFDEC Ministers on 17 June 2011)

We, the Ministers of ASEAN-SEAFDEC Member Countries who are responsible for fisheries, met in Bangkok, Thailand on the occasion of the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment” on 17 June 2011,

Recalling the principles of the ASEAN Vision 2020 and relevant ASEAN declarations/initiatives including the Roadmap for an ASEAN Community (2009-2015); the ASEAN Economic Community Blueprint; the ASEAN Socio-Cultural Community Blueprint; the ASEAN Fisheries Consultative Forum Work Plan (2010-2012); the ASEAN Integrated Food Security (AIFS) Framework and Strategic Plan of Action on Food Security in the ASEAN Region (SPA-FS) (2009-2013); and the ASEAN Multi-sectoral Framework on Climate Change: Agriculture and Forestry Towards Food Security (2010 onwards) ; and the Millennium Development Goals (MDGs) that need to be considered in achieving sustainable development of fisheries and the socio-economic well-being of all relevant stakeholders;

Guided by the ASEAN Charter, which aims to ensure sustainable development for the benefit of present and future generations and to place the well-being, livelihood and welfare of the people as the focus of the ASEAN Community building process;

Recognizing the importance of the fisheries sector for food security, livelihoods and well-being of the ASEAN people and its contribution to sustainable development and realisation of the ASEAN Community by 2015, which encompasses the three pillars - the ASEAN Political Security Community, the ASEAN Economic Community and the ASEAN Socio-Cultural Community;

In response to the challenges of the changing environment and the emerging issues including climate change and the growing gap between the increased demand for fish and fishery products and ASEAN’s ability to supply these products in a sustainable manner, and taking into account the imperative to minimize the impacts caused by the increasing pressures on fisheries and globalization of trade that are resulting in increased illegal, unreported and unregulated (IUU) fishing, the depletion of coastal fish resources, habitat degradation, negative impacts of aquaculture, and increased conflicts among resource users that further jeopardize the food security and livelihoods of ASEAN people, in particular the poor and disadvantaged;

Recognizing the “ASEAN-Japan Partnership for New Growth in Asia”, through supporting the implementation of the Roadmap for an ASEAN Community 2009-2015;

Recognizing the support from the other dialogue partners to ASEAN in the implementation of the Roadmap for an ASEAN Community 2009-2015;

Bearing in mind the provisions of international and regional declarations and instruments relevant to fisheries, food security, ocean governance, trade, rights/safety, social well-being and the aquatic environment, including the continued relevance of provisions provided in the FAO Code of Conduct for Responsible Fisheries and the Regional Guidelines on Responsible Fisheries in Southeast Asia;

Acknowledging the ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region that was adopted by the ASEAN-SEAFDEC Ministers responsible for fisheries during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium “Fish for the People” on 24 November 2001, and the progress made by the Member Countries in the implementation of the 2001 Resolution and Plan of Action;

Recognizing the ASEAN-SEAFDEC Strategic Partnership (ASSP) in providing a cooperative platform between ASEAN and SEAFDEC, in achieving long-term common goals towards development and management for sustainable fisheries;

Acknowledging that priority should be given to the issues identified through the national and regional participatory processes in preparation for, and at the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”*;

DO HEREBY RESOLVE, without prejudice to the sovereign rights, obligations, and responsibilities of our countries under relevant international laws and arrangements, to:

1. Sustain the supply of fish and fishery products from the ASEAN region to improve food security, facilitate poverty alleviation, and improve the livelihoods of ASEAN people dependent on the harvesting, farming and marketing of fish and fishery products, by enhancing the necessary national fisheries policy, legal and institutional frameworks that encourages and support small-scale fisheries/farmers, including providing alternative livelihood opportunities;
2. Further develop strategic partnerships and cooperation to maximize the synergies and complementarities among the various stakeholders – government, private sector, civil society and relevant development partners and donor agencies to address regional and global challenges;
3. Strengthen human capacity of relevant stakeholders through mobilization of resources and the harmonization of initiatives that support fisheries communities and governments, with a special focus on the women and youth;
4. Strengthen fisheries governance by evaluating current constraints to ensure comparability and compatibility between the required practices and operation of fisheries in the ASEAN Member Countries;
5. 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;
6. Implement effective management of fisheries through an ecosystem approach to fisheries that integrates habitat and fishery resource management aimed at increasing the social and economic benefits to all stakeholders, especially through delegating selected management functions to the local level and promoting co-management as a partnership between government and relevant stakeholders;
7. Promote better management of fishing capacity and use of responsible fishing technologies and practices, recognizing the movement towards replacing the “open access” to fisheries resources with “limited access” through rights-based fisheries, and at the same time, secure the rights and well-being of inland and coastal fisheries communities;
8. Foster cooperation among ASEAN Member Countries and with international and regional organizations in combating IUU fishing;
9. Enhance resilience of fisheries communities to anticipate and adapt to changes in environmental conditions of inland and coastal waters, including those caused by climate change, which could adversely affect fisheries and aquaculture of fisheries communities;
10. Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information;

11. Enhance the awareness of the contribution that inland fisheries makes to food security and sustainable livelihoods, and include consideration of fisheries stakeholders when undertaking development projects that may impact inland fisheries;
12. Support ASEAN efforts to promote low carbon development by minimizing the contribution of the fisheries sector to green-house 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;
14. Promote inter-agency coordination of multiple uses of freshwater resources for sustainable development of the resources and conservation of freshwater habitats;
15. Enhance the awareness that aquaculture makes to food security and sustainable livelihoods to deliver a responsible increase in aquaculture production that promotes aquaculture for rural development as means of rational use of land and water resources;
16. Promote cooperation among Member Countries and with international and regional organizations in encouraging responsible aquaculture practices through joint research, technology transfer and human resource development;
17. Mitigate the potential impacts of aquaculture on the environment and biodiversity including the spread of aquatic animal diseases caused by the uncontrolled introduction and transfer of exotic aquatic species and over-development of aquaculture;
18. Promote joint ASEAN approaches and positions in international trade in fish and fishery products indigenous to the region by harmonizing the standards, criteria and guidelines and developing mutually-recognized agreements on sustainability and safety management systems;
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;
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;
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;
22. Support the Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 adopted by the ASEAN-SEAFDEC Senior Officials; and
23. Pledge our commitment to fully support this Resolution and task ASEAN Senior Officials to implement necessary actions and report progress in the advancement of sustainable fisheries that contribute to a prosperous, stable and peaceful ASEAN Community.

AND DO HEREBY DECIDE,

That the Resolution be implemented as soon as possible and use the *Plan of Action* adopted by the ASEAN-SEAFDEC Senior Officials during the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”*, held June 13-17, 2011, in Bangkok, Thailand, as a guideline for formulating and implementing programs, projects, and activities through appropriate ASEAN-SEAFDEC mechanisms.

LIST OF ASEAN-SEAFDEC MINISTERS

H.E. Pehin Dato Yahya Bakar, Minister of Industry and Primary Resources, Brunei Darussalam

H.E. Dr. Fadel Muhammad, Minister of Marine Affairs and Fisheries, Indonesia

H.E. Mr. Seiji Kojima, Ambassador Extraordinary and Plenipotentiary of Japan to the Kingdom of Thailand

H.E. Dr. Ty Phommasack, Vice Minister of Agriculture and Forestry, Lao PDR

H.E. Noh Bin Omar, Minister of Agriculture and Agro-Based Industry, Malaysia

H.E. Mr. Khin Maung Aye, Deputy Minister of Livestocks and Fisheries, Myanmar

H.E. Ms. Linglingay F. Lacanlale, Ambassador Extraordinary and Plenipotentiary of Republic of the Philippines to the Kingdom of Thailand

H.E. Dr. Mohamad Maliki Bin Osman, Senior Parliamentary Secretary for National Development, Singapore

H.E. Mr. Theera Wongsamut, Minister of Agriculture and Cooperatives, Thailand

H.E. Dr. Chu Tien Vinh, Deputy Director General of Fisheries Administration, Ministry of Agriculture and Rural Development, Viet Nam

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Activities Related to Climate Change and Adaptation in Southeast Asia with Special Focus on the Andaman Sea
Lead Department:	Secretariat
Lead Country:	Thailand
Total Duration:	2009-2011

1. INTRODUCTION

In Southeast Asia, coastal people dependent on fish and coastal resources are facing hardship due to uncertainties and changes in the climate as well as through decreasing resources, pollution and degenerated coastal habitats/environments. Meanwhile, illegal and uncontrolled fishing is rampant in the region and concerns are raised at global, regional and national level. The management of fishing activities needs to be implemented urgently in the ASEAN region in response to decline of fisheries resources and damage to coastal habitats. There is a need to control the fishing effort to address overfishing, energy consumption and to build up adaption abilities in the fisheries sector.

To improve coastal environmental standard and to restore and maintain natural resources, it is important to embark upon schemes that, involving relevant institutions, can safeguard against further deterioration while at the same time protect against future hazards. SEAFDEC, together with Member Countries, have been addressing issues that relates to the integration of fisheries and habitat management and the management of fishing capacity to build up a platform for long term management responses at regional and sub-regional levels. Efforts to improve the sustainability of fisheries are being made by fisheries agencies and managers and to achieve this, it is imperative to better control the active fishing effort, both large-scale and small-scale. Furthermore, in order to improve fisheries management and to reduce illegal, unreported and unregulated (IUU) as well as destructive fishing collective regional and sub-regional arrangements and agreements are needed.

2. PROGRAM

2.1 Objectives

Goal/Development Objective:

Long-term sustainability of fisheries reduced vulnerability to impacts of climate change and improved livelihoods of fisher-folk in the ASEAN region, and around the Andaman Sea.

Immediate Objectives:

- 1) Capacity for the management of fisheries and important coastal habitats (*refugia*) and the protection against natural hazards built up around the Andaman Sea (integration of habitat and fisheries management);
- 2) Capacity strengthened and systems improved to monitor, record and control active fishing effort (large and small scale) as a basis for development for coordinated plans for management actions on fishing capacity around the Andaman Sea and among ASEAN-SEAFDEC Member Countries (to prepare for adaptive measures needed to respond to impacts of climate change); and
- 3) To provide support to policy development and the process to establish a regional fisheries management mechanism and sub-regional agreements for/in the ASEAN region including reached consensus on key issues.

2.2 Program Description

In the process of implementation four main aspects that have been highlighted in various fora will be addressed and incorporated in the process:

- The vulnerability of poorer coastal communities to natural hazards and the risk of them being (further) marginalized during the restoration process.
- Fishing capacity.
- Maintaining geographical features in the coastal areas, recognizing the importance of features (mangroves, corals, dunes, etc.) in the coastal areas for protection against natural hazards needs to be assessed as well as for fish reproduction.
- Local knowledge and local organization: Several reports have pointed at the way in which certain coastal communities, based on their traditional knowledge, are facing less damage by natural hazards than other communities.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the year 2011

Activity	Duration	Remarks
Major events organized in 2011		
1. SEAFDEC-Sida Project Annual Review Meeting	28 Jan 2011	
2. On-site Training/Workshop on the Integration of Fisheries and Habitat Management and the Management of Fishing Capacity		
• Myeik, Myanmar	3-5 Mar 2011	
• Satun province, Thailand	24-25 Mar 2011	
• Ranong Province, Thailand	26-27 Jul 2011	
3. The 3 rd Meeting of the Gulf of Thailand sub-region	20-22 Sept 2011	
4. The Sub-sub-region Meeting between Indonesia, Malaysia and Thailand	11-13 Oct 2011	
5. Study and follow up on the recommendations made during the 2010 Expert Consultation on Managing Fishing Capacity to combat IUU Fishing in Southeast Asia		
• Fishing vessel record and inventory		
• MCS network		
• Port monitoring		
• Climate change		
6. Participation in the following events:		
• RTC on International Fisheries-related Issues, Bangkok, Thailand	18-20 Jan 2011	
• ASEAN-SEAFDEC Consultation on Drafting the Resolution and Plan of Action on Sustainable Fisheries for Food Security in the ASEAN Region, in Bangkok, Thailand	21-23 Feb 2011	
• 43 rd Meeting of SEAFDEC Council, Malacca, Malaysia	4-8 Apr 2011	
• ASEAN-SEAFDEC Conference on Sustainable Fisheries for the Food Security 2020: Fish for the People	13-17 Jun 2011	
• Inception Workshop to follow up the Conference, in Bangkok, Thailand	4-5 July 2011	
• Regional Workshop on HRD programs, in Bangkok, Thailand	6-7 July 2011	
• AFCF Meeting, Cambodia	24-26 May 2011	
• APFIC Regional Consultative Workshop “ Implication of Climate Change on Fisheries and Aquaculture: Challenges for Adaption and Mitigation in the Asia-Pacific region”, in Nepal		
• Special Meeting on Tuna Improvement Information and Data Collection in Southeast Asia, Songkhla, Thailand	7-9 Sept 2011	

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues

<p>(1) Theme:</p> <ol style="list-style-type: none"> 1. Capacity for the management of fisheries and important coastal habitats (<i>refugia</i>) and the protection against natural hazards built up around the Andaman Sea (integration of habitat and fisheries management). 2. Capacity strengthened and systems improved to monitor, record and control active fishing effort (large and small scale) as a basis for development for coordinated plans for management actions on fishing capacity around the Andaman Sea and among ASEAN-SEAFDEC Member Countries (to prepare for adaptive measures needed to respond to impacts of climate change). 3. To provide support to policy development and the process to establish a regional fisheries management mechanism and sub-regional agreements for/in the ASEAN region including reached consensus on key issues.
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> • The vulnerability of poorer coastal communities to natural hazards and the risk of them being (further) marginalized during the restoration process. • Fishing capacity. • Maintaining geographical features in the coastal areas, recognizing the importance of features (mangroves, corals, dunes, etc.) in the coastal areas for protection against natural hazards needs to be assessed as well as for fish reproduction. • Local knowledge and local organization: Several reports have pointed at the way in which certain coastal communities, based on their traditional knowledge, are facing less damage by natural hazards than other communities.

3.2.2 Expected final goals of the program

<p>To improve capacity and coordination for fisheries and habitat management; improved cooperation on the management of fishing capacity; and to support processes to establish regional and sub-regional fisheries and habitat management mechanisms and agreements.</p>

3.2.3 “Steps” toward achieving final goals:

<p>The strategies for driving this process will be to encourage and facilitate cooperation among ASEAN-SEAFDEC Member Countries, at regional and sub-regional level, by addressing different important fisheries related issues, such as the management of fishing capacity, vessel registration, combat illegal fishing (IUU) and the mitigation of conflicts among fishers, habitat management/<i>refugia</i> or marine protected areas, information sharing and on the important aspects that will emerge such as climate change and adaptation. The project will promote and raise awareness on mentioned aspects at the local level and Strengthen cooperation at sub-regional of the Andaman Sea and the Gulf of Thailand countries and among ASEAN countries.</p>
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3.2.4 Activities in the current program

<p>(1) Current position of the program: Not applicable as the strategy is based on a rolling planning schedule and steps of progress in implementation and achievements emerge in parallel</p>
<p>(2) Program duration: 2009-2011 (extended until June 2012)</p>
<p>(3) Main activities</p> <ul style="list-style-type: none"> • Integration of Fisheries and Habitat Management • Monitor, Record and Control • 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 program

Integration of Fisheries and habitat Management

As identified during the 1st Meeting of the Andaman Sea sub-region, the geographical focus is divided in two areas in the eastern part 1) the area from Phuket up into Myanmar and 2) for the area from Phuket down into the Malacca Straits. During a sequence of on-site workshop organized in cooperation with the BOBLME Project in Medan, Indonesia (July 2010) and Langkawi, Malaysia (November 2010) as well as in Ranong (July 2010, through BOBLME), Yangon (October 2010, through BOBLME) and (bi-lateral Myanmar and Thailand) in Phuket (January 2011, through BOBLME) Myeik, Myanmar (3-5 March 2011) and Satun province, Thailand (24-25 March 2011), and Ranong (26-27 July 2011), information provided a basis for common understanding, raising awareness and information sharing on importance of critical habitats to fish and ecosystems, migratory fish stocks of *Rastrelliger* spp. and related species.

At the sub-regional level, SEAFDEC-Sida project convened the 3rd Meeting of the Gulf of Thailand sub-region in September 2011 to recapture and update on the status of important habitats and the establishment of “management areas” (MPA’s, trawling free zones, closed seasons, wildlife sanctuaries, etc) and location of established/planned/indicated *refugia* (UNEP/GEF/SCS) and the cooperation on trans-boundary fisheries and habitat management- options for joint approaches to Indo-Pacific Mackerel and related species to indicate suitable actions for continued work at the sub-regional level.

In October 2011, SEAFDEC-Sida project in collaboration with BOBLME project organized the Sub-regional Consultative Meeting of the Southern Andaman Sea. Initiative on the cooperation on trans-boundary fisheries and habitat management-options for joint approaches to Indo-Pacific Mackerel with the integration of habitat management around the Southern Andaman Sea/North Strait of Malacca was discussed.

Monitoring, Record and Control – large scale and small-scale (coastal) fishing incorporating with local knowledge and climate change

Common problems faced by all participating countries are the encroachment of larger vessels into coastal waters and destructive fishing in critical habitats of importance. The On-site Workshops organized by the project has, through participants, confirmed that attempts to manage marine resources, fisheries and habitats need to be done with an eye to the management of fishing capacity and the reduction of illegal and destructive fishing. To be effective common approaches would be needed and required for increased cooperation among nations in sub-regions to manage fishing capacity, by addressing efforts with respect to “Monitor, Control and Surveillance”, “Vessel Records and Inventory” and “Port Monitoring” to assess and record the status of fisheries in the countries in the Gulf of Thailand, the Andaman Sea and the ASEAN region as a whole. Based on the inputs from the on-site events, subsequent steps move for the Sub-sub-regional consultations with an aim to lay out the directions to take to strengthen the sub-sub-regional cooperation in the southeast (scheduled in 11-13 October 2011) and northeast part (scheduled in December/January 2012) of the Andaman Sea, respectively. In addition, the project also tried to maintain the momentum in the Gulf of Thailand sub-region, organized the 3rd Meeting of the Gulf of Thailand sub-region from 22-22 September 2011. The Meeting recaptured and discussed on the important issues and progress of fishing vessel registration and licensing system, port monitoring, MCS network around the Gulf of Thailand countries (Cambodia, Malaysia, Thailand and Vietnam).

The importance of local knowledge is another factor to be recognized in developing adaptive capacity, specifically on monitoring and control aspects as indicated by experiences in Indonesia and La-Ngu District in Satun, Thailand (such as local vessel record, community-based landing sites, fisheries, fisheries enhancement) shared during the on-site events.

In the process to manage fishing capacity and to combat IUU fishing, the ASEAN-SEAFDEC Conference, include as priority actions in the new 2011 Resolution and Plan of Action in cooperate

with issues on the conditions for workers engaged in the fishing industry, the working environment and the importance to have proper documents for those working on fishing vessels. Similar aspects were also raised in the perspective of the improvement of safety standards, including safety at sea and responses to climate change.

Policy dialogue and promotion of regional cooperation on fisheries management

For long-term sustainability for fisheries and habitats in Southeast Asia the promotion of regional cooperation on fisheries management had been strengthened. Responses to climate change and the need for adaptation measures have also been addressed in the process.

During 2010-2011, SEAFDEC-Sida project involved in the process of the development the 2011 ASEAN-SEAFDEC Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region towards 2020, which highlighting the promotion of regional and sub-regional cooperation on important aspects of fisheries and habitat management including responses to climate change and adaptation. The SEAFDEC-Sida project has been continually addressing the key elements at higher decision making mechanism through participation at *the ASEAN Fisheries Consultative Forum (AFCF)*, May 2011, *APFIC Regional Consultative Workshop "Implication of Climate Change on Fisheries and Aquaculture: Challenges for Adaption and Mitigation in the Asia-Pacific region"*, 26-27 May 2011 in Nepal.

In addition, to facilitate the dialogue among countries at regional and sub-regional level, the project continued to "Monitor national legislation and institutional arrangements pertaining to fisheries management, habitat management, and management of fishing capacity, to combat illegal fishing and climate change and adaptation" by brought together the legal aspects into the regional dialogue, SEAFDEC has during 2009-2011 been able to include legal aspects in the events organized by the project as indicated above.

SEAFDEC-Sida project have continued to actively participate in and/or organize other regional events together, as applicable, with ASEAN, FAO, UNEP, RPOA-IUU, MRC, BOBLME, Mangroves for the Future, Wetlands Alliance, etc. During these events the project has been able to promote regional cooperation, responses to climate change, policy dialogue and coordination – the outcome is reflected in documentation and reports from these. The project also maintained links with the key organizations and initiatives established during 2009-2011 (ASEAN Secretariat, FAO/RAP, BOBLME, MFF, ICSF etc.) by strengthening and building up the capacity of the Regional Fisheries Policy Network members, who are fisheries officers/biologist from Member Counties attached at SEAFDEC Secretariat and keep maintained dialogues among Member Countries.

3.2.6 Evaluation of Program activities in 2011

An independent review made by external resource persons.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

According to the Amendment Agreement between SEAFDEC and Sida, the activities will be further extended up until June 2012. The activities for 2012 will be based on the results from 2011 with reference to list indicated in the project proposal sent to Sweden. In specifying activities and target reference will be activity plan and priority indication of ASEAN, ACF, BOBLME, APFIC/FAO, RPOA, WWF and Mangrove for the Future, Wetland Alliance and SENSEA. For the complete reference with the whole list indicated in the project proposal to Sweden.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
<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-large scale and small scale fishing; 3. Local knowledge, cross cutting issues and safety at sea; 4. Policy dialogue and promotion of regional cooperation on fisheries management; and 5. Project management and coordination. <p>Aspects of climate change will be integrated in all outputs groups as a cross-cutting matters to be considered throughout</p> <p>For detail activities see the project document.</p>		

4.2 Expected Outcomes in the Year 2012

It is expected that the project will have made further advances in promoting regional and sub-regional cooperation for the Region on important issues such as IUU fishing (managing fishing capacity), the integration of fisheries and habitat management (ecosystem approach to fisheries), addressing the need and opportunities to incorporate aspects of climate change into the program structure and furthermore to strengthen capacity and awareness at local level with involvement of central and local resource persons.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing Related Countermeasures
Lead Department:	SEAFDEC Secretariat
Lead Country:	Indonesia
Total Duration:	2011-2015
Proposed Budget:	90,000 USD (tentative)

1. INTRODUCTION

SEAFDEC plays an important role in promoting the sustainable fisheries development and assisting the development of the IUU fishing related countermeasures. One possibility for SEAFDEC to support on these tasks is to strengthen SEAFDEC network and developing the coordination mechanism between SEAFDEC and others international organizations and among SEAFDEC member countries. To keep momentum of Southeast Asia Interest and updated the International instruments from not only FAO but other international for a related to fisheries aspects, the coordination mechanism is required under this project. Coordination with all SEAFDEC member countries can be made through establishment of the regional fisheries policy network (RFPN), by strengthening the existing RFPN mechanism. The coordinating functions between country and SEAFDEC and their scopes of work will not limited to the specific issues of the main program, but it would cover fisheries related issues concerning the sustainable fishery and food security that guided in the 2001 and 2011 ASEAN-SEAFDEC Resolution and Plan of Actions. As mentioned earlier, this program is only one of the four in the component "Promotion on Sustainable Fisheries and IUU Fishing Related Countermeasures in the Southeast Asia" One of the activity is the monitoring and evaluation of this component should be strengthened in order to ensure that such programs/activities continue to address the needs of region as well as member country. The monitoring and evaluating process of each program will be developed and introduced in the proposal.

2. PROGRAM

2.1 Objectives

The overall objectives of the projects are as follows:

- 1) To strengthen SEAFDEC network through coordinating mechanism among the International, regional organizations and member countries for better understanding on the global situations/requirements including the environmental task related issues (CITES) that affect to the development of sustainable fisheries at regional and national levels;
- 2) To strengthen regional coordination and cooperation among SEAFDEC and institutions/agencies related to fisheries, to address the SEAFDEC/ASEAN coordinated positions;
- 3) To strengthen the regional fisheries policy network (RFPN) as coordinating functions among SEAFDEC and ASEAN member countries for specific tasks on fisheries and trade related issues;
- 4) To monitor and evaluate the overall SEAFDEC programs under the Japanese Trust Funds to ensure all programs meet the requirement of ASEAN members and address the regional policy management on sustainable fisheries development; and
- 5) To publicize the ASEAN-SEAFDEC initiatives in addressing issues and concerns related to sustainable development of fisheries.

2.2 Program Description

To address the threats posed by IUU fishing to the Sustainable of Fisheries in the Southeast Asian, SEAFDEC proposing a program on the Promotion of Sustainable Fisheries and IUU Fishing Related Countermeasures in the Southeast Asia. This project proposal focuses on the Strengthening SEAFDEC Network for Sustainable Fisheries and IUU Fishing related Countermeasures. To strengthen the

SEAFDEC network and seek cooperation from Member Countries while ensuring the activities meet the Member Countries requirements, therefore the project is designed to implement three main activities as follows.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

In 2011, under the strengthening coordination mechanism for international/regional cooperation, SEAFDEC (TD and SEC) Participation to the 8th Meeting of the ASEAN Expert Group on CITES held in Brunei Darussalam from 8-12 February 2011, with the objectives to review and study the progress of various ongoing ASEAN cooperation activities under ASEAN Framework. SEAFDEC also SEAFDEC staff participated to the Regional Workshop on the Development of a RPOA for Sharks in the BOBLME Region held on 5-7 July 2011 at Male, Maldives organized by the BOBLME. In addition, SEAFDEC participated to the Scientific Committee 7th Regular Meeting of the WCPFC from 9-17 August 2011 at Pohnpei, Federated States of Micronesia. With the aims to better understanding the Works on tuna assessment and developing of the measures process by WCPFC. These all information concerns were to member countries during the specific SEAFDEC meetings. The RFPNs from 4 countries namely Cambodia, Lao PDR, Vietnam were invited for cooperation.

3.2 Evaluation of the Program Outcomes <in General>

3.2.1 Theme and issues:

(1) Theme: SEAFDEC network for IUU Fishing related Countermeasures

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

- Cooperation and clear regional coordinated positions among SEAFDEC Member Countries in order to work together for sustainable fisheries development in the region and to meet the international requirements of the IUU fishing related countermeasures

3.2.2 Expected final goals of the program:

- Effective SEAFDEC network with the International/Regional Organizations and arrangements to development of sustainable fisheries in the region;
- Effective coordination mechanism among SEAFDEC and its Member Countries for Regional task force and assessment to support in developing the regional interests and to ensure sustainable fisheries and food security in the region;
- Strengthening the Regional Fishery Policy Network while provide capacity building to RFPN staff on the Regional arrangements;
- Monitoring and evaluation procedures for the overall SEAFDEC programs to ensure all programs meet the requirement of ASEAN members and address the regional policy management on sustainable fisheries development; and
- Publicize the ASEAN-SEAFDEC initiatives in addressing issues and concerns related to sustainable development of fisheries.

3.2.3 “Steps” toward achieving final goals:

Enhancing the International and Regional Coordination

- Step 1: Identify and in-depth study on the specific task force on fisheries and environment related tasks which are linked to IUU fishing related countermeasures;
- Step 2: Addressing the regional coordinated positions or views at the International/ regional for a to ensure Southeast Asian countries play an important role on promotion of sustainable fisheries and food security and combating IUU fishing; and
- Step 3: Promote the international and regional coordination and information sharing in the Southeast Asian region.

<p>Strengthening the RFPN Step 1: Setup the ASEAN RFPN at SEAFDEC/SEC; Step 2: Identify the task force and effective coordination mechanism; Step 3: Collective activities for national inputs to assess the regional views on the sustainable fisheries and IUU fishing related countermeasures; Step 4: Develop the Virtual RFPN coordination mechanism for long term implementation; and Step 5: Information dissemination.</p>
<p>Monitoring and Evaluation Step 1: Develop the monitoring form; Step 2: Identify the standard criteria, indicators for the evaluation process of the program; Step 3: Conduct the evaluation meeting; Step 4: Communicate with member countries through evaluating process; Step 5: Update the outcomes/ progress of the evaluation of all program concerned; and Step 6: Information dissemination on the outcomes.</p>

3.2.4 Activities in the current program:

(1) Current position of the program: on going all activity components
(2) Program duration: 2011-2015
<p>(3) Main activities: -</p> <ol style="list-style-type: none"> 1) Strengthening the RFPNs coordinating among member countries and SEAFDEC, while involving on the Regional arrangements. 2) Preliminary Meeting of the SEAFDEC program evaluation. 3) Participation to the Regional/International Forum such as IOTC working party on By-catch, WCPFC scientific committee meeting, BOBLME Meeting on RPOA-IUU in the BOB area.

3.2.5 Progress and achievements of the current program until 2011:

The progress and achievement of the program include:

- Status of the Tuna in the WCPO area. Working paper was developed and presented at the special tuna meeting held in Songkhla, Thailand in September 2011
- Recommendations on the developing of the RPOA-IUU in the BOBLME sub-regional area where SEAFDEC member countries such as Thailand, Myanmar, Malaysia and Indonesia also participated.
- Preliminary report of the 1st Evaluation of SEAFDEC program in February 2011
- List of Activities and involvement by RFPNs

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

4.3 Planning of the Project Activities

Activity / Sub-Activity	2011											
	1	2	3	4	5	6	7	8	9	10	11	12
1. Enhancing Coordination/ Communication Mechanism with International/ regional Organizations												
1.1) Strengthening coordination mechanism for International, regional/ country cooperation												
1.2) Facilitating intra-regional exchange of expertise and information												
2. Strengthening Regional Fisheries Policy Network (RFPN)												
2.1) Strengthening Regional Fisheries Policy Network (RFPN)												
2.2) Developing and strengthening other mechanisms to enhance the country coordination												

3. Evaluation of the project activities for sustainable fisheries and IUU fishing related countermeasures												
3.1) Monitoring the project activities												
3.2) Evaluation process												
3.3) Production and Dissemination of the Special Publication												

4.4 Expected Outcomes in the Year 2012

- | |
|---|
| <ul style="list-style-type: none"> • Increasing the capacity of Regional Fisheries Policy Network (RFPN) on Regional and global issues related to IUU counter measures; • Coordination mechanism for enhancing the Regional Fisheries Policy Network in the region; • Update/progress of the program package for 2011-2012; • The outcome on the SEAFDEC program evaluation; • Enhancing coordination and cooperation with relevant international/regional organizations; and • Others. |
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PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Responsible Fishing Technologies and Practices (Fishing in Harmony with Nature)
Lead Department:	Training Department
Lead Country:	Thailand
Duration:	Since 2008
Proposed Budget:	10,000 USD

1. INTRODUCTION

SEAFDEC Training Department has implemented the project on responsible fishing technologies and practices in collaboration with Southeast Asian countries based upon the project formulation prescribed by the Resolution and Plan of Action endorsed at the Millennium Conference in 2001 and followed by the Resolution (RES) and Plan of Actions (POA) on Sustainable Fisheries for Food Security for the ASAN Region Towards 2020. Issues on selective fishing gear and device was clearly mentioned in POA: Para 25 “*Conduct research on the impacts of various gear types and methods, including light fishing, trawls and push nets, on ecosystems and populations of aquatic animals and also the effects of fishing vessel discharges and waste disposal on marine ecosystems, to promote the use of selective fishing gears and sustainable devices*”; and Para 26 “*Take reference from the FAO International Guidelines on Managing By-catch and Reducing Discards, where applicable, to identify and find solutions to ASEAN by-catch problems, including the excessive catch of juvenile fish*”.

In this regard, SEAFDEC has been promoting the development and adoption of responsible fishing gear and practices in the Southeast Asian waters that aim to minimize the impact of fishing to the coastal and marine environments. Such initiatives by SEAFDEC have been demonstrated through the implementation of various activities that include a number of R&D activities on turtle excluder devices (TEDs), Juvenile and Trash Excluder Devices (JTEDs) as well as human capacity building on topics related to the use of selective fishing gear and devices and promotion of the concept on fisheries *refugia*.

The activities on the development and experiment on Juvenile and Trash Excluder Devices (JTEDs) have been conducted in the Asian region with the support of Japanese Trust Fund in conjunction with the additional support of FAO/UNEP/GEF Project on Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of bycatch reduction technologies and change of the management. Through those activities, JTEDs have been recognized in the region as effective devices for reduction of commercial species caught by the shrimp trawl. As a result, various countries have already adopted the compulsory use of JTEDs in trawl fishing.

Many traditional fishing activities have been found to induce negative impacts on the coastal and marine environments as well as on the resources. In an effort to assess the extent of such impacts, SEAFDEC convened in January 2009 a workshop to address the concerns on the need to improve the designs and use of fishing gear in order to address the impacts of using such gear on the coastal and marine environments as well as mitigate sea turtle by-catch in fisheries. This article includes the initiatives of the Southeast Asian countries in reducing the impacts of fishing practices on the marine environments and resources.

The research and study on the impact of fishing on environment and ecosystem have been conducted in the region, such as in cooperation with the Department of Fisheries - Thailand, and Bureau of Fisheries and Aquatic Resources (BFAR) of the Philippines with the support of Tokyo University of Marine Science and Technology – Japan, and Kasetsart University - Thailand.

The interaction between threatened species of international concerned and fisheries has also been studied and investigated, whose focus is particularly given to the effectiveness on the use of the turtle

excuser devices (TEDs) in reducing sea turtle mortality. Besides, the information and data on the sea turtles mortality has been collected in the region in collaboration with member countries of SEAFDEC and with the assistance of countries of IOSEA/MOU. SEAFDEC has made a great effort and contribution to many international meetings and conferences through the presentation of its achievement during the course of promotion on the use of TEDs and circle hooks.

Another work is the compilation on fishing gear and methods in Southeast Asia. The survey for this purpose was conducted in most of the member countries. It was found that fishing gear monographs of SEAFDEC has been widely used as the reference for handbooks of fishers and gear technologists.

2. PROGRAM

2.1 Objectives

The objectives of this program are to:

- 1) Promote responsible fishing technologies and practices through sea trial demonstration, series of experiments;
- 2) Promote concept and applicability of using selective fishing gear devices to reduce bycatch (juvenile, sea turtles, trash fish, etc) in fishing; and
- 3) Improve responsible fishing technology and practices for the Southeast Asian Countries.

2.2 Program Description

In line with the directives given in the ASEAN-SEAFDEC RES&POA 2020 and FAO Code of Conduct for Responsible Fisheries, SEAFDEC has kept continuation in promoting the selective fishing gear and devices; promote reduction of bycatch and impact from fishing to marine and coastal environment in order to maintain biodiversity and to secure fish for the people as well as to conserve living aquatic ecosystem.

The activity under this project will be implemented based upon the current situation of promotion on the use of selective fishing gear and devices for reduction of unwanted catch, bycatch, and incidental catch. The program of activity also includes the initiatives and effort to reduce the impact of fishing on coastal and marine resources/environment through the promotion on the use of alternative energy for fishing, reduction on the use of energy in fishing operations (utilization of lights in squid/anchovy fishing operation, etc.), assist member countries in conducting actual demonstration and research on the use of such selective fishing gear/devices as well as appropriate technology development for conserving environment.

Since the year 2008, the implementation of the project has been supported by the Japanese Trust Fund in conjunction with FAO RYBIC-II Project, GEF/UNEP/FAO Project on Sustainable Tropical Shrimp Trawl and others such as Tokyo University of Marine Science and Technology (TUMSAT), responsible national agencies, and other relevant organizations/institutes. Implementation of Activity 3 also includes staff exchange program, dispatch of experts and participation in the relevant meeting/workshops.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. Technical assistance on selective fishing gears and devices for reduction of discards and by-catch of juvenile and trash fish in the Southeast Asia	Jan 2011	Participated to National Seminar of BFAR-Philippines "Installation of JTED in bottom trawl fishery in respected to the republic of the Philippines Fishery Administrative Order 237 applied to trawl fishery in 8 th Fisheries Region: Area of Catbalogan and Cabayog" in January 2011. The objective of the activity was to assist fisheries extension officers and fishing gear

		technologies of BFAR Philippine to clarify and evaluate the installation of juvenile and trash fish excluder device with the private sector including fishers. In addition, the project staff investigated baby shrimp trawl net in the Tachoban City.
2. Technical assistance for assessment of the impacts from various kind of fishing gear and practice on fisheries resources, environment and ecosystem	Sep 2011	Provided technical advice to Myanmar Department of Fisheries on their planning and preparation of the national study on the impact on fisheries resources and ecosystem from the use of light in squid fishing.
3. Interaction between threatened species of international concerned and fisheries	Oct-Nov 2011	Participation of project staff to relevant meetings, including: IOTC 7 th Working Party on Eco-system and Bycatch, Oct. 2011; and IOSEA-MOU Sixth Meeting of the Signatory States, Bangkok, Thailand.
4. Production of promotional materials and technical papers	Jun-Dec 2011	Preparation of the handbook for fishing gear survey (draft)

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Responsible fishing technologies
(2) Issues in the region at the beginning of the study: <ul style="list-style-type: none"> • Insufficient knowledge on selective fishing gear and devices to reduce bycatch, trash fish, and juvenile of commercial important species; • Inadequate enforcement of illegal fishing, and the difficulty in managing fishing capacity; and • Inadequate coordination and collaboration between national agencies responsible for fisheries management and conservation of endanger/threatened aquatic animals.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Adaption on the use of responsible fishing gear and practice such as use of JTED in bottom trawling in the Member Countries; • Availability of human resources and national institutions on selective fishing gear and devices in the region; • Strengthening coordination between national agencies responsible for fisheries management and conservation of endangered/threatened aquatic animals; and • Establishment of a network on reduction of the impact of fishing gears and their practices to coastal and marine ecosystem.

3.2.3 “Steps” toward achieving final goals:

Step 1: Enhance knowledge on selective fishing gear and devices through study, sea trial and demonstration on the use of selective fishing gear and device including TEDs and JTEDs in the Member Countries with the technical assistance from SEAFDEC as well as FAO and other relevant agencies.
Step 2: Update and gather information on the use of selective fishing gear and devices in the Member Countries through organization of regional technical meeting or survey, and carry out modification of fishing gear and devices where appropriate and applicable.
Step 3: Development of appropriate selective fishing gear, devices, and their best practice in order to reduce impact from fishing to coastal and marine environment.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1, 2, and 3
(2) Project duration: 2008~
(3) Main activities: <ul style="list-style-type: none"> • Develop and improve selective and responsible fishing gear of good practices for sustainable fisheries development and management in the Southeast Asian region; • Carry out research for reduction of the impact from fishing on coastal and marine ecosystem; and • Disseminate and updates information regarding responsible fishing gear and technology for the Member Countries.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Encouraging development of Plan of Action on Reduction of Impact from the Fishing Gears and Practices the Coastal and Marine Environment with the Member Countries; • Providing technical support to fishing gear technologists of the Member Countries on the use of selective fishing gear and devices to reduce: by-catch, mortality of aquatic species and endangered species, etc.; • Conducting sea trials and demonstration on the use of JTEDs and others conducted, and destructive fishing gears in SEAFDEC Member Countries; • Organization of technical meetings; and • Disseminating information of the project outputs. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • Reports of the events/activities attended/investigated by project staff • Plan of actions on Reduction of Impact from the Fishing Gears and Practices the Coastal and Marine Environment in Southeast Asia • Establishment collaboration mechanism with FAO/GEF and other relevant agencies • Draft plan of research on fishing gear selectivity and device in collaboration with Department of Fisheries Thailand • Dissemination information based on the outcomes from each project activity implementation 	
(3) Outcomes during the program period and expected achievement rate till the end of 2012	
Expected outcome	Achievement rate (%)
1. Technical assistance on selective fishing gears and devices to reduce discards and bycatch of juvenile and trash fish in the region	100%
2. Technical assistance for assessment of the impacts from various kind of fishing gears and practice on fisheries resources, environment, and ecosystem.	100%
3. Interaction between threatened species of international concerned and fisheries	100%
4. Production of promotional materials and technical papers	100%

3.2.6 Evaluation of program activities in 2011

<p>Technical assistance to the fishing gear technologists of the Member Countries on the use of selective fishing gear and devices was carried out based on the request from BFAR, that legal framework on the use of JTED was established in the Philippines. The Philippines has gone in advance for the use of selective device in trawl fishing where there are still the need to further promote such responsible fishing gear and devices in other countries for food security in the region. Since previous year, TD has put its effort in reviewing the use of lights in fishing operation of which the result from this investigation can provide a basis for formulation and development of the research work on the use of lights in fishing in the near future. It is considered that program of activity to promote the use of LED light source in fishing operation will take place in very near future with the advantage on reduction of energy use in fishing operation when using LED; and to reduce the catch of target species (for example reduction of juvenile of commercial fish species in anchovy purse seine in associated with lights).</p> <p>In the previous year, implementation of RYBIC-II project will be started in 2012 with the regional project manager stationed at TD. Close coordination between RYBIC-II project and SEAFDEC relevant</p>

initiatives would be achieved and this could lead to benefit of the SEAFDEC countries in reduction of duplication works at the national and regional level.

With regard to threatened species of international concern and fisheries, project staff could participate to the IOTC meeting that discussed on the issue of bycatch in tuna fisheries. At the same time, information exchange between the Member Countries of IOTC and project staff was made. This provided a basis for formulation and planning of project activities related to bycatch reduction.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

Activity 1: Technical assistance of selective fishing gears and devices for reduce discards and bycatch of juvenile and trash in the region

SEAFDEC will continue to promote the implementation of the selective fishing devices in the region in close collaboration with its Member Countries. It includes the use of Juveniles and Trash Excluder Devices (JTEDs) for reduction of discards and by-catch in trawl fisheries and promotion on the use of other appropriate selective devices/technology. However, it is recently observed that fishers have modified their fishing gear for higher efficiency with the aim to compensate their income from having lower catch due to the declination of fisheries resources. Some of new modified bottom trawl net is one of example that having very net height opening and now widely used in the coastal zone of the region. Therefore, it is very timely to investigate the catch efficiency of such modified gear for better understanding and further to be used as a basis for revision of the policy/measure. For the activity implementation, SEAFDEC will coordinate with GEF/UNEP/FAO Bycatch Project Phase II that will be implemented from 2011 to 2014. It is proposed that SEAFDEC will also expand the result from the study of the development of other fishing gear such as traps and other fishing gear/practices for alternative responsible fishing gear and practices.

Activity 2: Technical Assistance of the assessment of the impacts of various kinds of fishing gear and practice on fisheries resources, seabeds, environment and ecosystem

Currently it was observed that there is increasing use of lights in squids and anchovies fishing. Over the years, their catch efficiency has been improved with an increased energy consumption and fishing efforts. In this connection, there is the need to update such modified gear/practices, SEAFDEC will carry out research through technical review on current squid and anchovy fisheries together with at-sea experiment and sea trial in selected countries (tentatively with Myanmar and Vietnam). It is envisaged that reliable information can be obtained and preliminary results from the review and experiment can be disseminated to the SEAFDEC Member Countries for raising their awareness on responsible fishing gear and technologies. It is also envisaged that the appropriate use of energy in relation to light intensity as well as the color of lights in squid and anchovy fishing will be further discussed among the gear technologists in the near future based on the results from this sub-activity.

Activity 3: Interaction between threatened species of international concern and fisheries

Implementation of this sub-activity will be carried with the reference to the incidental catch of threatened species such as sea turtles, dolphins and other commercially-exploited aquatic species that potentially be included in the list of CITES. However, it was found through various SEAFDEC's technical meetings that there is still insufficient information and understanding, in particular on the current status of sea turtles and factors affecting the mortality of sea turtles. In this connection, information collection on sea turtle mortality will be continued from the previous years in close cooperation with the Member Countries and other relevant agencies, namely; IOSEA-Turtle MOU, Department of Coastal and Marine Resources, etc.

Activity 4: Production of promotion materials and technical papers

The information outputs from the activities implementation will be disseminated through SEAFDEC's project website, participation of project staff at regional and international events. It also includes works in cooperation with relevant agencies, particularly the support of FAO on Global Fishing Gear

Classification Catalogue. The promotional materials and technical papers will also be produced and disseminated.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Technical assistance on selective fishing gears and devices to reduce discards and bycatch of juvenile and trash fish in the region	Jan - Dec	Research and investigation the current destructive fishing gear and practices. And summarize the selective fishing technology carried out by SEAFDEC/TD.
2. Technical assistance for assessment of the impacts from various kind of fishing gear and practice on fisheries resources, environment and ecosystem.	Jan - Dec	Follow-up works on the use of light in fishing in some of the Southeast Asian countries. Result from the project implementation conducted since 2010 will be summarized and to be used as the key references for future research planning, development, and implementation. It is planned that system setup for research on the use of light in squid fishing will be conducted in early 2012. And 2012 activities will be fully implemented based on the draft plan.
3. Interaction between threatened species of international concerned and fisheries	Jan - Dec	Information collection on status of sea turtle incidental catch will be continued through communication with relevant initiatives and agencies, or by participation of the project staff to relevant events.
4. Production of promotional materials and technical papers	Jan - Dec	Review of the publications related to fishing gear selectivity that issued by SEAFDEC/TD will be carried out. The review will be published and disseminated (publication, CDs, and SEAFDEC website).

4.2 Expected Outcomes in the Year 2012

<p>Issues on impact from fishing on coastal and marine environment</p> <ul style="list-style-type: none"> • Follow-up the Plan of Action on the Reduction of the Impact from Fishing on Coastal and Marine Environment; • Overview on the use of lights in fishing operation in the Southeast Asia; and • Formulation of the draft plan for research on the appropriate use of lights in fishing operations in Southeast Asian region. <p>Promotion on the use of selective fishing gear and device</p> <ul style="list-style-type: none"> • Implementation of parallel activity with the RYBIC-II project for SEAFDEC countries; and • Evaluation on the use of selective fishing gear and device in Southeast Asia based on SEAFDEC's initiatives in cooperation with other relevant initiatives. <p>Issues on interaction between threatened species of international concerned and fisheries</p> <ul style="list-style-type: none"> • Back-to-office report based on participation of project staff to relevant meetings; and • Information sharing with other initiatives on interaction between threatened species and fishing activities. <p>Publication of promotional materials and technical papers</p> <ul style="list-style-type: none"> • Publications of the above-mentioned subjects will be issued.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Sustainable Utilization of Potential Fisheries Resources and Reduction of Post-harvested Losses
Lead Department:	Training Department
Lead Country:	Thailand
Total Duration:	2008-2012

1. INTRODUCTION

There is potential to develop new fisheries and expand currently under-exploited fisheries resources including aquatic animals living on un-trawlable ground in the Southeast Asian waters. However there is insufficient knowledge for supporting their full extent and status. Reasons for these stocks not being exploited to maximum potential are wide and vary, and include difficulties in harvesting and processing the resource, lack of suitable harvesting methodologies and lack of market demand.¹⁷ To supplement the achievement of the utilization of these resources, onboard and on-shore post-harvest technologies are also required. It is therefore, a set of the program and activities under this project include R&D for the un-trawlable fishery resources and post-harvest technologies.

In addition, project activities also includes R&D on improvement of catch quality onboard fishing vessels through on-site training programs based on the current situation of the Countries. The project will be implemented in close collaboration with the Member Countries. Concerning that many of onboard fish handling and preservation techniques in small-scale and commercial scale fishing boats of the Southeast Asian region are still in the developing stage. Nevertheless, the demands of fish and living aquatic animal have gradually increased particular for the human fish food. It is therefore, program of activities under this project aims to improve quality of catch onboard fishing boats through reduction of the post-harvest losses. Beneficiaries of this project are mainly small- and medium-scale fishing operators and fishery officials concerned with post-harvest technology. Activities under this project include onsite training program and capacity building for fishing vessels, including squid fishing boats, purse seiners, longliners, etc.

The expected outputs from the project include; data collection on fisheries resources of un-trawlable grounds in the SEA waters; development of the appropriate sampling gear and techniques for utilization of the resources in un-trawlable grounds of the Southeast Asian waters; and enhancement of human resources capacities of the member countries on fishing gear development and post-harvest reduction techniques.

2. PROGRAM

2.1 Objectives

- 1) Conduct and support the actual survey, and analyze the potential fisheries resources of economically important species on the un-trawlable grounds in the Southeast Asian (SEA) Countries through collaborative research programs/activities using M.V. SEAFDEC 2 and/or other research vessels;
- 2) Carry out research and development (R&D) on the appropriate post-harvest fish technology considering user and environmental friendly including promotion of the hygienic handling of fish onboard;
- 3) Carry out R&D on appropriate fishing gear and practices for sustainable development of fisheries resources in un-trawlable grounds of the region;

¹⁷ Technical Document: ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium, 19-24 November 2001, Bangkok, Thailand.

- 4) Improve fish preservation methods/techniques for fishing vessels in SEAFDEC Countries through on-site training programs; and
- 5) Disseminate information on the potential resources on un-trawlable grounds.

2.2 Program Description

Activity will be implemented in line with the Resolution (RES) and Plan of Action (PoA) on Sustainable Fisheries for Food Security for the ASEAN Regional Towards 2020, as mentioned in RES Para 20 “*Optimise the utilisation 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*”; in PoA Para 1 “*Integrate the planning of marine capture fisheries, inland capture fisheries and the aquaculture subsectors to promote the sustainable development of the fisheries sector, including harvesting and post-harvest in both capture fisheries and aquaculture.*”; in PoA Para 58 “*Introduce and provide support for the development and application of technologies that optimise the utilisation 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*”, PoA Para 63 “*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*”.

Understanding the potential under-utilized fisheries resources and promotion of the resource exploration in a precautionary manner in the Member Countries through the collaborative program among SEAFDEC and Member Countries will be focused and developed, in particular on the utilization of M.V. SEAFDEC 2 under the cost sharing policy. The preliminary results from the collaborative survey include new findings on the potential fishery resources will be reported and shared with other Member Countries as appropriate. R&D on improvement of catch quality and onsite training program on environmental friendly post-harvest technology onboard fishing vessels will be continually implemented in close collaboration with the Member Countries.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1.Data collection on fisheries resources	July-Aug	Consultation visit to Brunei Darussalam for formulation of the national fisheries resources survey in EEZ of Brunei waters. Fisheries resources data collections through the resources survey the Philippine waters.
2. R&D on appropriate sampling gears and environmental users friendly fish handling techniques	Jan~	Develop/improve appropriated sampling gear and techniques for un-trawlable ground: hook-and-line in September. Develop suitable fish handling techniques in collaboration with SEAFDEC Member Countries. Fishing trials on efficiency fish trap in collaborate with Brunei Darussalam in December.
3.Human resource development	Nov-Dec	On-site training for Thai fishers on environmental friendly fish handling and the utilization of fuel consumption for fish handling and transportation. On-site training for Vietnam fishers on environmental friendly fish handling and the utilization of fuel consumption for fish handling and transportation.
4.Information dissemination	Nov-Dec	Production of the publications of the events organized by the project.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Sustainable utilization of fisheries resources
(2) Issues in the region at the beginning of the study: <ul style="list-style-type: none"> • Over exploitation of fisheries resources in the coastal areas; • Insufficient information for potential of fisheries resources in un-trawlable grounds in the Southeast Asian region; and • Losses of catch quality that resulting to low market value due to the poor fish handling at sea and landing site.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Information on potential fishery resources in the un-trawlable grounds for future formulation of its sustainable development/management plan; and • Improvement of quality and value of catch through reduction of the post harvest losses by using appropriate onboard fish handling technology/methodology.
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3.2.3 “Steps” toward achieving final goals:

Step 1: Information collection and R&D on potential fishery resource in un-trawlable grounds <ul style="list-style-type: none"> • Information collection on the potential fishery resources in the un-trawlable grounds through organization of workshop/meeting and actual survey by using M.V. SEAFDEC 2; • R&D on appropriate fishing gears and techniques for utilization of fishery resources in the un-trawlable grounds; and • R&D on appropriate onboard fish handling techniques/systems.
Step 2: Estimate potential fishery resources in un-trawlable grounds, and improve national capacities for reduction of post-harvested losses <ul style="list-style-type: none"> • Estimate the potential fishery resources in un-trawlable grounds through the actual resource surveys using M.V. SEAFDEC 2 and/or national research vessel; • Continuation of R&D on appropriate fishing gears and techniques for utilization of resources in the un-trawlable areas; and • Support national capacities through various HRD programs/activities focusing on: <ul style="list-style-type: none"> - development/use of appropriate fishing gears and techniques for utilization of the resources in the un-trawlable grounds - onboard fish handling techniques/systems.
Step 3: Information exchange and dissemination <ul style="list-style-type: none"> • Organization on the workshop/onsite training on the potential fishery resources in the Southeast Asian region; • Formulation of the set of recommendations for sustainable utilization of resources in un-trawlable grounds in the Southeast Asian region; and • Information dissemination of the output from the project implementation.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1, 2, and 3
(2) Project duration: 2008-2012
(3) Main activities: <ul style="list-style-type: none"> • Supporting actual surveys, information/data collection, and data analysis; • R&D on appropriate fishing gear and techniques for un-trawlable areas and onboard fish handling techniques; • HRD on the appropriate fishing gear and techniques for un-trawlable areas; and • HRD on the appropriate onboard fish handling techniques.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Supporting of actual surveys, information/data collection, and data analysis; • R&D on appropriate fishing gear and technique for un-trawlable area and onboard fish handling technique; • HRD on the appropriate fishing gear and technique for un-trawlable area; and • HRD on the appropriate onboard fish handling technique. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • Supporting actual surveys, information/data collection, and data analysis: <ul style="list-style-type: none"> - Consultation visit to the country requested to use M.V. SEAFDEC for the national fisheries resources survey in their EEZ. - Data collection through actual survey: supporting staff of SEAFDEC/TD joined the fishery resource survey by using M.V. SEAFDEC 2 and other national research vessels (<i>i.e.</i> M.V. DA-BFAR, and R.V. Chulabhorn). • R&D on appropriate fishing gear and techniques for un-trawlable areas and onboard fish handling techniques: <ul style="list-style-type: none"> - R&D and promotion on the use of environmental/users friendly fish handling techniques in collaboration with Member Countries. - Ongoing process in preparation for: (i) development of the appropriate fish handling techniques; study/review on the fish freshness detection tool; and (iii) fish handling on research vessel; • HRD on the appropriate fishing gear and techniques for un-trawlable areas: <ul style="list-style-type: none"> - Knowledge transfer on the design of fishing gear and its operation during the cruise survey in Bitune, Indonesia. - Design and experiment of deep-sea trap target to catch deep-sea shrimp in collaboration with BFAR, Philippines. • HRD on the appropriate onboard fish handling techniques: <ul style="list-style-type: none"> - Organization of a series of onsite training on environmental/user friendly fish handling and preservation techniques in Member Countries. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. Supporting of actual surveys, information and data collection, and data analysis	100%
2. R&D on appropriate fishing gear and techniques for un-trawlable areas and onboard fish handling techniques	100%
3. HRD on the appropriate fishing gear and techniques for un-trawlable areas	100%
4. HRD on the appropriate onboard fish handling techniques	100%

3.2.6 Evaluation of program activities in 2011

After the resources survey completion in Brunei water, the Minister of Industry and Primary Resources of Brunei Darussalam visited the M.V. SEAFDEC 2 and observed the vessel's facilities such as the wet laboratory, equipment room, mess room and various fishing gear. With the Minister onboard, the vessel sailed to Zone 2 for a demonstration of actual trawling as well as relevant oceanographic activities such as collecting data on water temperature and salinity, among others. It was well recognized by the Department of Fisheries Brunei on SEAFDEC research work that has been carried out over the years. In addition, technical discussion among SEAFDEC and Fisheries Department Staff was organized with the aim to strengthen technical cooperation between the two organizations in various areas such as data analysis of the previous survey carried out in Brunei water, capacity building needs for Brunei on development of sampling gear in un-trawlable grounds, identification of samples/specimens collected from the previous cruises, etc.

Regarding the organization of the on-site training that plan for Vietnam and Thailand in late 2011, it is envisaged that the fish quality onboard fishing vessels would be improved through introduction of the good practice for fish handling in the course of discussion and observation of the real situation of fishing vessels. Hygienic onboard fishing vessels and knowledge on how to utilize fuel for fish handling onboard will also be discussed. This could help in transferring technical knowledge of good practice/techniques for

improvement of catch quality and increase the price of catch for benefit to the fishers. In addition, the results from the sea trials for sampling gears that were developed since the project implementation in 2008 will be summarized as the project will end by the year 2012. All training materials and media will be packaged for further usage.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

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

Activity 1: Data Collection on Fishery Resources

The collaboration research survey on potential of under-utilized resources in Member Countries will be continually conducted based on the national research program(s) using M.V. SEAFDEC 2 and/or by their research vessels. The survey areas will be un-trawlable grounds in the EEZ of the Member Countries. The result of the survey will be jointly analyzed with the countries and to be reported at national and regional level. In case that the actual survey by M.V. SEAFDEC 2 could not be carried out, data collection will be made through various sources, such as from participation of the staff to relevant meetings/workshops. Activity plan for this activity includes the support for fishery resource survey, consultation visit, and data collection through actual survey and/or from the meeting/workshop to be organized by SEAFDEC or by others relevant initiatives.

Activity 2: R&D on Appropriate Sampling Gears, and Environmental/Users Friendly Fish Handling Techniques

To explore the under-utilized resources in the un-trawlable grounds, R&D on suitable fishing/sampling gears (*i.e.* deep-sea traps, hook-and-line, etc.), fishing operation techniques, and instrument and machineries will be continually carried out using M.V. SEAFDEC 2 and/or other research vessels. In addition, R&D to promote reduction of the post-harvest losses onboard fishing vessels will be carried out, in particular for the high value species from un-trawlable grounds. Fishing trial for testing developed fishing gear/instrument will also be carried out.

Activity 3: Human Resource Development

The HRD programs to promote user and environmental friendly fish handling onboard fishing vessels will be carried out through on-the-job training/research program in collaboration with the Member Countries during the fishery research survey using M.V. SEAFDEC 2 or by other research vessels. Activities under this category include: on-the-job training for research methods on the fisheries resources survey/exploration in the un-trawlable grounds; and on-site training on the user and environmental friendly fish handling and preservation techniques.

Activity 4: Information Dissemination

Information dissemination will be made through various sources, including SEAFDEC's website, brochures, publication, reports, information package (CD/DVDs, manual), etc.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1.Data collection on fisheries resources	Mar –Dec	1. Consultation visit for formulation of the actual survey plan, based upon the request from the Member Countries. 2. Fishery resources data collection through actual survey in collaboration with the Member Countries, based upon request from the Member Countries.
2.R&D on appropriate sampling gears, and environmental/user friendly fish handling	Jan-Dec	1. Develop fishing gears for un-trawlable ground. 2. Develop & promote fish handling

techniques		techniques in Member Countries. 3. Fishing trial for testing efficiency of developed gear and techniques (Sampling gear/fishing handling techniques).
3. Human resource development	Based on the request	1. Provide technical support to the member countries focusing on-the-job training for researchers on survey methods of fisheries resources in un-trawlable grounds, based on the request from the countries on the use of M.V. SEAFDEC 2. 2. Assist in national capacity building program related to fish handling and post-harvested technologies by co-organizing the on-site training in close collaboration with the Member Countries. 3. Onsite training on environmental friendly fish handling and preservation technique in selected Member Countries.
4. Information dissemination	July-Dec	Publications based on project activity implementation will be published. Summary report of the project will be formulated to conclude major achievement, experiences and lessons learned from the project implementation since 2008.

4.2 Expected Outcomes in the Year 2012

<p>The envisaged outcome from the program for the year 2012 includes summary of the potential fisheries resources of economically species to be utilized in the un-trawlable grounds in EEZ of the Member Countries through promotion of the appropriate fishing technology/practices and acceptable post-harvested technology. Human resource development of the Member Countries includes onboard fish handling techniques, fishing gear technology/method to be used for un-trawlable grounds.</p> <p>Specific expected outcomes in the year 2012 include:</p> <ul style="list-style-type: none"> • Support national fisheries resources survey in the EEZ of Member Countries; • Improved fishing gear performance for resource survey in un-trawlable grounds; and • On-site training program for the Member Countries to improve onboard post-harvest fish handling considering user and environmental friendly method.
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PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Fisheries Resources Survey and Operational Plan for M.V. SEAFDEC 2
Lead Department:	Training Department
Lead Country:	All Member Countries

1. INTRODUCTION

Since 2004, SEAFDEC Training Department has worked in close collaboration with the Member Countries and other key partners at both national and regional levels on utilization for the use of M.V. SEAFDEC 2. The M.V. SEAFDEC 2 has supported the MCs in assessing and utilizing their fishery resources. In a broader sense, the acquisition of M.V. SEAFDEC 2 will help strengthen technical cooperation and effective fisheries and environmental management in the ASEAN region through the enhancement of research and training capability.

Over the years, more than 30 cruises have been carried out by M.V. SEAFDEC 2. Regarding operational coast of using M.V. SEAFDEC 2 until the year 2009, national research surveys was based on a cost-sharing policy using the budget from SEAFDEC's Minimum Regular Contribution and the Member Countries, as adopted at the 37th Meeting of the Council of SEAFDEC in 2005.

Due to the globally increased oil price starting from the year 2006, consequently in early year 2009 this issue was discussed during the 40th Meeting of SEAFDEC Council. The Council agreed that the country that request to use M.V. SEAFDEC 2 should responsible for the cost incurred by the vessel. It is therefore agreed on modified cost-sharing policy that support of the fuel for the entire duration of the research/survey including cursing to and back to the requesting country; and this scheme will be implemented from the year 2010.

2. PROGRAM

2.1 Objectives

The objectives of this project are to:

- 1) Assist Member Countries in conducting research surveys on fisheries resources (*i.e.* fishing trail and demonstration, ecosystem and hydro-acoustic surveys), oceanographic surveys, fish preservation, fish sampling and its species identification;
- 2) Assist Member Countries in building human capacity resources during the surveys onboard M.V. SEAFDEC 2 based upon the request; and
- 3) Facilitate a new fishing ground establishment for the region (*e.g.* deep-sea fisheries, un-trawlable grounds, etc.).

2.2 Program Description

To accomplish key activities as mentioned above, TD works in close collaboration with the MCs and other key partners at both national and regional levels. Over the years, the M.V. SEAFDEC 2 has been used to assess the utilization of fishery resources. The vessel will also be used to implement fishery training programs.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. National fisheries resources survey in EEZ water of Brunei Darussalam	3-28 July	<p>Fisheries resources survey was carried out for total period of 25 day. Specific objectives of the survey are to facilitate national research survey of Department of Fisheries, Brunei Darussalam. Research survey on the following topics were carried out:</p> <ol style="list-style-type: none"> 1. Demersal resource survey in Zone 2 using bottom trawl; 2. Biomass assessment survey using hydro-acoustics equipment (scientific eco-sounder); 3. Oceanographic survey using ICTD, Temperature-Depth sensor, and acoustic current indicator; 4. Biological survey using Bongo net, Nueston net; and 5. Cetacean sighting during to/from research areas.
2. Fisheries resources survey in Vietnam water	TBD	<p>During the previous SEAFDEC Council Meeting held in Malaysia, SEAFDEC/TD was requested to support the fisheries resources survey in Vietnam waters. Based on communication with the focal point for Vietnam (to date – 2 Oct 2011), it was tentatively plan that three major type of surveys will be carried out: (i) demersal resources survey using bottom trawl; (ii) large pelagic resources survey using longline and gillnet; and (iii) small pelagic resources survey using hydro-acoustic equipments.</p> <p>It is planned that the survey period will be from 2011 to 2015 (5 years). However, the project proposal is still in the process of approval by Vietnam Government.</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Fisheries resources survey</p> <p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> • Still potential and under-utilized fisheries resources areas in the Southeast Asian region, including un-trawalable grounds, and deep-sea areas where there is insufficient information/data; • Human resource capacity in the field of fisheries resources exploration is significantly needed in the Member Countries; and • Resource capacity in terms of research vessels for fisheries resources survey is limited in the Member Countries.
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3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Exploration of fisheries resources in the un-trawlable grounds in the area of EEZ of the Member Countries; • Establishment of new fishing resources area for the Member Countries; and • Building various human resources capacities for fisheries officials of the Member Countries in the field of marine resources survey.

3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Consultation visit to the Member Countries who requested the utilization of M.V. SEAFDEC 2</p> <ul style="list-style-type: none"> • SEAFDEC/TD initiate discussion with the country by preparing draft plan of activities onboard M.V. SEAFDEC 2 for the cruise survey; • SEAFDEC TD staff concerned pay the visit to the Member Countries based upon their request to discuss in greater details on the cruise plan; and • Summary report of the meeting for the cruise plan is drafted.
<p>Step 2: Collaborative arrangement of SEAFDEC/TD and the country to implement the cruise survey</p> <ul style="list-style-type: none"> • SEAFDEC/TD and the country proceed with all arrangement for the cruise survey; and • M.V. SEAFDEC 2 carries out the cruise survey based upon the survey planned.
<p>Step 3: Result reporting</p> <ul style="list-style-type: none"> • Results from the fisheries resources survey will be reported and published within the proper period of time by the country with the assistance of SEAFDEC.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1-3
(2) Project duration: since 2004 to date
<p>(3) Main activities:</p> <ul style="list-style-type: none"> • Supporting actual fisheries resources survey by conducting: fishing gear survey, oceanographic survey, hydro-acoustic survey, and other activities. • Carry out on-the-job training program based upon the request and plan of activity with the country

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Supporting actual fisheries resources survey by conducting: fishing gear survey, oceanographic survey, hydro-acoustic survey, and other activities. • Carry out on-the-job training program based upon the request and plan of activity with the country. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • National fisheries resources survey in the Member Countries. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. National fisheries resources survey in EEZ of Malaysia	100%
2. National fisheries resources survey in EEZ of Brunei Darussalam	100%
3. Training workshop on the research methodology for the study of impact of fishing on deep-sea ecosystem	100%

3.2.6 Evaluation of program activities in 2011:

The national fisheries resources surveys in Brunei Darussalam were successfully implemented as requested/planned. After the survey, the Minister of Industry and Primary Resources of Brunei Darussalam visited the M.V. SEAFDEC 2 and observed the vessel’s facilities such as the wet laboratory, equipment room, mess room and various fishing gear.

Brunei is one of the country that always request to use M.V. SEAFDEC 2 for their national research survey due to their limitation of staff, equipments and facilities in similar to other countries in the region. It is considered that other Member Countries may face the problem with financial support for requesting

M.V. SEAFDEC 2. It is therefore suggested that SEAFDEC may develop/initiate a package of regional or sub-regional program on the coastal/offshore fisheries resource survey in order to utilise the use of M.V. SEAFDEC 2 for more benefit to the countries in the region.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
National fisheries resources survey in EEZ water of Vietnam	TBD	As mentioned above that the collaborative survey in the Vietnam water will be carried out from 2011 to 2015, however, the proposal of activities plan is still in the process of national approval. SEAFDEC shall communicate and finalize the tentative plan with concerned staff of Vietnam to be able to start the program.

4.2 Expected Outcomes in the Year 2012

- Support to the national fisheries resources survey in the EEZ of Member Countries including un-trawlable grounds, deep-sea areas, etc.
- Building human resource capacity of the Member Countries on the fisheries resources survey in the field of fishing/sampling gears, oceanographic survey equipment, hydro-acoustic survey using FQ-80 system.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Information Collection on Highly Migratory Species in Southeast Asian Waters
Lead Department:	Training Department
Lead Country:	The Philippines
Total Duration:	2008-2012

1. INTRODUCTION

Tuna fishery in the Southeast Asian waters is significantly important for the domestic consumptions as valuable protein resource for most of the countries in the region as well as for exports to the many parts of the world. Due to the decline of tuna stock in the high seas, the attempt of tuna Regional Fisheries Management Organizations (RFMOs) was made to estimate tuna stocks at the global level. However, based on the current tuna fisheries statistics in Southeast Asia, there is still no clear figure how much tuna captured in EEZ waters because they included tuna raw materials imported from overseas into their tuna statistics. In addition, trend of coastal tuna resources shows declination recently. The keys could be because of the failure in managing coastal fishing capacity due to the inadequate information and data for policy-makers to decide where they should go.

The project initiated information collection of highly migratory species in Southeast Asian Waters since 2008 with specific objectives to review and evaluate status of tuna fisheries/productions in the Southeast Asian waters as well as to develop the regional tuna database based on information collection from selected tuna landing sites and from national tuna statistic. Development of tuna data logbook or documentation system to support the proper data and information collection will be a part of activity. Through the establishment of a working group for information collection on tuna fisheries, there are currently participating countries, namely Indonesia, Philippines, Thailand and Vietnam (IPTV countries).

At the 1st Working Group Meeting, the existing information of tuna productions at national level and ways to improve tuna data collection were discussed. It was found that level of national development of the participating countries for information collection is significantly different. Regarding this the 2009 annual plans and implementing activities were identified for each country at this meeting. Tuna landing sites and the enumerators at each countries were also identified before starting the tuna data collection in early of 2009.

During the 2nd Working Party Meeting, 10 years tuna production from 1997-2007 based on fisheries statistic of all relevant countries were reported. Another progress was the outcome of data collection at selected landing sites in each IPTV country based on 6-8 months implementation. In addition, it was concluded that one-year-cycle of information collection on tuna landing production at the selected landing sites should be completed under the project's support together with the support from their respective countries. To achieve this goal, the project plan and activities from late 2009 till early of 2010 was finalized as well as the future activities for IPTV countries including the developing of fishing logbook or catch documentation system to support proper tuna data collection.

In the 3rd meeting, project's Working Group Member were requested to present their progress of work on data collection by enumerators at the selected tuna landing site since 2008 to date as well as to finalize the future plans and activities to be implemented by each countries based on the current situation. The meeting finally recommended that the project activities should promote the use of tuna fishing logbook in order to obtain more reliable information/data on. Furthermore, the meeting suggested the project to pay more effort in setting up minimum requirement of information collection through the use of fishing recording. In order to do so, pilot activity in the IPTV countries will be implemented in their major selected tuna landing sites.

2. PROGRAM

2.1 Objectives

The objectives of this project are to:

- 1) Obtain better understanding on status of tuna fisheries in the Southeast Asian Waters;
- 2) Develop/improve tuna database based on information collection at major landing sites in the participating countries; and
- 3) Promote the use of tuna logbook system for improvement of quality of data and information.

2.2 Program Description

To be able to sustainably develop tuna fisheries in the region, there is the need to enhance national capacity to collect and improve data/information on tuna fisheries both for proper planning and management of the tuna resources and also for qualitative data to be reported to tuna RFMOs. In addition, no tuna fishery statistics and information is in place in some countries. In this connection, main objective of this program is to enhance the national capacity to be able to improve and produce good quality of data and timely information on tuna fisheries.

The current program of activities implementing under this project focuses on the works with IPTV countries. Based on the framework developed with the project initiative, tuna information on the origin of the tuna and neritic tuna species caught (at the selected landing sites in the IPTV countries) is now ongoing investigated by using one-year cycle data collected by the countries. As suggested by the members of the Working Group, it is planned that pilot program on the use of tuna fishing logbook will be developed in close consultation with the countries considering the current situation of each IPTV country.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1.Consultation/working party meeting	Oct.	Consultation visit to Indonesia will be carried out with the objective to discuss on: formulation of the draft plan to promote the use of fishing logbook in tuna fishing vessels; draft pilot activity on improvement of tuna information collection at the major landing sites in Indonesia; and national training program on checking accuracy of tuna species identification at tuna cannery in Indonesia.
2.Development of regional tuna database	Jan-Dec	The project maintains data input activity and adjust the use of database for tuna information for better users' friendly environment.
3.Data collection and analysis	Sep	Conclusion and summary of data submitted from IPTV countries were reported to the Special Meeting on Tuna held in September 2011 in Songkhla. Information on tuna production at the major landing sites were shared with the resource persons and other national representative (non IPTV countries). This would further encourage involvement of non-IPTV countries to share and join the program on collecting tuna information in the Southeast Asia. Further discussion will be made in collaboration with other SEAFDEC relevant initiatives such as IUU-fishing information gathering improvement project, fisheries statistics for Southeast Asia, etc.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Fishery management of shared stocks in the Southeast Asian waters
(2) Issues in the region at the beginning of the study: <ul style="list-style-type: none"> • Tuna production landed in each member countries are not actually represent the current situation of tuna resources stock status due to poor quality of data collected at onboard tuna fishing vessels, landing sites, and cannery. • In some member countries, tuna data collection system is not in place (such as Vietnam) while the country exported several then thousand MT annually. • Need on a new framework to separate data of tuna catch from EEZ and beyond EEZ.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Better figure on the status of tuna fisheries/production in the Southeast Asian waters. • Use of an improved system for tuna landing data collection for further improvement of tuna statistics. • Use of tuna fishing logbook that developed/promoted by the project or by other relevant initiatives.

3.2.3 “Steps” toward achieving final goals:

Step 1: Establish the working group party and conduct annual meeting <ul style="list-style-type: none"> • Establish the working group party to work on tuna data collection at national level, in 1st phase the project selected only 4 main countries, namely Indonesia, Philippine, Thailand, and Vietnam. • The meeting will be conducted one a year to: monitor the progress of work supporting by the project; to discuss/identify urgent issues for improvement of data collection from landing sites. In addition, to have a cross check with the national statistics.
Step 2: Regional analysis on tuna production <ul style="list-style-type: none"> • Based on statistic data collection where existed in most member countries except Vietnam and Myanmar, the regional analysis will be conducted to better understanding the trends of production. • Identify the landing sites for data collection for future consideration for improving.
Step 3: Implementation of the data collection and analysis <ul style="list-style-type: none"> • Identify the landing sites for data collection; hire enumerator to monitor and record the catch landing at the selected sites. • Analysis on the status of tuna resources in the Southeast Asia waters based on tuna production by countries, by species. • Provide a set of technical data for further consideration by the country(s) for improvement of information collection on tuna catch in their respective country(s).
Step 4: Development for the regional tuna database <ul style="list-style-type: none"> • Develop the tuna database software. • Develop the tuna database via online internet.
Step 5: Final consultation and information dissemination <ul style="list-style-type: none"> • The evaluation on the result from the project implementation will be made through the organization of the regional technical consultation. • To publish the outcomes of the project implementation.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 3
(2) Project duration: 2008-2012
(3) Main activities: <ul style="list-style-type: none"> • Organize working party meeting; • Regional synthesis on tuna fisheries in the participating countries (IPTV) have been conducted; and • Developing tuna database software/system.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Working group meetings were conducted (3 times during 2008 to 2010); • Regional analysis covering IPTV countries have been conducted; • Catch data collection based on the new framework have been conducted in the IPTV countries; and • Tuna database have been developing. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • Drafting the regional analysis on the trend of tuna production in the Southeast Asia; • Ongoing process for system planning with some information inputs for the tuna database; and • Mechanism for tuna data collection system established in major tuna landing sites in Vietnam, which initiated by the project. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. Status of tuna fisheries in the Southeast Asian Waters	100%
2. Tuna database development based on information collected at tuna landing sites in the participating countries	100%
3. Promotion on the use of fishing logbook system for sustainable management of tuna fisheries	100%
4. Formulation of the working group party on information collection of tuna fisheries from concerned Member Countries	100%

3.2.6 Evaluation of program activities in 2011

Due to the project will be implemented until 2012, its activity has gradually been absorbed into the other relevant project such as IUU-fishing information gathering improvement implementing by TD since 2011. Activity under this project by 2011, formulation of pilot work related to improvement of tuna information collection was started. It is planned that activity in 2012 of the project will focus on the pilot activity with Indonesia and Vietnam (still need to be confirmed with the country). After 2012, database of tuna fisheries in participating countries would be maintained by different source of budget. This topic will be discussed in the process of project activity implementation in 2012.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

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

Activity 1: Consultation/working party meeting

In 2012, the Project-end-meeting is planned to be organized with the aim to summarize the outputs of the project implementation since 2008. Based on the data inputs from the working party members, progress development of the tuna regional database will be reported. It is also planned that long-term mechanism to update tuna data/information will be discussed during the meeting in 2012.

Activity 2: Development of the regional database for tuna

Development/improvement of the regional tuna database will be made. In addition, information on non-member of the working party of the project, namely Myanmar and Malaysia will be included in the regional database for tuna. However, in order to sustain long-term data input and to establish the collaboration mechanism to obtain the data inputs from the countries, discussion will also be made during the Project-end-meeting scheduled in the 2nd or 3rd quarter of 2012.

Activity 3: Data collection and analysis

Results of information/data collected and submitted by the working party members and non-members as well as the result from the pilot program with the participating countries on the use of tuna fishing logbook (for the fishing boats catching in EEZ) and observer program onboard tuna fishing vessels, and other supported by the projects since 2008 will be regionally synthesized. Outputs of the project implementation will be published.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1.Consultation/working party meeting	TBD	Organization of the Project-end-meeting for summarizing all the outcomes from the project implementation since 2008, and to discuss for future possible activity of SEAFDEC to support improvement of tuna information/data collection in the Member Countries.
2.Development of regional tuna database	Jan-Dec	Maintain and improve tuna regional fisheries database.
3.Data collection and analysis	Jun-Dec	Outputs from the project implementation will be published.

4.2 Expected Outcomes in the Year 2012

- Data set of tuna production in IPTV and non-IPTV countries will be available online;
- Result of the pilot activity in collaboration with Indonesia and Vietnam will be reported; and
- Conclusion and recommendation from the project implementation.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Improvement of Information Gathering System for IUU Fishing Related Countermeasures in Southeast Asia
Lead Department:	Training Department
Lead Country:	Indonesia
Total Duration:	2008-2012

1. INTRODUCTION

Based on FAO's definition, illegal fishing is "fishing in contravention of the laws and regulations of a country or an international agreement". The declining fish stocks may be pushing the fishers to operate illegal fishing within and beyond their EEZ. It is widely accepted that illegal fishing is considered a major problem for future global food security, driven by substantial world population growth, continuously increasing demand for fish protein, even with large numbers of the world's fish stocks are currently being depleted.

The situation is similarly happening in every region in the world including the Southeast Asian region which is currently responsible for one-fourth of the global marine fish production contributing about 14 million tons of fish products. It has been remarkably shown that the increasing demand for fish products as well as rapid growth of fishing capacity and development of modernization in fishing technologies and practices resulted in the over-exploitation of fisheries resources in the Southeast Asia. Nonetheless, the demand for fish by the existing fisheries industries is still increasing, which in a way leads to the increased number of fishers and vessels, and intensity of fishing aiming to meet the soaring demand. This in turn, has set off the practice of illegal fishing both inside and outside the Southeast Asian waters.

The project activity will be implemented in line with the Resolution (RES) and Plan of Action (POA) on Sustainable Fisheries for Food Security for the ASEAN Regional Towards 2020, as referred to POA Para 21 "*Strengthen 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 promote the awareness and understanding of international and regional instruments and agreements through information dissemination campaigns*".

In this connection, the project provides and initiates set of activities focusing on information gathering on the illegal unreported and unregulated fishing (IUU-fishing) in coastal and marine fisheries for further improvement of the IUU-fishing related countermeasures for the Southeast Asian countries.

2. PROGRAM

2.1 Objectives

The objectives of this project are to:

- 1) Improve fisheries information gathering system/mechanism through various capacity building programs/activities towards improvement of IUU-fishing related countermeasures in the Southeast Asian Countries;
- 2) Obtain better understanding and knowledge of fisheries in the region particularly on small-scale coastal and inland fisheries towards achieving sustainable fisheries development in the Southeast Asian Region;
- 3) Improve compilation of information and statistics on small-scale coastal and inland fisheries in the Southeast Asian; and
- 4) Facilitate better presentation and knowledge on status and condition of small-scale coastal and inland fisheries at national and regional level.

2.2 Program Description

Improvement of Information Gathering to Support the Improvement of IUU-fishing Related Countermeasures

IUU-fishing is considered one of the most serious threats to the sustainable development and management of fisheries. EU catch documentation scheme is an example of the current market measures taking place with the mainstream to combat the IUU-fishing. Before the EU catch documentation scheme taken effective actions by January 2010, all countries in the region have to build their institutional and human resources capacities in order to response to the measures of the EC. In addition, it is foreseen that there are increasing trends of similar market-oriented measures that moving towards effectively management of fishing capacity particularly to improve the IUU-fishing countermeasures.

It is therefore, various national capacities to collect national information are needed in order to obtain qualitative data for proper management of the fisheries resources. In this connection, main objective of this program is to enhance their capacity to improve and produce quality and timely fishery information. Furthermore, the project will also facilitate exchanging of information among countries on the implementation of catch certification systems of the ASEAN Member Countries as required by European Commission, as well as harmonizing export of fishery products to other regions.

Specific objectives of this sub-program are to:

- 1) Review and update information on initiatives and program of activities that being implementing for combating IUU-fishing in the Southeast Asian region;
- 2) Improve accuracy and reliability of fisheries information to support improvement of fisheries management including IUU-fishing countermeasures; and
- 3) Enhance better understanding of the impact from IUU-fishing on fisheries resources.

Improvement of Information Gathering on Small-scale Coastal and Inland Fisheries Towards Sustainable Fisheries Development in the Southeast Asian Region

In the Southeast Asian Region, Inland Fisheries is one of main fisheries production and more socially and economically, not only marine fisheries. People rely on the waters of the river, reservoir, lake and etc system to provide them with their primary source of nutrition and as well their livelihood. Sustainable development of the fisheries resources need to enhance various national capacities to collect national information for example in catch data information collection for proper management of the fisheries resources and to obtain qualitative data. Fisheries statistics and information is widely accepted as a tool to provide a basis and being crucial to the determination of national fisheries policies, the formulation of national management frameworks and actions or even as a basis for understanding the status and condition of fisheries resources. The need for accurate, timely and reliable statistics and information for the formulation and evaluation of fishery programs and policies has inevitable expanded manifold for development and management purpose.

In this connection, main objective of this program is to enhance the national capacities in order to be able to improve or produce quality and timely fishery information in Inland fisheries. The statistic and information in Inland fisheries is difficult and complex, because of the diversity of the yield, the dispersed geographic of many fisheries, and the range in scale of different types of fisheries. Therefore, estimates of the yield (production) and value of inland fisheries are needed to improve and develop material for capacity building through compilation of available existing tools and methodologies for maximizing its utilization for planning and management of fisheries at national and regional levels while maintaining the linkage and cooperation in the harmonization of norms/standards definitions and classifications of fishery statistics and information at regional and international levels.

Improve Information Gathering of Tuna Catch Data of SEAFDEC Member Countries and Support Improvement of IUU-fishing Countermeasures for Tuna Fisheries

In Southeast Asian region, it was recognized that insufficient information to assess stock status of tuna fishery resources in EEZ waters of the Countries in this region. It is therefore the need to have better understanding on stock status, fishing area, fishing effort/capacity, and catch landing of tuna. In addition, there is currently increasing international concern on IUU-fishing activities, trading endangered aquatic species, which include tuna fisheries. In this connection, the activities under this category are aimed to support improvement of the tuna data/information collection in order to encourage some of the SEAFDEC Countries who exporting tuna for their long-term sustainable management and development of tuna fisheries.

Under this program category, various capacities of the Member Countries will be built for improvement of data quality on tuna catch. It is envisaged that the countries could obtain more reliable and timely data for further management of the tuna fisheries in their respective countries. Activities to be implemented under this activity include improvement of information collection at-sea fishing activities, landing sites, and processing plants.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. Improve information gathering system to support the improvement of IUU-fishing countermeasures in Southeast Asia	June~	<p>Organization of the training program on improvement of tuna information collection: correcting of data at tuna cannery, etc. (scheduled in December 2011).</p> <p>Participation of the project staff to events/meetings related to IUU-fishing.</p>
2. Improve information gathering on small-scale coastal and inland fisheries towards sustainable fisheries development in the Southeast Asian Region	Nov/Dec	<p>Review the tool and methodologies for collection and compilation of information and statistic on inland fisheries in Cambodia and Thailand; the draft tools and methodology for collection and compilation of information and statistic on inland fisheries is reported.</p> <p>Organization of the special meeting on development of tools and methodologies for collection and compilation of information and statistics on inland fisheries in Cambodia, and based on the meeting will be summarized the national workshop at the early of 2012.</p>
3. Improve information gathering on tuna catch data of SEAFDEC Member Countries and support the improvement of IUU-fishing countermeasures for tuna fisheries	Sep	<p>Organization of the Special Meeting on Improvement of Tuna Information and Data Collection in Southeast Asia, 7-9 September 2011, Songkhla, Thailand.</p> <p>Organization of the Special Meeting on Sharks Information Collection in Southeast Asia, 15-17 September 2011, Bangkok, Thailand.</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

Activity 1 and 3

3.2.1 Theme and issues:

<p>(1) Theme: Improvement of IUU-fishing related countermeasures in the Southeast Asian Region through improvement of information gathering system/mechanism</p>
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> • Insufficient fisheries information to support fishery management, particular for management of fishing capacity (boats, people, gears, standard and safety onboard fishing boats, illegal fishing gear, illegal fishing operation, etc.); • Various actions needed for combating IUU-fishing in response to: resources declination; poverty at local/community level; ineffective fishing regulation/countermeasures; weak in-country coordination; IUU-fishing activities frequently occurred in the neighboring countries; • Insufficient skill in transferring science-based findings into policy actions; and • Insufficient knowledge and understanding of information collection and compilation of information and statistics on coastal marine and inland fisheries of the ASEAN Member Countries, particularly CLMV countries.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Establishment of an effective information gathering system/mechanism to improve IUU-fishing related counter measures in the Southeast Asian region; • Enhancement of regional and national capacities for science-based policy development, particularly for improvement of IUU-fishing related countermeasures in Southeast Asia; • Support establishment of inventory/database system for monitoring and recording movement of fishing activities in the Southeast Asian region through the collection of good practices; • Enhancement of collaboration between regional and national initiatives related to combat IUU-fishing; and • Building capacity to fisheries officials on tools and methodologies for collection and compilation of information and statistics on small-scale coastal and inland fisheries.

3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Identify priority issues and gaps to improve information gathering to combat IUU-fishing in the Southeast Asian region</p> <ul style="list-style-type: none"> • Organization of the project planning meeting; • Organization of the regional technical consultation meetings; • Organization of the national technical consultation meetings; • Draft planning for developing a practical model to support the mitigation of the impact from IUU-fishing; • Draft planning for the feasibility study on validating the common data set for obtaining more reliable information on fishing activities; • Organization of the experts meeting on planning and design for database system; and • Organization of the capacity building program for fisheries officials responsible for collection and compilation of information and statistics on coastal marine and inland fisheries, in CLMV countries.
<p>Step 2: Carry out regional and national capacities building program for improvement of information gathering to improve IUU-fishing countermeasures in the Southeast Asian region</p> <ul style="list-style-type: none"> • On-the-job capacities building; • Capacity building for improvement of accuracy of catch data for Member Countries; and • Packaging the documents/materials/media to compile good practices for improvement of IUU-fishing countermeasures.
<p>Step 3: Setup regional inventory/database for monitoring IUU-fishing activities</p> <ul style="list-style-type: none"> • Information dissemination on the improved system for the information gathering; and • Maintain the established regional inventory/database for monitoring/coordinating with other relevant agencies on IUU-fishing fishing activities.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1
(2) Project duration: 2011-2015
(3) Main activities: <ul style="list-style-type: none"> • Regional/national technical consultations/meetings; • Capacity building programs for improvement of information gathering; • Compilation/development and promotion of best practices for improvement of information gathering; • Capacity building program for science-based policy development; and • Information sharing and dissemination of major outputs from the project implementations.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Organization of the Special Meeting on Improvement of Tuna Information Collection in Southeast Asia, September, 2011; • Organization of the Special Meeting on Sharks Information Collection in Southeast Asia, September 2011; • Organization of the training program on improvement of tuna information collection at tuna cannery; and • Collection of training materials for the training program for improvement of tuna information collection. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • Identification of needs and gaps in collecting information on tuna and sharks; • Set of recommendations for improvement of data collection in tuna fisheries; • Set of recommendations for improvement of shark information collection in Southeast Asia; and • Collection of training materials for improvement of information collection onboard fishing vessels (fishing logbook) and the observer program (that implemented in some courtiers in the region). 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. Establishment of an effective information gathering system/mechanism to improve IUU-fishing related countermeasures in the Southeast Asian region	35%
2. Enhance regional and national capacities for science-based policy development, particularly for improvement of IUU-fishing related countermeasures in the Southeast Asian region	35%
3. Establishment of inventory/database system for monitoring and recording movement of fishing activities in the Southeast Asian region through the collection of best practices	35%
4. Human capacity building to fisheries officials on tools and methodologies for collection and compilation of information and statistics on small-scale and inland fisheries	35%

3.2.6 Evaluation of program activities in 2011 – Activity 1 and 3

Under Activity 1: information on previous and ongoing initiatives related to the issues of combatting IUU-fishing were gathered through participation of the project staff to relevant meetings/events organized by SEAFDEC and others. It is planned that the activity in the year 2012 will be developed/implemented in complementary to the other relevant initiatives at both national and regional levels.

Under Activity 3: the project could obtain the set of recommendations for future improvement of information gathering for combatting IUU-fishing in tuna fisheries. In addition, update information on the national initiatives related to shark fisheries could also be obtained. These two outputs from the Activity 3 implementation can be used as the basis for national/regional preparation works towards CITES COP-16.

Activity 2

3.2.1 Theme and issues:

(1) Theme: Improvement of Information Gathering on Inland Fisheries Towards Sustainable Fisheries Development in the Southeast Asian Region

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

- The requirement from SEAFDEC Conference to strengthen of fishery statistics and maximizing their use for fisheries planning and management, as well as development of standard definitions and classifications to facilitate regional fishery statistics and information exchanges.
- Insufficient standard of tools and methodologies for collection and compilation of information and statistics on Small-scale Coastal and Inland Fisheries in the Southeast Asian Region.
- Insufficient fishery statistics and information on Inland Fisheries in Southeast Asian to provide a basis and being crucial to the determination of national fisheries policies, the formulation of national management frameworks and actions or even as a basis for understanding the status and condition of fisheries resources.

3.2.2 Expected final goals of the program:

- Improvement of the tools and methodologies for collection and compilation of information and statistics on Inland Fisheries for Member Countries.
- Maintaining the linkage and cooperation in the harmonization of norms/standards definitions and classification of fisheries statistics and information at regional and international levels.
- Fisheries Officials of Member Countries have improved skill and knowledge on collection and compilation of information and statistics on Inland Fisheries.

3.2.3 “Steps” toward achieving final goals:

Step 1: Study on the document/material/media on tools and methodologies for collection and compilation of information and statistics on small-scale coastal and inland fisheries of the Southeast Asian Region.

- Identification the tools and methodologies for collection and compilation of information and statistics on small-scale coastal and inland fisheries in the Southeast Asian Region.
- Organization of the consultation meeting resource person and SEAFDEC.
- Improvement the draft of tools and methodologies for collection and compilation of information and statistics on inland fisheries is reported.

Step 2: Preparatory for a National Workshop in the targeted Member Countries

- Organization of the national technical consultation meeting.
- Discussion in detail of draft tools for collection information on inland fisheries, and summarized the national workshop in target Member Countries.

Step 3: National Workshops on collection and compilation of information and statistics on small-scale coastal and inland fisheries

- Organization of the national workshop in target Member Countries.
- The final of tools and methodologies for collection and compilation of information and statistics on inland fisheries of each country is reported.
- Organization of the regional workshop on tools and methodologies for collection and compilation of information and statistics on inland fisheries.
- Tools and methodologies for collection and compilation of information and statistics on inland fisheries in Southeast Asian Region is reported.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1

(2) Project duration: 2011-2015

(3) Main activities:

- Identification the tools and methodologies for collection and compilation of information and statistics on inland fisheries in the Southeast Asian Region.
- Organization of the national technical consultation meeting.
- Organization of the national workshop in target Member Countries.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • Identification the tools and methodologies for collection and compilation of information and statistics on inland fisheries in target Member Countries (Cambodia). • Discussion in detail of draft tools with resource person (DOF Thailand). • Organization of the national technical consultation meeting on November 2011 in Cambodia. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> • Draft of tool and methodologies for collection and compilation of information and statistic on inland fisheries of Cambodia is reported. • The draft of tools will be discussed at the national technical consultation meeting. • The period of national workshop to improve tool and methodology for collection and compilation of information and statistics on inland fisheries will be assign by consultation meeting. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. Identification the tools and methodologies for collection and compilation of information and statistics on inland fisheries in target Member Countries.	20%
2. Establishment of the appropriate tool and methodology for collection and compilation of information and statistics on inland fisheries in target Member Countries.	10%
3. Enhance fisheries officials in target Member Countries on tools and methodologies for collection and compilation of information and statistics on inland fisheries.	0%
4. Establishment of the tools and methodologies for collection and compilation of information and statistics on inland fisheries in Southeast Asian Region.	0%

3.2.6 Evaluation of program activities in 2011 – Activity 2

Tools and methodology that will be used in the project Activity 2 for collection and compilation of information and statistics of inland fisheries were discussed. It is planned that further discussion for development of tools and methods for collecting inland fisheries statistics will be made in early 2012 through the organization of the special meeting.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Improve information gathering system to support the improvement of IUU-fishing countermeasures in Southeast Asia	Jan - Dec	<p>Organization of the regional meeting for updating/sharing information on IUU-fishing countermeasures among Member Countries, SEAFDEC, and other relevant agencies.</p> <p>Organization of the regional technical meetings to monitor the progress of work implementing by the project and by the national programs related to IUU-fishing.</p> <p>Conduct research activity to facilitate development of a practical model for better understanding of the impact from IUU-fishing.</p> <p>Organization of the training program to enhance capability of the Member Countries to improve quality of data.</p>

		<p>Carry out pilot activity for improvement of fishing record onboard fishing vessels and at landing sites (based on the ad-hoc working group meeting outputs).</p> <p>Organization of regional training program for building capacity of the fisheries officials of the Member Countries to translate national research work into policy recommendations.</p> <p>Collect and compile information based on SEAFDEC and other initiatives in order to come up with the information package to facilitate future development of good practice to improve information collection to combat IUU-fishing.</p> <p>Conduct feasibility study on validating the common data set of fishing record to improve information collection for combating IUU-fishing.</p>
<p>2. Improve information gathering on small-scale coastal and inland fisheries towards sustainable fisheries development in the Southeast Asian Region</p>	<p>To be decided</p>	<p>Organization of the national workshop to improve tool and methodology for collection and compilation of information and statistics on inland fisheries in Cambodia.</p> <p>Study the tools and methodologies for collection and compilation of information and statistic on inland fisheries in Lao PDR.</p> <p>Organization of the special meeting with fisheries officials in Lao PDR to improve tool and methodology for collection and compilation of information and statistics on inland fisheries, and summarized the national workshop.</p> <p>Organization of the national workshop to improve tool and methodology for collection and compilation of information and statistics on inland fisheries in Lao PDR.</p>
<p>3. Improve information gathering on tuna catch data of SEAFDEC Member Countries and support the improvement of IUU-fishing countermeasures for tuna fisheries</p>	<p>Jan - Dec</p>	<p>Organization of the ad-hoc working group meeting for harmonization of common data set for tuna catches data/information collection.</p> <p>Information collection of materials and documents related to IUU-fishing in tuna fisheries.</p> <p>Organization of on-site training on accuracy of data at tuna cannery.</p> <p>Organization of the 2nd Special Meeting on Tuna.</p> <p>Support participation of SEAFDEC staff to relevant meetings for sharing information with other relevant initiatives.</p> <p>Develop and maintain regional tuna fisheries statistics/database.</p>

4.2 Expected Outcomes in the Year 2012

Activity 1: it is envisaged that national countermeasures related to IUU-fishing will be regionally synthesized through the organization of regional meeting(s). During the regional meeting that will be organized by the project, pilot study or information on the good practice in combatting IUU-fishing would also be obtained. After the regional meeting, it is planned that the training program for improvement of fishing record that identified during the regional meeting or by other follow-up meeting with the countries can be started. Other activity will also be implemented with the aim to enhance capacity of the countries to reduce IUU-fishing in their respective countries.

Activity 2: it is envisaged that appropriate tools and method for collecting inland fisheries information/statistics will be identified at the national workshop in Cambodia and Lao PDR. And follow-up activities in the two countries for testing the tools and methods will be carried out.

Activity 3: it is planned that various capacity building program to improve at sea, landing sites, and canneries of tuna information collection will be carried out in the year 2012. It is also planned that the existing tuna database developed by TD will be transferred to be maintained by the project in the year 2013.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Deep-sea Fisheries Resources Exploration in the Southeast Asian Waters
Lead Department:	Training Department
Lead Country:	Thailand
Total Duration:	2008-2012

1. INTRODUCTION

Due to the trend of depletion of the inshore/costal fisheries resources in the Southeast Asian Countries in conjunction with the fuel crisis that make many fishers suffering, some fishers have to stop their operations and change to other business. In other hand this automatically reduces the fishing capacity in the sense, goes in line with national fishery policies in many countries. However, this trend of depletion may reduce the supply of seafood materials to many fish processing industries in the region and will also reduce the food supply to the global market in the near future. In the point of view of fishery policy maker or government, searching of new fishing ground is one of the important research works under the national program and to important this research work it is very much needs to get fully support in both funding and capacity building from government.

Considering the geographic features in the SEA waters, more than 50% of the sea areas are identified as deep-sea whereas utilization of those resources have not been initiated yet. This is due to the insufficient information on the species composition and how potential of the resources. In addition, it is clear that research vessels for deep-sea survey seem to be one of the main factors that many countries in the region are facing with. There are not many research scientific instruments, type of fishing gears for fish samplings, and expertise. To encourage members to initiate the deep-sea resources exploration, therefore, modification of sampling gears for those research vessels is essential.

In the point of view of the international concerns on the ecosystem approach for the deep-sea fisheries, to provide better understanding of the Member Countries on the deep-sea issues in the international forum therefore exploration of the deep-sea resources through this program are needed for further consideration and sustainable management.

2. PROGRAM

2.1 Objectives

The objectives of this project are to:

- 1) Provide technical support of exploration of deep-sea resources in the Southeast Asian waters by using M.V. SEAFDEC 2 to Member Countries and/or by other research vessels in collaboration with the Member Countries;
- 2) Increase number and capacity of researcher in Member Countries to explore deep-sea living resources and study impact of fishing activity to deep-sea ecosystem.

2.2 Program Description

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 Para 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 has provided technical support to the MCs in exploring the new fishing grounds in their respective EEZ waters, and enhances knowledge and understanding of deep-sea fishery resources.

SEAFDEC has supported exploration of fishery/living resources in the deep-sea waters of the Southeast Asia through various programs in close collaboration with its Member Countries. The

overall aims of this program are: to explore ways to collect the information on the deep-sea fishery resources in the Southeast Asian waters including the support on actual survey using SEAFDEC's research vessels or national research vessels; to encourage SEAFDEC Member Countries to explore deep-sea fishery resources; and to build human resources capacity on deep-sea fishery resources exploration.

As far as ecosystem-based approach for fisheries management is concern, there is a need to know the impact of fishing to deep-sea ecosystem. This program of activity also provides opportunity to scientists from SEAFDEC Member Countries for better understanding of knowledge on impact of fishing on deep-sea ecosystem (particularly on the seabed) and also to share their experience related to deep-sea fishery resources exploration.

Various regional activities (including series of Experts consultation meetings, on-the-job training, and information dissemination on the deep-sea resources exploration in the Southeast Asian waters) have been conducted to gather deep-sea scientist and fishery researchers to discuss on the topic focusing on the deep-sea considering *Vulnerable Marine Ecosystems* of the ocean. In addition, this project also provides a platform for regional important discussion on the issue related to the deep-sea fisheries resources of the region.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1.Meeting and seminar	Dec	Organization of the Expert meeting on deep-sea exploration.
2. Development/Improvement of sampling gear and exploration methodology	June- Oct	1) Improve the durability of sampling gear (beam trawl and IKMT); 2) Information collection on the design and technique of sampling gears such as gillnet that more friendly with the environment than bottom trawl.
3.Supporting deep-sea fisheries resource survey	July	1) Support technical staffs of SEAFDEC/TD to join the fisheries resources survey in Brunei water 3-28 July 2011 (25 days); 2) Technical support to technical officials of Department of Fisheries – Brunei Darussalam on sampling gears, survey equipments, and some of data analysis, etc. during the resources survey; and 3) Organization of technical discussion on the National Fisheries Resources Survey in Brunei Water during 23-24 July 2011, at Fisheries Department Brunei Darussalam, Brunei. This activity was carried out to strengthen technical cooperation between SEAFDEC and Fisheries Department Brunei Darussalam on fisheries resources survey (un-trawlable grounds, deep-sea fishery resources, pelagic resources, etc.) and explore ways to assist DOF Brunei in building their capacity for M.V. SEAFDEC 2 Cruise survey data analyzing .
4. HRD programs on deep-sea fisheries resources exploration	July	1) Organization of the On-Site Training on Identification of Deep-Sea Fishes, 18-21 Jul 2011, at SEAFDEC/MFRDMD, Malaysia. There are sixteen Malaysia fishery biologists participated in the training. Fish specimens from deep-sea fisheries resources survey carried out in Sabah-Sarawak water in 2010

		<p>that preserved in the South China Sea depository room of MFRDMD were confirmed their species identification by resource persons; and</p> <p>2) Organization of the Training Workshop on Identification of Deep-sea Benthic Macroinvertebrate Vulnerable to Fishing Gear, 11-15 July 2011, at SEAFDEC/TD, Samut Prakan, Thailand. Seven participant, nine observers and six resource person participated in the training.</p>
5. Information dissemination	Jan-Dec	<p>1) The article entitled “Deep-sea Resource Exploration: Challenges of the Southeast Asian Countries” was publish in the SEAFDEC Magazine Fish for the People, Vol.9, No.2.;</p> <p>2) Updated project website http://map.seafdec.org/DeepSea/;</p> <p>3) Publication of the reports of the On-Site Training on Identification of Deep-Sea Fishes;</p> <p>4) Publication of the reports of the Training Workshop on Identification of Deep-sea Benthic Macroinvertebrate Vulnerable to Fishing Gear;</p> <p>5) Publication of expert meeting; and</p> <p>6) Publish fish larvae identification guide book.</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Exploration of new fishing ground in deep-sea areas and investigation on impact of fishing activities to the deep-sea ecosystem</p>
<p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> • Significant depletion of inshore/coastal fisheries resources in the Southeast Asian Countries; • Approximately 50% of sea area in the region was identified as deep-sea waters, whereas utilization of fisheries resources in the deep-sea area is not utilized; • Insufficient information on the potential of resources in the deep-sea area; and • Insufficient information on the impact of fishing activity to the deep-sea environment.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Information available for potential fishery resources in deep-sea areas in the Southeast Asian region; • Information available on the impact of fishing activity to the deep-sea ecosystem; and • A set of recommendations for the medium- and long-term development and management plan of activities for utilization of fishery resources in the deep-sea in the Southeast Asian region.
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3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Data and information collection on the deep-sea and impact from fishing to ecosystem</p> <ul style="list-style-type: none"> • Fisheries resources exploration in the deep-sea areas in the Southeast Asian region • Conduct/support deep-sea fisheries resources exploration by using M.V. SEAFDEC 2 and other national research vessels • Organization of training/workshop on the exploration methodology for the deep-sea fishery resources • Study on impact of fishing activity to the deep-sea ecosystem
<p>Step 2: Data analysis and sharing experience among deep-sea researchers/scientist.</p> <ul style="list-style-type: none"> • Data analysis on the potential deep-sea fishery resources as output from Step1; and • Organization of the workshop on exploration methodology for the deep-sea fishery resources.

<p>Step 3: Information dissemination and establishment of the regional network on the deep-sea fishery</p> <ul style="list-style-type: none"> • Establish a regional network on deep-sea fishery; • Develop and formulate a set of policy recommendations for management plan at national and regional levels for utilization of the deep-sea fishery resources in the Southeast Asian region; and • Disseminate, sharing, and exchange information collected from the project's initiatives with the SEAFDEC Member Countries and other relevant organization/initiatives.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1~3
(2) Project duration: 2008-2012
<p>(3) Main activities:</p> <ul style="list-style-type: none"> • Support deep-sea fishery resources survey; • Research and Development on fishery resources exploration in the deep-sea areas in the Southeast Asian region; • Study on the impact of fishery to deep-sea ecosystem; • Training/workshop on the exploration methodology for the deep-sea fisheries resources; and • Information dissemination.

3.2.5 Progress and achievements of the current program:

<p>(1) Main activities conducted in the current program</p> <ul style="list-style-type: none"> • Support deep-sea fishery resources survey by using M.V. SEAFDEC 2, M.V. SEAFDEC, M.V. DA-BFAR, etc. • Research and Development on fishery resources exploration in the deep-sea areas in the Southeast Asian region <ul style="list-style-type: none"> - Design and construct deep-sea sampling gear and improvement of their sampling techniques. - Carry out deep-sea resource survey using the developed deep-sea sampling gears in collaboration with the Member Countries. • Study on the impact of fishery to deep-sea ecosystem <ul style="list-style-type: none"> - Information collection on the impact of the fishing through expert consultation and review of references/documents. - Publication on the review work on deep-sea resource survey in the Southeast Asian region. - Publication on the review work on taxonomy of deep-sea fish in the Southeast Asian region. • Training/workshop on the exploration methodology for the deep-sea fisheries resources <ul style="list-style-type: none"> - Organization of Shipboard training on deep sea exploration, R.V. DA BFAR, Philippines. - Organization of on the job training on collection, preservation and digital imaging technique for deep-sea fish, Brunei Darussalam. - Organization of the training workshop on identification of deep-sea fish, SEAFDEC/TD - Organization of on-site training on technique for preparation of deep sea fish pictorial book, Brunei Darussalam. - Organization of the training on research methodologies for study on impact of fishing on deep-sea ecosystem, Brunei Darussalam. - Organization of the training/workshop on identification of deep-sea benthic macro-invertebrate vulnerable to fishing gear, SEAFDEC/TD. - Organization of on-site training on identification of deep-sea fish, Malaysia. • Information dissemination <ul style="list-style-type: none"> - Disseminate information collected from survey of deep-sea fishery resources to Member Countries and other relevant initiatives. - Sharing and exchange knowledge with experts and scientists on deep-sea fishery resource and impact of fishing on deep-sea ecosystem through various communications/meetings as well as project website: http://map.seafdec.org/DeepSea/. • Assisting Member Countries in data analysis for their information/data collected by the collaborative cruise survey in their EEZ during the past years.
<p>(2) Main achievements till the end of 2011</p> <ul style="list-style-type: none"> • Data collection on potential deep-sea fishery resources through actual survey by M.V. SEAFDEC 2 and other research vessels. • A series of reports on the regional event organized by the current project.

<ul style="list-style-type: none"> • Publication on Standard Operational Procedure for deep-sea resource sampling gear. • A set of information on deep-sea fish resources (specimens, guidebook, posters, leaflet, CDs, Web site, etc.). • A set of recommendations for future development of deep-sea fishery. • Developed and improved deep-sea sampling gears in collaboration with experts in Member Countries. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
1. Support deep-sea fishery resources survey	80%
2. Research and development on fishery resources exploration in the deep-sea areas in the Southeast Asian region	80%
3. Study on impact of fishing activity to deep-sea ecosystem	80%
4. Training/workshop on the exploration methodology for the deep-sea fishery resources	80%
5. Information dissemination	80%

3.2.6 Evaluation of program activities in 2011

Technical support to the Member Countries on deep-sea fisheries resources was completely implemented in the EEZ of Brunei Darussalam. However, the survey in the deep-sea area of zone 4 was cancelled. The technical supports are also included the meeting for discussion on the national fisheries resource survey in Brunei water. The meeting results suggested that Brunei still need SEAFDEC technical support on various fields of fishery including impact assessment, fishing gear survey, marine ecosystem study, fishing gear selectivity and red tide monitoring.

For the training activity on the identification of deep-sea benthic macro-invertebrate vulnerable to fishing gear, participants included not only the Member Countries with the full support from project, but some countries sent additional participants using their own budget. This implies that the countries aware of the training course content that could support future development and management of the deep-sea fishery in their respective countries. Training materials and manuals related to deep-sea fishery resource exploration that used for the project implementation are available at the project website with the download services.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

The project will be implemented through the following activities:

Activity 1: Meeting and seminar

No activity in year 2012

Activity 2: Development/Improvement of sampling gear and exploration methodology

Result from the “Expert Meeting on Deep-Sea Fishing and Its Impact on Ecosystem” organized during 31 August to 2 September 2010 suggested that SEAFDEC should consider testing the sampling gear’s design and technique that more friendly with the environment than bottom trawl such as mid-water trawl, gill net and bottom vertical longline. There are also suggestions to support Member Countries to conduct Bathymetric mapping which could provide information of Vulnerable Marine Ecosystems area.

Therefore, in the year 2012, the project will study the possibility to use those fishing gear. The activity is including conduct the sea trial using research vessel of SEAFDEC or other national research vessels. The mapping survey tool such as Side Scanning Sonar, Remotely Operated Underwater Vehicle and/or Drop Camera System for faster and more efficient detection of Vulnerable Marine Ecosystems area will also be investigated.

Activity 3: Supporting deep-sea fisheries resource survey

The project will continue support the deep-sea fisheries resources survey in the EEZ of the Member Countries based on the request. The survey may be under cost sharing policy by utilizing M.V. SEAFDEC 2 or by countries initiative by using their national research vessel namely M.V. DA-BFAR, R.V. Chulaphorn, R.V.Chakthong, etc.

Activity 4: HRD programs on deep-sea fisheries resources exploration

HRD program and activities will be carried out to assist MCs base on the research activities and needs of the countries. The program will also include capacity building for young staffs of TD.

Activity 5: Information dissemination

Major outputs and outcomes from the project implementation will be disseminated and share with the MCs and other relevant initiatives, to be used as the regional and national reference and also used as the regional and national reference and also used as the handbook for deep-sea resources exploration.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Meeting and seminar		No activity
2. Development/Improvement of sampling gear and exploration methodology	Jan-Jun	2.1 Design and construction of sampling gear such as deep-sea gillnet and longline and mapping tool 2.2 Sea trial on the performance of the sampling gear and mapping tool
3. Supporting deep-sea fisheries resource survey	Mar-June	3.1 Technical consultation meeting/visit 3.2 Support technical staff to join the survey with MCs
4. HRD programs on deep-sea fisheries resources exploration	Apr-May	4.1 In-house workshop on habitat mapping 4.2 Regional training workshop on habitat mapping
5. Information dissemination	Jan-Dec	5.1 Produce the publications and reports of the events organized/carried out by the project 5.2 Update scientific information obtained from the project implementation and other relevant technical knowledge related to deep-sea exploration, through project website.

4.2 Expected Outcomes in the Year 2012

<ul style="list-style-type: none"> • Deep-sea resources exploration in the Member Countries will be supported by SEAFDEC TD in terms of technical knowledge on sampling gears and equipments for the survey, joint supporting for the actual survey, technical visit to discuss and explore the potential deep-sea fishing area with the MCs; • Continuation of the technical information gathering to built awareness on the impact of fisheries to the deep-sea ecosystem to the Member Countries; review and updates available information related to the tropical deep-sea; sharing experiences with others relevant agencies and others programs/initiatives related to deep-sea exploration in the Southeast Asian waters; • Enhance human resource capacity through various HRD program of activities; including on-the-job training on: <ul style="list-style-type: none"> - Deep-sea habitat mapping, - Data analysis during the survey, and - Deep-sea living organisms species identification during the survey; • Dissemination of information collected throughout the project implementation.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Development of Regional Database for Fisheries Management
Lead Department:	Training Department, in collaboration with SEAFDEC Secretariat
Lead Country:	Thailand
Total Duration:	2008-2012

1. INTRODUCTION

To make efficiently use of the regional databases, especially for the SEAFDEC Member Countries (MCs), standardization of the data and information of national fisheries data input are needed. Appropriate fisheries database system can then facilitate and generate reporting process. TD has initiated and developed the regional database and its system for and based on: (i) fisheries statistical bulletin for the South China Sea; and (ii) the new harmonized framework and format of fisheries data reporting with FAO on Fisheries Statistics for Southeast Asia. For the later one, TD has provided service on data input to the database system based on the data submitted from participating countries since 2008. Recently, TD also assists MFRDMD in developing the database system for the tagging program for economically important pelagic species in the Southeast China Sea and Andaman Sea.

2. PROGRAM

2.1 Objectives

- 1) Maintain/improve the regional database services in order to support data analysis of the tagging other relevant programs; and
- 2) Enhance human capacity of the Member Countries on the use of Regional Fishery Statistics and databases particularly for the less developed countries.

2.2 Program Description

Activity will be implemented in line with the Resolution (RES) and Plan of Action (POA) on Sustainable Fisheries for Food Security for the ASEAN Regional Towards 2020, as referred to RES Para 10 “*Strengthen knowledge/science-based development and management of fisheries through enhancing the national capacity in the collection and sharing of fisheries data and information*”; in POA Para 3 “*Strengthen national statistical mechanisms for fisheries and aquaculture and the exchange of statistical data and related information. Include other non-routine data and information such as fish consumption surveys as well as mobilising local and indigenous knowledge with the aim of improving the valuation of fisheries and monitoring their performance...*”; POA Para 4 “*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 standardised definitions and classifications for statistical data to facilitate regional compilation, analysis and data exchange*”; POA Para 5 “*Coordinate, decentralize and enhance the sharing of relevant statistics and information of fisheries related statistical data and information between the national fisheries and other authorities including those responsible for food security, environment, trade, aquaculture, water resources, agriculture/forestry, wetlands, migration/employment and rural development*”.

Program of activities implementing under this project includes maintain and improvement of regional fisheries statistics for Southeast Asia including previous and new statistical framework. Various human resource capacity building programs (e.g. the use of stand-alone database software for management of fishery data and information collected at landing sites) for the database developer of the member countries are also included under this project. The project also provides server and the system of regional database for supporting sustainable development and management of fisheries in the region.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2012

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. Development of Regional Database	Jan – Dec	1) Maintain/improve regional fishery statistics database. Fishery statistic data of year 2009 except data from Brunei Darussalam are already input to the database. 2) Maintain/improve regional tagging database. 3) Web base map information of results from the cruise surveys carried out by M.V. SEAFDEC (http://map.seafdec.org/cftd/mv_seafdec/index.php) and M.V. SEAFDEC 2 (http://map.seafdec.org/cftd/survey_mv2/mvseafdec_2.php). Currently, information of 37 cruises of M.V. SEAFDEC and 36 cruises of M.V. SEAFDEC 2 are available on line.
2. Building the Human Resources Capacity on utilization of Database	Nov (tentative)	Organization of the human capacity building program for Brunei Darussalam to install and test application of “Fish landing data system” in their routine data collection scheduled in November 2011.
3. Information Dissemination	Jan – Dec	Dissemination of information package related to database through participation of staff at relevant meetings.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Information collection for sustainable fisheries in the South China Sea and Andaman Sea
(2) Issues in the region at the beginning of the study: <ul style="list-style-type: none"> • Lacking of regional program/activity related to fishery statistics and database for management of fishery resources in South China Sea and Andaman Sea; • Insufficient information and poor data for pelagic fishery resources management in South China Sea and Andaman Sea; • Fishery statistics, including information/data collection, data analysis and dissemination required improvement; and • Insufficient human resources capacity at national level in using fishery information and database for sustainable fishery management, particular to less developed countries in the region.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • Improvement/establishment of the database system of Fisheries Statistics for Member Countries; • Improvement of regional and national fishery statistics, particularly in less-developed ASEAN countries (Cambodia, Lao PDR., Myanmar, and Vietnam: CLMV countries); and • Enhance human/institutional capacity in using fishery information and database for sustainable fishery management, particularly in CLMV countries.

3.2.3 (Act.1) “Steps” toward achieving final goals:

<p>Step 1: Capacity building for human and institutional resources for sustainable management of fishery resources in South China Sea and Andaman Sea, focusing on fishing information system</p> <ul style="list-style-type: none"> • Develop/promote the regional database on fishery resources in South China Sea and Andaman Sea using data collected from actual surveys, fish landing site, and review on available information; • Develop/improve national and regional fishery statistics and its system in the Southeast Asian region to support less-developed countries on the use of fishery statistical database; • Enhance human/institutional capacity in using of the regional database for sustainable fishery management through various programs/activities; and • Strengthen collaboration and coordination with other relevant initiatives to avoid duplication of program/activity.
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<p>Step 2: Develop and maintain: (i) fishery resources database to support data analysis for tagging and other relevant programs/activities; (ii) fishing ground information and its system for pelagic resources in the Southeast Asian region</p> <ul style="list-style-type: none"> • Provide support to develop/maintain fishery resources database for SEAFDEC relevant initiatives; • Maintain system of the fishing ground information on pelagic fishery resources in the Southeast Asia;
<p>Step 3: Information dissemination and continue promotion on the use of regional/national database for sustainable fishery management in South China Sea and Andaman Sea</p> <ul style="list-style-type: none"> • Provide online database service to support the less-developed countries in the region in order to improve their fishery resources.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 2 and 3
(2) Project duration: 2008-2012
<p>(3) Main activities:</p> <ul style="list-style-type: none"> • Develop and maintain regional database; • Build human resources capacity for utilization of the database; • Collaboration with other relevant initiatives, organizations, and partners; and • Information dissemination.

3.2.5 Progress and achievements of the current program:

<p>(1) Main activities conducted in the current program</p> <ul style="list-style-type: none"> • Develop and maintain regional database <ul style="list-style-type: none"> - Hired an assistance database administrator - Setup internet system for database service • Build human resources capacity for utilization of the database <ul style="list-style-type: none"> - Organization of the onsite training on the use of database for pelagic resources to analyze fish landing data for fishery officers of Cambodia, 16-20 Feb 2009 - Organization of the onsite training on the use of database for pelagic resources, Brunei Darussalam, November 2010 - Organization of the human capacity building program for Brunei to install and test application of “Fish landing data system” in their routine data collection scheduled in November 2011 • Collaboration with (i) relevant initiatives, organizations and partners, (ii) tagging program of MFRDMD <ul style="list-style-type: none"> - Assist and support regional fishery statistic project of the SEAFDEC Secretariat • Information dissemination • Distribution of the media for database exchange and promotion of the work/output from this program 									
<p>(2) Main achievements till the end of 2011</p> <ul style="list-style-type: none"> • Development of the regional fishery statistics – a new framework – streamlining SEAFDEC and FAO fishery statistics • Human capacity building on the use of fishery database for fishery resources management in less developed countries in the region • Information exchange mechanism established among SEAFDEC and other relevant initiatives on improvement of fishery statistics/database • Distribution of the stand-alone database software for analysis of pelagic fish catch landing 									
<p>(3) Outcomes during the program period and expected achievement rate till the end of 2011</p> <table border="1"> <thead> <tr> <th>Expected outcome</th> <th>Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td>1. Database development</td> <td>60%</td> </tr> <tr> <td>2. Enhance human capacity on utilization of the fishery database</td> <td>60%</td> </tr> <tr> <td>3. Information dissemination</td> <td>60%</td> </tr> </tbody> </table>		Expected outcome	Achievement rate (%)	1. Database development	60%	2. Enhance human capacity on utilization of the fishery database	60%	3. Information dissemination	60%
Expected outcome	Achievement rate (%)								
1. Database development	60%								
2. Enhance human capacity on utilization of the fishery database	60%								
3. Information dissemination	60%								

3.2.6 Evaluation of program activities in 2011

Regarding the Fisheries Statistic for Southeast Asia, data of year 2009 excluding data from Brunei were already input into the existing database system. The development of the regional database for tagging program of pelagic fisheries resources was completed. MCs coordinators of the project are able to input/update/query data online. In 2011, online database service will be improved to be more users' friendly environment. It is envisaged that the use of online fisheries statistics will be more widely used in supporting planning and management of fisheries in the Member Countries. Web-based map information of results from the cruise surveys carried out previously by M.V. SEAFDEC and M.V. SEAFDEC 2 were developed, and available at http://map.seafdec.org/cftd/mv_seafdec/index.php and at http://map.seafdec.org/cftd/survey_mv2/mvseafdec_2.php. Currently, information of 37 cruises of M.V. SEAFDEC and 36 cruises of M.V. SEAFDEC 2 are available on line.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

Activity 1: Develop and Maintain Regional Databases

The project will continue to improve the databases that were initiated by SEAFDEC. The activity also includes the support on improvement of the database of tagging program on economically important pelagic species and development of database for vessels registration/licensing program (implementing by MFRDMD and for the data collected on research survey by M.V. SEAFDEC and M.V. SEAFDEC 2.

Activities 2: Build Human Resources Capacity for Utilization of the Databases

With the aim to utilize the fishery statistics and database, the continued support to the less developed countries in the region in terms of human resources capacity building will be conducted. Main activity under this category includes capacity building program to support the regional fishery statistics and databases for economically important pelagic species. In addition, formulation and development of the national HRD program on the use of database will also be provided based upon the request from Member Countries. Information package (*i.e.* promotion of the database software, guidelines, handbooks, etc) will be continued to develop in order to support the Member Countries on the use of fishery databases and information system.

Activity 3: Information Dissemination

The developed fisheries databases, information system/services will be provided to the Member Countries through various ways, such as internet online services, information/training packages, brochures, booklets, CDs/DVDs, participation of the staff to the meeting/event organized by other relevant initiatives.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Development of Regional Database	Jan – Dec	<ol style="list-style-type: none"> 1. Continue to maintain/improve regional fishery statistics database 2. Continue to maintain/improve regional tagging database 3. Maintain and improve Web base map information of results from the cruise surveys carried out by M.V. SEAFDEC and M.V. SEAFDEC 2
2. Building the Human Resources Capacity on utilization of Database	Apr – May	Organization of the human resources capacity building program as requested (tentatively in Brunei to monitor the fish landing system that Brunei Darussalam would like to test this application in their routine data collection.)
3. Information Dissemination	Jan – Dec	Dissemination of information obtained from the project implementation through SEAFDEC Website, CDs, media, etc.

4.2 Expected Outcomes in the Year 2012

The national fisheries statistics data from the Member Countries in the year 2010 will be completely input by the first half of the year 2012. However, it should be noted that the completion of the database input is in according to the data submission from the Participating Countries. For small pelagic tagging database, the project will provide technical advice to the project based upon the request from SEAFDEC/MFRDMD. The project activity also includes updating web-based map information of results from the cruise surveys carried out by M.V. SEAFDEC and M.V. SEAFDEC 2.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Promotion of Rights-based Fisheries and Co-management towards Institutional Building and Participatory Mechanism for Coastal Fisheries Management
Lead Department:	Training Department
Lead Country:	All Member Countries
Total Duration:	2008-2012
Proposed Budget:	USD 177,795

1. INTRODUCTION

There are a number of small scale fisheries in the Southeast Asia, the most of small scale fisheries are facing a problem on conflict over multiple resource use and livelihood of coastal communities have been further threatened by illegal fishing. 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. The project purpose is to promote co-management and rights-based fisheries for coastal fisheries management in the Southeast Asian region. Two strategies are institutional building and participatory mechanism taken an emphasis to encourage the program implementation. The institutional building is to gather all stakeholders to construct an enabling environment of sharing power, responsibility and function for fisheries management. All stakeholders exercise participating in decision-making process to formulate and regulate function, responsibility and authority for fisheries management through training workshop. The knowledge gained from the training workshop will be useful to stakeholders to apply the concept of co-management and rights-based fisheries which relies on their national fisheries legal framework to promote coastal fisheries management. Other strategy is participatory mechanism of co-management highlighted to promote the regional guidelines on the use of indicators for the sustainable development and management of capture fisheries in Southeast Asia. The appropriate participatory mechanism of co-management fosters interested parties participate in making decision process to either select best available information or adapt policies and management framework to obtain more responsible and sustainable future condition of fisheries resources.

2. PROGRAM

2.1 Objectives

The objectives are to:

- 1) To promote the applicable practice of rights-based fisheries and co-management towards institutional building of stakeholders for coastal fisheries management;
- 2) To introduce the appropriate participatory mechanism of co-management to foster the use of indicator for coastal fisheries management; and
- 3) To overview feasibility on traditional small-scale fisheries, community information and scientific database to formulate a proper action plan and best fitted activities for sustainability of small-scale fisheries and livelihood in fisheries.

2.2 Program Description

Both coastal and inland fisheries resource management is recognized an importance of local users' participation in decision-making process to define solutions in conjunction with issues. Co-management in fisheries and right-based fisheries is innovative practice to strengthen and improve local users' participation enabling coordinated with local government officials for managing fisheries resources in coastal and inland fisheries sector. To promote and support local user coordinating with local government official, SEAFDEC has taken a responsibility to build up and improve fisheries official as facilitator helping local user in managing fisheries resources. Capacity building activities, which are regional training and workshop, are key means to improve capacity of ASEAN fisheries official acknowledged the

concept and theoretical framework of co-management and right-based fisheries for fisheries resource management. Then, they are enable facilitating local users to organize and institute their either group or management body responsible for fisheries resources management.

The program of Promotion on supporting gender for entering into alternative livelihood and encourage microfinance service is one way of alternative opportunity to introducing and arranging to community fisheries, and conducted through training program. This program aims to develop traditional knowledge of women in community fisheries in modernization and sanitation for producing community products. The program will develop and strengthen women in community fisheries for both individual and organizational levels to strongly encourage local community business. Promotion and encourage microfinance services, based on execution needs and community's sound structure.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. Regional workshop on Promotion of strategic implementation of fisheries co-management and right-based fisheries for enhancing good governance in coastal and inland fisheries.	Dec.	To promote and introduce appropriate the applicable practice of rights-based fisheries and co-management towards institutional building of stakeholders for coastal fisheries management in Southeast Asian Region.
2. Development of alternative fishing activities for small-scale fisheries in Southeast Asia.	Jan.-Dec.	The result of literature review show that, 1) Improved incomes and livelihood security is a clear need for many resource-dependent fishing communities. 2) Income are declining and the natural resource base is becoming increasingly degraded.
2.1 Literature review on the status of small-scale fisheries in Southeast Asia	Jan.-Mar.	
2.2 Questionnaire design	Mar.	
2.3 Socio-economic survey in small-scale fisheries in Southeast Asia	May-Nov.	1) Conduct socio-economic survey in Thailand, Ban Mai Root Sub-District, Trat Province on 24-27 May, Ban Klong Kean Sub-District, Phangnga Province on 1-4 August, and Ban Thakachai Sub-District, Surattani Province on 5-7 August 2011. 2) Conduct socio-economic survey at Zambales Province, the Philippines on 30 Aug.-3 Sep. 2011. 3) Conduct socio-economic survey at Van Don District, Quang Ninh Province, Vietnam on 20-24 September 2011. 4) Conduct socio-economic survey at Marang District, Kuala Terengganu, Malaysia on 18-22 October 2011. 5) Conduct socio-economic survey at Phar Pon District, Ayarwaddy region, Myanmar on 25-29 October 2011. 6) Conduct socio-economic survey at Kaliburu, North Jakarta, Indonesia on 3-7

2.4 Data analysis	May-Nov.	November 2011. 7) Conduct socio-economic survey at Sihanoukville, Cambodia on 15-19 November 2011.
2.5 Publication	Dec.	The report will review the status of small-scale fisheries in Southeast Asia on problem, expectation, and attitude on climate change and adaptation, safety at sea, job opportunity, and IUU fishing.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Promotion of Right-based Fisheries through Co-management Approach for Fisheries Management in the Southeast Asian Region
(2) Issues in the region at the beginning of the study: It is well recognized that fisheries resources in many places of the world, particularly in our region where coastal fisheries resources are over-exploited and impact to local community and fisher livelihood. Then the co-management and rights-based fisheries for coastal fisheries management in the Southeast Asian region has been promoted to the region in order to achieve fisheries resources management by the local fishers. In the end of the year 2005, co-management using group user rights for small-scale were developed and distribution but it's quite new for the region and might be difficult to understand among fishers even through the fisheries officers and policy makers. The project aims to transfer the knowledge and skill on co-management concept and participatory approach on the areas of defining and sharing responsibility and function between local user-based management either body or organization and government-based agency to carry forward coastal fisheries management. In the year 2011, the project aims to understand the status of small-scale fisheries, to improving and sustaining the way of life of local people in Southeast Asia.

3.2.2 Expected final goals of the program:

<ol style="list-style-type: none"> 1) To promote and strengthen fisheries officers, policy makers and local users to comprehend the concept and recognize a good lesson and experience to apply an essence into coastal and inland fisheries for better and sustainable fisheries management and development. 2) To clarify the importance, objectives and application of fisheries co-management and right-based fisheries enabling secured means of livelihood and poverty alleviation to fisheries communities. 3) To facilitate participants sharing and exchanging experiences and views on coastal and inland fisheries for improving fisheries management. 4) The status of small-scale fisheries in Southeast Asia is well analyzed.
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3.2.3 “Steps” toward achieving final goals:

Step 1: To promote concept and application of co-management for coastal and inland fisheries management in the Southeast Asian Region
Step 2: To promote co-management approach as strategy to organize local institution and practice fisheries management in the Southeast Asian Region through discussing workshop
Step 3: To distribute a guidebook for promoting fisheries co-management and right-based fisheries approach for fisheries management in the Southeast Asian Region

3.2.4 Activities in the current program:

(1) Current position of the project: Step 1-3
(2) Project duration: 2008-2012
(3) Main activities The co-management and rights-based fisheries for fisheries management in the Southeast Asian region has been promoted to the region in order to achieve fisheries resources management by the local fishers. Therefore, this endeavour is to both shift role and customize their attitude of local fishers from resource users to be resource managers.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> Promotion of strategic implementation of fisheries co-management and right-based fisheries for enhancing good governance in coastal and inland fisheries management. Development of alternative fishing activities for small-scale fisheries in Southeast Asia. 	
(2) Main achievements till the end of 2011	
<ul style="list-style-type: none"> Fisheries official expertise in capture, aquaculture, biology comprehended an importance of fisheries co-management and right-based fisheries for managing fisheries resources. Nevertheless, they still need to know more on strategy and practice to select a best fitted way applying into their respective countries. Review and update on status and condition of small-scale fisheries in Southeast Asian Region. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011	
Expected outcome	Achievement rate (%)
<ul style="list-style-type: none"> Increase number of fisheries officials and fishers to recognize a strategic implementation of fisheries co-management and right-based fisheries to select and apply into fisheries resources management in their respective fisheries communities. 	60%
<ul style="list-style-type: none"> Increase number of fisheries officials and fishers to improve the practice of right-based fisheries and co-management for better fisheries management at all level concerned in ASEAN Member Countries 	80%
<ul style="list-style-type: none"> Increase number of fisheries officials and fishers to recognize fisheries co-management functioning in financial and economic activities managements for supporting gender entering into alternative livelihood. 	60%
<ul style="list-style-type: none"> Basic information and attitude on environment aspect of small-scale fisheries in Southeast Asia is well analyzed. 	80%
<ul style="list-style-type: none"> Skillful human resource capacity to encourage participatory mechanism of co-management for livelihood and well being as well as alleviating poverty. 	60%

3.2.6 Evaluation of program activities in 2011

Fisheries co-management and right-based fisheries are applicable approaches to fundamentally help reducing conflict among resource users to compete using common resources. Fisheries co-management is credible concept to provide an opportunity to user-based organization sharing and collaborating with government-based agencies to manage fisheries resources in both coastal and inland sectors. Meanwhile, right-based fisheries are vigorously recommended to promote in order to secure resource users particular small-scale fishers accessing the right to fish. In addition, right-based fisheries are reliable to apply into managing fishing capacity and efforts; consequently, fisheries resources are responsibly and sustainably utilized. This optimistic practice helps diminishing social conflict in competition of exploiting fisheries resources. Both coastal and inland fisheries management executed in ASEAN region has various type and strategy, which varies from country to country. Fundamental strategy is based upon local resource users participating in decision-making process to alleviate conflict of interest among them. Lesson-learn and experience is relevant to local resource users' participation in both coastal and inland fisheries are worth to analytically identify into strategic implementation and outcome in conjunction with social, economic, biological and environmental aspects. Moreover, local resource users' participation, which is traditionally and customarily carried out in fisheries management, is important factor to further apply into an improvement of fisheries co-management and right-based fisheries. An execution of fisheries co-management and right-based fisheries is anticipated at least reducing conflict of interest, securing both livelihood and well-being as well as alleviating poverty.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

Activity 1: Promotion of fisheries co-management functioning in supporting gender entering into alternative livelihood

Objective of this activity is to promote fisheries co-management optimistically functioned in financial and economic activities managements. Second objective is to clarify how fisheries co-management is effective enough to function in financial and economic activities management in order to secure accessible source of fund employing in alternative livelihood. The Regional workshop will be organized to recognize a principle and practice of fisheries co-management functioning in financial and economic activities management. Experience of either active or successful cases will be presented as an input for discussion. In addition, strategy and practice of this function will be made a linkage to promoting alternative livelihood to responsible fisheries officials and local user organization. Comment and recommendation gains from the workshop will synthesized and summarized as guidebook distributing to fisheries officials and local users both individual and organization. Moreover, an output of the workshop will be developed as additional subject of the region training course on co-management and right-based fisheries to enhance fisheries officials to suggest and consult with their responsible fisheries community to seek and employ in a proper alternative livelihood.

Activity 2: Promotion on supporting gender for entering into alternative livelihood and encourage microfinance services

Sub-Activity 1: Promotion on supporting gender for entering into alternative livelihood

This activity has two main objectives, to increase income and job opportunity particular outside fisheries sector to community fisheries, and reduced pressure on natural resources (reduced fishing effort, reduced demands of aquaculture on ecosystem services). There are 5 activities as follow:

- Group organization (three countries of Member Countries);
- Identification of applicable job opportunity;
- Study on practicability and economic feasibility;
- Training course; and
- Implementation.

Sub-Activity 2: Promotion and encourage microfinance services

The main objective of microfinance is managing risks and reducing economic and social vulnerability. There are 4 activities as follow:

- Formulation of the microfinance framework;
- Workshop on awareness building of readiness for participation;
- Microfinance practice; and
- Monitoring.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 1: Promotion of fisheries co-management functioning in supporting gender entering into alternative livelihood	October	The Regional workshop will be organized to recognize a principle and practice of fisheries co-management functioning in financial and economic activities management. Comment and recommendation gains from the workshop will synthesized and summarized as guidebook distributing to fisheries officials and local users both individual and organization.
Activity 2: Promotion on supporting gender for entering into alternative livelihood and encourage microfinance	Jan.-Dec.	

<p>services</p> <p>Sub-Activity 1: Promotion on supporting gender for entering into alternative livelihood.</p> <p>Sub-Activity 2: Promotion and encourage microfinance services.</p>		<p>This activity has two main objectives, to increase income and job opportunity particular outside fisheries sector to community fisheries, and reduced pressure on natural resources (reduced fishing effort, reduced demands of aquaculture on ecosystem services). There are 5 activities as follow:</p> <ul style="list-style-type: none"> • Group organization (three countries of member countries); • Identification of applicable job opportunity; • Study on practicability and economic feasibility; • Training course; and • Implementation. <p>The main objective of microfinance is managing risks and reducing economic and social vulnerability. There are 4 activities as follow:</p> <ul style="list-style-type: none"> • Formulation of the microfinance framework; • Workshop on awareness building of readiness for participation; • Microfinance practice; and • Monitoring.
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4.2 Expected Outcomes in the Year 2012

The strategy and practice of Promotion of fisheries co-management functioning in supporting gender entering into alternative livelihood program will be made a linkage to promoting alternative livelihood to responsible fisheries officials and local user organization. Based on the comment and recommendation gain from the workshop will synthesized and summarized as guidebook distributing to fisheries officials and local users both individual and organization of Member Countries. Moreover, an output of the workshop will be developed as additional subject of the region training course on co-management and right-based fisheries to enhance fisheries officials to suggest and consult with their responsible fisheries community to seek and employ in a proper alternative livelihood. Based on the status of small-scale fisheries and community need in Southeast Asia, the project will provide the capacity building on alternative livelihood and microfinance service. It is envisaged that this program will improving and sustaining way of life of local people in community fisheries and the increase of food security such in food supply, job opportunity and protection of the environment. Microfinance is needed by the households to increase their income from fisheries activities and other income-generating activities. It is required for social needs related to their quality of life and for smoothening consumption patterns, particularly during lean and off-seasons when little or no income or food is generated.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN- SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds for Resources Enhancement
Lead Department:	Training Department
Lead Country:	Thailand
Total Duration:	5 years (2010-2014)
Proposed Budget:	USD 70,400

1. INTRODUCTION

The quality of coastal and inshore ecosystems has 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. In many areas, the introduction of man-made structures, including artificial reefs, aquaculture facilities, breakwaters, stationary nets and jetties are shown to enhance local populations of aquatic organisms, provided that there are sufficient numbers of structures to have a significant and positive impact on ecosystem productivity and that they are integrated into coastal zone management regimes. These structures can enhance fisheries resources. To optimize the results of such initiatives, careful impact assessment and planning procedures are required.

Re-stocking may be an effective component in the enhancement of marine resources in inshore waters. Juveniles and seeds produced by hatcheries or collected from the wild in other areas are removed rapidly from the ecosystem by destructive fishing gears such as push nets or small-mesh trawl nets. Furthermore, in order to retain the released stocks within the immediate vicinity and minimize losses through out-migration, suitable habitat must be available to them. Therefore, habitat restoration and/or enhancement and establishment of exclusive fishing rights may be necessary prerequisites for any marine re-stocking exercises.

Natural refugia play a central role in the sustainability of fisheries. The existence of large-scale natural refuges for population of fished species contributes to the resilience of communities of commercially fished species to the effects of high fishing effort level. The identifying important spawning and nursing grounds of fisheries resources in the established of fisheries refugia could help improving management of fisheries.

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. Habitat creation and the establishment of artificial reefs, the use of fish attraction devices and predator removal all have potential in the region.

2. PROGRAM

2.1 Objectives

This Project titled “Rehabilitation of Fisheries Resources and Habitat/Fishing Grounds through 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 Program Description

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.

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.

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

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Briefly explain major achievements of projects and activities conducted in the year 2011. This section is inapplicable for the newly proposed program.

Activity Title	Duration
<p>Activity 1. Development on diagnoses of critical fishing grounds and evaluation by resources enhancement practices</p> <p>Sub-Activity 1.1: Investigation/review of the status of critical fishing grounds in the Southeast Asian region</p> <p>Investigation of the existing basic information and research works in identifying the critical fishing grounds as well as spawning and nursery grounds was conducted through deskwork and visiting to the Member Countries. The results of the gathered information would be processed and used for mapping and assessment by indices of the status of the critical fishing grounds in the region.</p>	Jan-Dec
<p>Sub-Activity 1.2: Information collection on suitable designs of resource enhancement practices including their evaluation and promotion</p> <p>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 were collected. Information collection was conducted through deskwork, visiting to Member Countries.</p>	Jan-Dec
<p>Sub-Activity 1.3: Workshop/Expert consultation on identification of critical fishing grounds and on regional habitat rehabilitation and management approach</p> <p>The workshops/expert consultative meeting is scheduled to be conducted during 11-13 October 2011. 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.</p>	Oct.

<p>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.</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>Sub-Activity 2.1: Technical assistance in a pilot site for suitable designs of resource enhancement practices</p> <p>A sequence of survey in the selected onsite study and evaluation on enhancement practices including artificial reefs impact to fisheries resources and environment has been being conducted in Rayong Province since 2010 (near Samet Island). Recently, the third survey study has been conducted during 8-12 August 2011. The survey study included fish species composition inspection by trammel net operations, giant trap operation (hauling and re-setup), juvenile fish trap operation and underwater video recording around the deployed artificial reefs which previously made by DoF of Thailand in 2009.</p> <p>Sub-Activity 2.2: Technical assistance in pilot sites for diagnoses of fishing grounds and evaluation of fishery ecosystem management</p> <p>A selected pilot site for the purpose of diagnosing fishing grounds and monitoring the achievements of rehabilitation program in sea grass beds in Krabi Province (Andaman Sea), Thailand was followed up in the second survey during 19-24 July 2011. Apart from the investigation on the fish species compositions by using juvenile fish traps and trammel net operations, seed releasing of dog conch was simultaneously made in the selected site. Two rearing cages were constructed and dog conchs were released in in order to study their survival rate and growth rate. Monitoring would be made every 3 months or as possible.</p> <p>Technical assistance in a pilot site for suitable designs of resource enhancement practices has been also extended to Lao PDR. Nam Houm Reservoir was selected as a site for a case study on the identification and evaluation of fisheries ecosystem in the fresh water ecosystem. The first survey was conducted during 25-29 April 2011 in collaboration with Department of Livestock and Fisheries, Lao PDR and the local fishermen. The survey included the investigation of the fish species compositions by gill net and trammels net operations, fish larvae collection, landing survey and discussion with the local fishermen and fisheries officers. Geographic survey was also initiated in order to assess and obtain the general information of the reservoir's profile.</p> <p>Sub-Activity 2.3: Capacity building on identification of critical fishing grounds and on regional habitat rehabilitation and management approach</p> <p>This sub-activity has the 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. This sub-activity is tentatively scheduled in Dec. 2011.</p>	<p>Mar, May, Sep</p> <p>Feb-Nov.</p> <p>Dec.</p>
<p>Activity 3. Promotion and extension on rehabilitation of fisheries resources and habitat/ fishing grounds in ASEAN Region</p> <p>Activity 3.1: Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness</p> <p>Information on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness as outputs from the workshop would be compiled and disseminated to Member Countries.</p>	<p>Jan-Dec.</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: 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 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 goals of the program:

<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 action plans 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.
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3.2.3 "Steps" toward achieving final goals:

<p>Step 1:</p> <ul style="list-style-type: none"> • Information survey & method validation. • Case study on selected site in Thailand and Lao PDR. • 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 case study analyses and preparation/submission of reports. • Guideline preparation /publication.

3.2.4 Activities in the current program:

<p>(1) Current position of the program: Step 2</p>
<p>(2) Program duration: 2010-2014)</p>
<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 program:

(1) Main activities conducted in the current program	
<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; and 10) Regional seminar for end of the project. 	
(2) Main achievements till the end of 2011 (tentative)	
<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; and 7) Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcomes	Achievement rate (%)
• To optimize the use of fishing ground through resource enhancement programs;	35 %
• To develop human resources for the implementation of resource enhancement programs.	35 %
• To develop a guideline for implementing resources enhancement program.	35 %
• To formulate strategies and actions plan in rehabilitating the selected critical fishing grounds.	30 %
• To enhance cooperation and collaboration among Member Countries to improve capacity building in rehabilitation of the critical fishing grounds.	40 %
• 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	35 %
• To develop a guideline for implementing resources enhancement program.	40 %

3.2.6 Evaluation of program activities in 2011

The program activities were conducted as proposed schedule. The out-come of the program activities are obtained as the proposed objectives.

4. PROPOSED ACTIVITIES FOR THE YEAR 2012

Planning for the project and activities (project/activity title and its short description) to be implemented as well as expected outcomes in the year 2012. In case that there are linkages among programs, the linkages and coordination mechanism among concerned programs should be provided.

4.1 Planning of the Project Activities

Project/Activity Title	Duration
<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</p> <p>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/model experiment.</p> <p><i>Sub-Activity 1.3:</i> Workshop/Expert consultation on resource enhancement practices</p> <p>This activity includes workshops as well as expert consultations to identify appropriate and effective resources enhancement tools for various fishery habitats. Implementation plans and actions would be also discussed.</p>	<p>May, Sep.</p> <p>Aug.</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</p> <p>The selected onsite study and evaluation on enhancement practices including artificial reefs impact to fisheries resources and environment will be continuously 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</p> <p>The selected pilot study site for the purpose of diagnosing fishing grounds and monitoring the achievements of rehabilitation program in sea grass beds in Krabi Province (Andaman Sea), Thailand will be monitored on the survival and growth rate of released dog conch seeds in the keeping cages as well as the investigation on fish species composition and other organisms.</p> <p>Case studies on the selected priority important fisheries ecosystem identified and evaluated in cooperation with Member Countries in Nam Houm Reservoir, Lao PDR will be continuously conducted including a case study by SEAFDEC on identification and evaluation of fisheries ecosystem.</p> <p><i>Sub-Activity 2.3:</i> Capacity building on rehabilitation practices of fisheries resources and habitats/fishing grounds</p> <p>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.</p>	<p>Mar., Jun., Sep.</p> <p>Feb. – Dec.</p> <p>Nov.</p>

<p>Activity 3. Promotion and extension on rehabilitation of fisheries resources and habitat/ fishing grounds in ASEAN Region</p> <p>Activity 3.1: Information dissemination on rehabilitation of fisheries resources and habitats/fishing grounds for public awareness</p> <p>Documentation of the best practices of the project implementation and gathered information will be carried out, which can be used as inputs in the preparation of IEC (information, education and communication) materials for dissemination to the Member Countries.</p>	<p>Jan. – Dec.</p>
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4.2 Expected Outcomes in the Year 2012

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| <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; and • To develop a guideline for implementing resources enhancement program. |
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PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN- SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Promotion of Fishing License, Boats Registration and Port State Measures
Lead Department:	TD and MFRDMD
Lead Country:	Malaysia
Total Duration:	2012 (2011- 2015)
Proposed Budget:	USD 107,000

1. INTRODUCTION

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. Fishing management schemes such as fishing license, boats registration, port state control, and Monitoring, Control and Surveillance (MCS) are recognized as effective measures to promote the sustainable use and the long-term conservation of marine living resources.

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 i) 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; ii) 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; iii) 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 iv) 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.

Therefore, the promotion on fishing license, boats registration and port state measures through MCS to combat IUU fishing should be in harmony with the structure of fisheries in the region. The experiences of countries in the region in the implementation activities to combat IUU fishing should be shared and learned in order to strengthen the regional efforts and network.

2. PROGRAM

2.1 Objectives

- 1) To promote fishing license, boats registration and port state measures to combat IUU fishing;
- 2) To develop regional guidelines on fishing license and boats registration in Southeast Asia;
- 3) To promote Member Countries management for sustainable fisheries in the region;
- 4) To develop regional guideline to prevent IUU fishing and its products from being exported; and
- 5) To assist the SEAFDEC Member Countries in application and implementation of IUU fishing related countermeasures.

2.2 Program Description

Based on the current situation and the above-mentioned concerns, SEAFDEC wishes to propose a technical program to support the Member Countries in promoting fishing license, boats registration and port state measures to combat IUU fishing. The proposal includes the following activities. i) Promotion of fishing license, boats registration and port state measures (Lead by TD); ii) Promotion of Monitoring, Control and Surveillance (MCS) in Southeast Asia (Lead by TD); and iii) Preventing export of IUU fishing product (Lead by MFRDMD).

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration
<p>Activity 1: Promotion of fishing license, boats registration and port state measures</p> <p>Sub-activity 1.1: Preparatory process of the project activities</p> <p><i>1.1.1 Literature reviews and documentary analysis</i> An intensified literature review and documentary analysis was conducted through a study of existing reports and documents on fishing license and boats registration including port state measures. This means to avoid duplication of works but to complement and enhance good coordination with projects being or had been implemented in the region.</p> <p><i>1.1.2 Regional/ international coordination and cooperation</i> Regional/international coordination and cooperation were enhanced through discussions and consultation with Indonesia and the lead departments will actively participate in meetings on IUU fishing.</p> <p><i>1.1.3 Identification and establishment of core expert groups</i> The identification of regional/international experts on fishing license, boats registration and port state measures was conducted in collaboration with Member Countries.</p> <p>Sub-activity 1.2: Development of regional guidelines on fishing license, boats registration and/or port state measures in Southeast Asia</p> <p><i>1.2.1 Regional core expert Meeting</i> A regional core expert meeting will be organized in October 2011 to discuss and develop draft regional guidelines through sharing and exchange of related information and experiences among the experts.</p> <p>Sub-activity 1.3: Production of information and promotional materials Information and promotional materials on fishing license, boat registration system and port state measures to combat IUU fishing were produced and disseminated to the SEAFDEC Member Countries and worldwide.</p>	<p>Jan-Dec 11</p> <p>Sep-Dec 11</p> <p>Jan-Dec 11</p> <p>4-7 Oct 11</p> <p>Sep-Dec 11</p>
<p>Activity 2: Promotion of Monitoring, Control and Surveillance (MCS) in Southeast Asia</p> <p>Sub-activity 2.1: Regional workshop on review and improvement of Monitoring, Control and Surveillance system (MCS) in Southeast Asia The regional workshop on MCS will be organized in December 2011. Review of MCS experience of each country will be carried out to identify the lessons that can be applied in the region including the promotion and share of information through coordination of regional activities that support the promotion of responsible fishing practices.</p> <p>Sub-activity 2.2: National training/ workshop on the promotion of Monitoring, Control and Surveillance system (MCS) to combat IUU fishing The national training and workshops in Thailand will be conducted for government staff, stakeholders and others sectors who were concerned in this issue.</p>	<p>Postpone to Feb.2012</p> <p>Postpone to 2012</p>

<p>Activity 3: Preventing export of IUU fishing products</p> <p>Sub-activity 3.1: Present status of export of fisheries products from SEAFDEC Member Countries</p> <p><i>3.1.1 Gathering information regarding export of fisheries products</i> For this activity, MFRDMD distributed questionnaires pertaining export of fisheries products from ASEAN Member Countries and the current export procedures and catch documentation to ASEAN Member Countries.</p> <p><i>3.1.2 A workshop for information gathering regarding export of fisheries products and recommendation on information required for development of regional guidelines</i> The workshop will be held in the fourth quarter of 2011. Representatives from all SEAFDEC Member Countries and resource persons will be invited to the workshop. The output from it will indicate trends and volumes of trades of fisheries products in SEAFDEC Member Countries and the current export procedures and documentations. The workshop will list information necessary for development of regional guidelines.</p>	<p>Jan-Sep 11</p> <p>4-7 Oct 11</p>
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3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Promotion of fishing license, boats registration and port state measures</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 fisheries resources and stocks; • The European Union (EU) adopted a regulation to prevent, deter and eliminate IUU fisheries on 29 September 2008 that impactson fisheries export products in the region; • Efforts to combat illegal, unreported and unregulated fishing should be built on the primary responsibility; and • Fishing license, boats registration and port state measures provide including Member Countries the powerful and cost-effective means of preventing, deterring and eliminating IUU fishing.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • A target group should have a common understanding of and be engaged in fishing license, boats registration and port state measures through Member Countries management to combat IUU fishing; • Regional guidelines on fishing license, boats registration and/or port state measure; • Regional guidelines to prevent IUU fishing and its products from being exported in Southeast Asia; and • Coordination and cooperation with Member Countries, other organizations/ institutions to adopt and implement measures to combat IUU fishing.
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3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Preparatory process and cooperation of the project activities</p> <ul style="list-style-type: none"> • Review and documentary analysis on fishing license, boat registration system and other related port state measures in the region <ul style="list-style-type: none"> - Collection of information regarding export of fisheries products from SEAFDEC Member Countries • Coordination and cooperation with Member Countries and regional/international organizations and institution • Identification and establishment of core expert group
<p>Step 2: Development of regional guidelines on fishing license, boats registration and/or port state measures and a regional guidelines to prevent IUU fishing and its products from being exported in Southeast Asia</p> <ul style="list-style-type: none"> • To develop draft regional guidelines on fishing license, boats registration and/or port state measures in Southeast Asia • To develop draft regional guidelines to prevent IUU fishing and its products from being exported
<p>Step 3: Promotion on activities of the project</p> <ul style="list-style-type: none"> • To organize a national workshop to promote fishing license, boats registration and port state measures/Member Countries management system;

<ul style="list-style-type: none"> • To promote the regional guideline to Member Countries; and • To produce information materials and disseminate to Member Countries.
Step 4: Evaluation of project implementation. <ul style="list-style-type: none"> • Coordination and cooperation with Member Countries to evaluate project implementation; and • To organize regional end of project evaluation workshop.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 1, 2 and 3
(2) Program duration: 2011-2015
(3) Main activities: <ul style="list-style-type: none"> • Regional experts meeting and workshop; • RTC workshop on fishing license and boat registration; • National training and workshop on related issues; • Production of information and promotion materials; and • Coordination and cooperation with Member Countries and regional/international organizations and institutions for project implementation.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program <ul style="list-style-type: none"> • Development of regional guidelines on fishing license and boats registration in Southeast Asia; • Development of regional guidelines to prevent IUU fishing and its products from being exported for Southeast Asia; • Coordination and cooperation with Member Countries and regional/international organizations and institutions to combat IUU fishing; • Promotion on fishing license, boats registration and port state measures including enhancement of awareness and common understanding of MCS management to combat IUU fishing among target group; • Assistance and advice to the SEAFDEC Member Countries in application and implementation of measures to combat IUU fishing; and • Development and implementation of the regional guideline to prevent IUU fishing and its products from being exported. 	
(2) Main achievements till the end of 2011 (tentative) <ul style="list-style-type: none"> • Coordination and cooperation with Member Countries and regional/international organizations and institutions to combat IUU fishing; • Identification of regional/international experts on fishing license, boats registration and PSMs; • The content of regional guideline on fishing license, boats registration and/or port state measures; • The recommendation and information to prepare a regional guideline to prevent IUU fishing and its products from being exported; and • A target group in some Member Countries had a common understanding on MCS management to combat IUU fishing. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcomes	Achievement rate (%)
<ul style="list-style-type: none"> • Development of regional guidelines on fishing license, boats registration and/or port state measures for Southeast Asia 	30%
<ul style="list-style-type: none"> • Development of regional guidelines to prevent IUU fishing and its products from being exported for Southeast Asia 	15%
<ul style="list-style-type: none"> • Coordination and cooperation with Member Countries and regional/international organizations and institutions to combat IUU fishing 	30%
<ul style="list-style-type: none"> • Promotion on fishing license, boats registration and port state measures including enhancement of awareness and common understanding of MCS management combat IUU fishing of target group 	10%
<ul style="list-style-type: none"> • Assistance and advice to the SEAFDEC Member Countries in application and implementation of measures to combat IUU fishing 	5%

3.2.6 Evaluation of program activities in 2011

- The review and documentary on fishing license, boat registration system and other related port state measures in the region was analyzed and prepared as a process of the project activities;
- The first draft of regional guidelines on fishing license and boats registration in Southeast Asia was developed and discussed;
- Cooperation/collaboration with member countries and other organizations/institutions was enhanced;
- Target groups commonly understood and are involved as voluntary groups in MCS to combat IUU fishing for sustainable fisheries in the region;
- Each country in the region has adopted and implemented activities to combat IUU fishing with assistance from SEAFDEC;
- Information gathering and sharing regarding export of fisheries products from SEAFDEC Member Countries; and
- Recommendation on information required for development of regional guideline to prevent IUU fishing and its products from being exported.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

Activity 1: Promotion of fishing license, boats registration and port state measures (Led by TD)

Sub-activity 1.1: Preparatory process of the project activities

1.1.1 Regional/international coordination and cooperation

Regional/international coordination and cooperation will continuously be enhanced through discussions and consultation with the Member Countries and other international organizations in order to seek their cooperation and support during the implementation of the activities of the project. Participation of the project staff in relevant regional/international meetings and workshops to exchange information will also be part of this activity. (The regional coordination will be also conducted through the mobilization of the WGRFP system develop in SEAFDEC).

Sub-activity 1.2: Development of regional guidelines on fishing license, boats registration and/or port state measures in Southeast Asia

1.2.1 The regional expert meeting

To follow up an issue of regional core experts on fishing license, boats registration and information on export of fisheries product in Southeast Asia in 2011, two regional experts meetings should be organized before RTC meeting. The objectives of this meeting is to follow up progress of draft regional guidelines through discussion and preparation for RTC meeting to finalize the regional guideline on fishing license and boats registration.

1.2.2 Regional Technical Consultation (RTC) to finalize the regional guidelines on fishing license, and boats registration in Southeast Asia

Comments and suggestions from the national workshops on the draft of regional guidelines will be used for discussion in the RTC. The second draft of the regional guidelines will be finalized at this RTC. The technical staff from fisheries administrative offices, technical officers of related agencies will be expected participants in the RTC.

Sub-activity 1.3: Production of information and promotional materials

Production of information and promotional materials on fishing license, boats registration and port state measures to combat IUU fishing will be carried out during the implementation of the project activities. Finally, the regional guidelines will be produced and disseminated to the SEAFDEC Member Countries and worldwide.

Activity 2: Promotion of Monitoring, Control and Surveillance (MCS) in Southeast Asia (Led by TD)

Sub-activity 2.1: National training/workshop on the promotion of Monitoring, Control and Surveillance system (MCS) to combat IUU fishing (Thailand, Philippine and Indonesia)

The national training and workshops will be conducted in collaboration with the SEAFDEC Member Countries as follow-up activities of the regional workshop on MCS. Representatives from government agencies, stakeholders and others sectors concerned will be invited to participate in this activity. The national training and workshops are envisaged to promote knowledge and understanding of the fishing industry about MCS activities, and also to develop appropriate observer programs. Moreover, the workshops would also address various concerns including the requirements of the fishing industry to adhere to inspection regimes and carry observer onboard when required and to build up awareness on the effectiveness of the use of MCS tools for sustainable fisheries to combat IUU fishing. Implementation of MCS in the countries will be conducted through case studies to assess the level of its application and adoption in the country. This activity is also expected to establish the network and voluntary groups to promote MCS to combat IUU fishing in the respective countries.

Sub-activity 2.2: Production of promotional materials

Information materials on MCS tools will be produced and disseminated to SEAFDEC Member Countries and various sectors concerned. Furthermore, promotion of the program activities to the public will also be included in this activity.

Activity 3: Preventing export of IUU fishing product (Led by MFRDMD)

Sub-activity 3.2 Developing regional guidelines to prevent IUU fishing and its products from being exported

3.2.1 Gathering information to develop regional guidelines to prevent IUU fishing and its products from being exported

MFRDMD will collect information that is listed for development of regional guidelines during the workshop for information gathering in 2011. The information will be compiled and analyzed by MFRDMD researchers for the regional workshop to develop regional guidelines to prevent IUU fishing and its products being exported.

3.2.2 Regional Workshop to develop regional guidelines to prevent IUU fishing and its products from being exported

In the third or fourth quarter of 2012, a workshop to develop regional guidelines will be organized. Representatives from all SEAFDEC Member Countries and resource persons will be invited to the workshop. Using the information collected by MFRDMD, participants will develop draft regional guidelines to prevent IUU fishing and its products from being exported.

4.1 Planning of the Project Activities

Project/Activity Title	Duration
Activity 1. Promotion of fishing license, boats registration and port state measures	
1.1 Preparatory process of the project activities	
1.1.1 Regional/international coordination and cooperation	Jan – Dec 12
1.2 Development of regional guidelines on fishing license, boats registration and/or port state measures in Southeast Asia	
1.2.1 The regional experts meeting	Mar and Sep 12
1.2.2 Regional Technical Consultation (RTC) to finalize the regional guidelines on fishing license and boats registration in Southeast Asia	Nov 12

1.3 Production of information and promotional materials	Jan-Dec 12
Activity 2. Promotion of Monitoring, Control and Surveillance (MCS) in Southeast Asia	
2.1 National training/workshop on MCS to combat IUU fishing for sustainable fisheries development	Apr, Jul, Oct 12
2.2 Production of information and promotional materials	Jan – Dec 12
Activity 3. Preventing export of IUU fishing products	
3.2 Developing regional guidelines to prevent IUU fishing and its production from being exported	
3.2.1 Gathering information to develop regional guidelines to prevent IUU fishing and its products from being exported	Jan-Dec 12
3.2.2 Regional Workshop to develop regional guidelines to prevent IUU fishing and its products from being exported	Jul-Dec 12

4.2 Expected Outcomes in the Year 2012

- The finalization of regional guidelines on fishing license, boats registration and/or port state measures in Southeast Asia;
- Cooperation/collaboration with Member Countries and other organizations/institutions will be enhanced;
- A focal point in each country will be a key person to promote MCS to combat IUU fishing for sustainable fisheries;
- Information gathering to develop regional guidelines to prevent IUU fishing and its products from being exported;
- Draft regional guidelines to prevent IUU fishing and its products from being exported; and
- Each country in the region will have adopted and implemented activities to combat IUU fishing with assistance from SEAFDEC.

PROGRAM DOCUMENT

Program Category: Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title: Human Resource Development for Sustainable Fisheries
Lead Department: Training Department
Lead Country: Vietnam
Total Duration: 2011- 2015

1. INTRODUCTION

Illegal, Unreported and Unregulated (IUU) fishing is a global problem affecting both Exclusive Economic Zones (EEZs) and the high seas. It is a global phenomenon with many detrimental environmental, economic and social impacts, and has led the international community to consider it a serious threat to world fisheries. IUU fishing is bad news for legitimate fishermen everywhere, whether in developing countries or in advanced ones. Underreporting of catches by authorized fishers, and unreported illegal catches, mean that the catch data collected by fisheries managers is incomplete and likely to give a more optimistic assessment of the status of fish stocks than is actually the case. Management decisions made are therefore likely to be inadequate, and will fail to conserve stocks as intended. In extreme circumstances this can lead to the collapse of a fishery, or serious impairment of efforts to rebuild stocks that are already depleted.

In addition to negative effects on target stocks, IUU fishing can severely impact the wider marine ecosystem. As IUU fishermen flout rules designed to protect the marine environment, including restrictions on the harvest of juveniles, closed spawning grounds, and gear modifications designed to minimize the by-catch of non-target species. Quantifying the ecosystem effects of IUU fishing and distinguishing from those of legitimate fishermen is often extremely difficult, not least because the environmental damage inflicted by legitimate fishing is often so great.

Moreover, 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 emphasized i) Accelerating the development of fisheries management plans based on an ecosystem approach, as a basis for fisheries conservation and management; ii) Taking measures to prevent unauthorized fishing and eliminate the use of illegal fishing practices by building awareness of their adverse impacts; iii) enhancing and promoting the participation of local communities, fisheries associations and other stakeholders in fisheries management and co-management, and encouraging communities to take part in fisheries and stock assessments by providing data; and iv) 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 promote the awareness and understanding of international and regional instruments and agreements through information dissemination campaigns.

Therefore the Human Resource Development for Sustainable Fisheries Project is proposed to work as a part in line with the Plan of Action on sustainable fisheries and food security for the region. The project mainly aims to raise up awareness to the region on the impact of IUU fishing to sustainable fisheries and food security as well as to build up human capacity of governance officers who are engaged in the fisheries management which should be strengthened in coping up with the IUU fishing problems in the region.

2. PROGRAM

2.1 Objectives

- 1) To strengthen human capacity of the Member Countries on fisheries management for sustainable fisheries and food security in the region;
- 2) To build up human capacity of the Member Countries on appropriate measures/ approaches for fisheries management to combat IUU fishing through the use of HRD and awareness building programs; and
- 3) To build capacity and knowledge of the Member Countries on appropriate tools and methodologies for gathering fishery information and statistics to better present status and performance of marine (coastal) fisheries for development planning and management of fisheries that contribute to combating IUU fishing.

2.2 Program Description

The project will emphasize building up/developing human capacity of SEAFDEC Member Countries on fisheries management, especially to combat IUU fishing for sustainable fishery in the region. Regional training programs will be organized and focus on fishery management, ecosystem approach to fisheries and fishery statistics and information as well as relevant issues which support to combat IUU fishing. Training tool kits and promotional materials for raising awareness and strengthening understanding will be developed to build up human capacity and awareness throughout the region.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration
<p>Activity 1. Regional Consultation Workshop on HRD Programs in Southeast Asia</p> <p>The regional workshop on HRD programs for sustainable fisheries and related counter measures to combat IUU fishing in Southeast Asia was completely conducted during 6-8 July 2011. The workshop was able to come up with common needs of the countries in the region for HRD to combat IUU fishing. Training programs which are under the project were introduced and got the recommendations in order to shape up, modify and adjust for the courses curricula. Also the HRD network was established and has continued to work.</p>	6-8 July 2011
<p>Activity 2. Human Resource Development and Human Awareness Building Programs</p> <p><i>Sub-activity 2.1 Regional Training for the Trainers Course on Fishery Management to Combat IUU Fishing (for fishery managers)</i></p> <p>The training course was conducted and participants were encouraged to cope up with the problems of IUU fishing in their countries. Measures and approaches are introduced/discussed among resource persons and participants.</p> <p><i>Sub-activity 2.2 Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies</i></p> <p>The course aims to strengthen awareness and knowledge of the participants on the impact of Illegal fishing on sustainable fisheries and food security, familiarize participants with the principles and concept of responsible fishing, sustainable fisheries development, ecosystem approach to fisheries and their application in Southeast Asia. Another aims are to strengthen the capability of participants in the principles, concepts, techniques and methodologies in extension, communication and media production and to strengthen the practical competence of participants in planning and carrying out extension work, by focusing on the essential participation of concerned sectors and stakeholders in ecosystem approach to fisheries management.</p>	<p>6-15 September 2011</p> <p>22 Nov. – 16 Dec. 2011</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Human Resource Development for Sustainable Fisheries</p> <p>(2) Issues in the region at the beginning of the study:</p> <ul style="list-style-type: none"> • Weakness of the fisheries management systems/approaches and awareness for fisheries sustainability; • Insufficient knowledge and understanding of the impact of IUU fishing on sustainable fisheries; • Insufficient knowledge and understanding of the existed counter measures/management tools and approaches for combating IUU fishing; • Insufficient knowledge on the principle and applicability on the ecosystem approach to fisheries • Insufficient understanding and limitation of skill on the extension work and activities; • Insufficient skill in gathering necessary information from the community levels to the policy actions; • Insufficient skill in transferring the knowledge and information to the community levels; • Insufficient involvement of the concerned sectors and national coordinators; • Insufficient knowledge on tools/methodologies and mechanism in gathering the quality fishery information and statistics for management of marine fisheries; and • Limitation of the training and appropriate promotion materials for sustainable fisheries as well as to combat IUU fishing.

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • The understanding and awareness building on the impact of IUU fishing as well as appropriate counter measures for combating IUU fishing and sustainable fisheries will be strengthened throughout target groups who are engaged in fishing operations; • The understanding on the principle and applicability of the ecosystem approach to fisheries will be strengthened throughout target groups who are engaged in fisheries management activities in the region; • Fishery information and statistics collection, presentation and dissemination for fisheries management will be improved throughout the region; • The collaboration between regional and national initiatives related to sustainable fisheries and IUU fishing related countermeasures will be enhanced; and • Training tool kits and promotion materials which can be used to raising awareness and strengthen capacity/understanding on sustainable fisheries as well as to combat IUU fishing will be produced for target persons who are involved in fishing operation in this region.
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3.2.5 “Steps” toward achieving final goals:

<p>Step 1: Identify /Prioritize the requirement criteria of knowledge for conducting the regional HRD program for the region in the future</p> <ul style="list-style-type: none"> • Literature review; • Organization of a project planning meeting (in-house); • Organization of a regional consultation workshop; • Compilation of documents/materials/media for appropriate practices as other management tools which can be used in the region; • Organization of organization technical meetings for planning and designing the HRD courses curriculum (in-house); • Draft out for the HRD courses curriculums; and • Draft out/set up design-template for training tool kits and promotion materials.
<p>Step 2: Carry out regional capacities building programs in combating IUU fishing in the Southeast Asian region</p> <ul style="list-style-type: none"> • Production of SEAFDEC tool kits and promotion materials for sustainable fisheries; • Conduction of the Regional Training for the Trainers Course on Fishery Management to Combat IUU Fishing and Extension Methodologies; • Conduction of the Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies;

<ul style="list-style-type: none"> • Conduction of the Regional Training Course on Effective MCS system; and • Conduction of the Regional Training for the Trainers Course on Fishery Information and Statistics for Management of Marine (Coastal) Fisheries.
<p>Step 3: Follow up in transferring the information and knowledge to the national level, follow up on the establishment the efficient national network for evaluation of the project implementation.</p> <ul style="list-style-type: none"> • National training/workshop (follow-up activity with national focal points) in selected countries on i) Fisheries Management to Combat IUU Fishing, ii) Ecosystem Approach to Fisheries and iii) Fisheries Information and Data Needs; • Follow up to the national focal points on promotion materials production and dissemination; • Coordination and cooperation with member countries in evaluation of the project implementation; • Conduction of the post regional workshop on the program activities evaluation and regional follow up activity; and • Production/Documentation for booklet(s) of the results, outcomes and lessons learned from project activities.

3.2.6 Activities in the current project:

(1) Current position of the project: step 1
(2) Total project duration: 2011 – 2015
1. Regional Consultation Workshop on HRD Programs in Southeast Asia.
2. Human Resource Development and Human Awareness Building Programs
2.1 Regional Training Course on Fisheries Management to Combat IUU Fishing and Extension Methodologies.
2.2 Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies
2.3 Regional Training Course on Effective MCS system
2.4 Regional Training for the Trainers Program on Fishery Information and Statistics for management of Marine (Coastal) Fisheries
2.5 Production of Promotion Materials and Training Toolkits
2.6 National Training/Workshop and Follow up Activities on Fishery Management to Combat IUU Fishing(follow up activity with the national focal points) in the selected countries on : i) Fisheries Management to Combat IUU Fishing, ii) Ecosystem Approach to Fisheries and iii) Fisheries Information and Data Needs.
2.7 The Post Regional Workshop on the Program Activities Evaluation and Regional Follow Up Activity.

3.2.7 Progress and achievements of the current project:

(1) Main activities conducted in the current project	
<ul style="list-style-type: none"> • Regional Consultation Workshop on HRD Programs in Southeast. • Regional Training Course on Fishery Management to Combat IUU Fishing for Fishery Managers. • Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies. 	
(2) Expected achievements till the end of this year (2011)	
<ul style="list-style-type: none"> • A set of regional recommendations for current needs and requirement for the HRD program for the Southeast Asian Region is developed as well as the appropriate counter measures and other management tools through HRD and awareness raising programs in Southeast Asia is identified. • The regional training course on fishery management to combat IUU Fishing for fishery managers is completely conducted. • The regional training for the trainer course on ecosystem approach to fisheries and extension methodologies is conducted. 	
(3) Expected outcome during the project period and expected achievement rate till the end of next year	
<i>Expected outcome</i>	<i>Achievement rate (%)</i>
1) A set of regional recommendation for current needs and requirements for the HRD program for the Southeast Asian Region will be draft out.	100%
2) The government officers /fisheries extension officers (course participants) will increase their knowledge on Fisheries Management to	27%

Combat IUU Fishing and Extension Methodologies and they will be able to apply the knowledge to their respective countries.	
3) Government officers (course participants) will understand the linkage and the value of the ecosystems to fisheries and be aware of the impact of illegal fishing to the ecosystems and fisheries resources. They will also understand the concept, approaches of co-management and community-base management and be able to apply the knowledge to their ecosystems management plans and activities	27%
4) Training tool kits and promotion materials for combating IUU fishing through fisheries management for the region will be produced	10%

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Proposed Activities for the Year 2012

The project will be implemented through the following activities:

4.1.1 Regional Training for the Trainers Course on the Fishery Management to Combat IUU Fishing and Extension Methodologies

The regional training on the reducing of IUU fishing through fisheries management counter measure will be conducted at SEAFDEC/TD, for about 26 days. One representative from each Member Countries will be invited to participate in the training course. The training contents will mainly deal with the characteristics of fishery resources, IUU fishing activities, effects of IUU fishing and its problems to sustainable fisheries approaches as well as tools to combat IUU fishing by using different counter measures such as Monitoring Control and Surveillance (MCS), Port State Management (PSM), Integrated Fisheries Management (IFM) and other management tools. A Presentation from each country will be required in order to illustrate the situation and problems of IUU fishing in the country, her current solution and methods used as well as lesson learned on the fishery management tools in combating the IUU fishing in each country. The course will also include subjects of appropriate extension methods to work with stakeholders and fishers in order to build up their awareness. Extension/promotion materials production techniques and methods will be also introduced to the participants.

4.1.2 Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies

The regional training course will be conducted at SEAFDEC/TD for about 26 days. One representative from each Member Countries will be invited to it. Its target participants are fisheries extension officers, fisheries officers or others working for fisheries management. The course focuses on modern principles and concepts of ecosystem management; appropriate approaches including ecosystem approach to fisheries, co-management, locally-based management and applying ecosystem principles to fisheries management; fishery communities problems and constraints; facilitation, mediation and conflict resolution skills; extension concepts, methodologies and implementation; study/field trips to fishing communities and some existing pilot projects; practical involvement and presentation of extension media. The course evaluation program will be designed to evaluate based on the goals, process and outcomes of the training program. Methods will be used are questionnaires, observation, interview and active research to participants and resource persons. The information will be collected/ sorted as the quantitative and qualitative types and then the sorted information will be further analyzed, interpreted and used for a course report.

4.1.3 Regional Training Course on Effective MCS system

The regional training course will be conducted at SEAFDEC/TD for about 12 days. One representative from each member countries will be invited to the training course. Target participants are fisheries officers or others working for fisheries management. The training course will focus on the common understanding on the impact of IUU fishing as well as the MCS system and operation procedures which can be used and applied to combat the IUU fishing in each country of this region.

4.1.4 Regional Training for the Trainers Course on Fishery Information and Statistics for Management of Marine (Coastal) Fisheries

This training course is planned to be conducted at SEAFDEC/TD for about 18 days. One representative from each Member Countries will be invited to participate in the training course. This training course aims to build capacity and enhance knowledge of the ASEAN Member Countries on appropriate tools and methodologies for collection, analysis and presentation of fishery information and statistics to better present status and performance of marine fisheries for development of planning and management of fisheries that contribute to combating IUU fishing in the region.

4.1.5 Production of Promotion Materials and Training Toolkits

Promotion materials and training toolkits such as posters, cartoon booklet, VCD and practical handbooks will be produced to enhance and strengthen awareness as well as to buildup understanding of readers. The package will be translated into a national language of each Member Country.

4.2 Planning of the Project Activities

Project/Activity Title	Duration
1. Human Resource Development and Human Awareness Building program	
2. Regional Training for the Trainers Course on the Fishery Management to Combat IUU Fishing and Extension Methodologies	June (26 days)
3. Regional Training for the Trainers Course on Ecosystem Approach to Fisheries and Extension Methodologies	August (26 days)
4. Regional Training Course on Effective MCS system	March-April (12 days)
5. Regional Training for the Trainers Course on Fishery Information and Statistics for Management of Marine (Coastal) Fisheries	November (18 days)
6. Production of Promotion Materials and Training Toolkits	January – December

4.2.1 Expected Outcomes in the Year 2012

- 1) Building up of capacity and increase in the number of trainers (government officers) who are strengthened on the knowledge/experience on
 - Fisheries management to combat IUU fishing and extension methodologies;
 - Ecosystem Approach to Fisheries and Extension Methodologies;
 - Effective MCS System; and
 - Fishery Information and Statistics for management of Marine (Coastal) Fisheries.
- 2) Series of Promotion materials (posters/cartoon booklets/VCD) and training toolkits some of which will be produced and distributed in order to enhance awareness and understanding of readers/clients on the issues of the impact of IUU fishing on the food security.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Chemical and Drug Residues in Fish and Fish Products in Southeast Asia-Biotoxins Monitoring in ASEAN
Lead Department:	Marine Fisheries Research Department (MFRD)
Lead Country:	Singapore
Total Duration:	Year 2009 - 2012
Proposed Budget:	USD 181,000

1. INTRODUCTION

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 water containing toxins produced by such organisms.

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 of locations. Furthermore, the growing harvest of non-traditional shellfish (such as moon snails, whelks, barnacles, etc) may increase human health problems and management responsibilities (FAO, 2004).

In view of these, MFRD has proposed a project on biotoxins monitoring in ASEAN Countries 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 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.

2. PROGRAM

2.1 Objectives

The objectives of the project are:

- 1) Upgrade regional laboratory capabilities and credibility for testing of DSP, PSP and TTX biotoxins through conduct of a regional training course on methodologies for Member Countries and 1-year survey in Member Countries;
- 2) 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; and
- 3) Improve knowledge and understanding on levels of biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries by establishing a directory of biotoxins experts and responsible persons/national authorities in each Member Country.

2.2 Program Description

MFRD will be the responsible SEAFDEC Department for the project and will manage and coordinate all project activities.

A Regional Technical Consultation Meeting will be held in Singapore in 2009 to initiate the project and plan for all the project activities. All the ASEAN-SEAFDEC Member Countries will be invited to the meeting and to participate in the project activities. ASEAN-SEAFDEC Member Countries will present country papers on the status of biotoxins monitoring systems in their countries' fisheries industry. A key project leader for each country will be designated to be responsible for implementing and monitoring the project in his/her country. Countries will be identified to conduct surveys in biotoxins detection and monitoring. The meeting also aims to identify the necessary training needs and finalise the details of the training courses to be conducted and the implementation of the survey.

A regional training course involving regional expertise will be conducted in 2010 to build up capacity in ASEAN-SEAFDEC Member Countries for biotoxins detection and monitoring implementation.

ASEAN-SEAFDEC Member Countries will be involved in implementing the relevant project activities on a cost-sharing basis to develop the methodologies in biotoxins analyses in their laboratories. Participating countries will identify specific biotoxins and project sites for monitoring for a 1-year period in 2011. The key project leader will be responsible for implementing and monitoring the progress of the survey in the respective country.

The expected outputs for the project include development of methodologies of biotoxins analyses, biotoxins survey results, training courses and publication of a technical report on biotoxins monitoring in ASEAN.

Project monitoring and evaluation will include annual progress reports, regular monitoring and evaluation of the surveys, and End-of-Project (EOP) Seminar.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
Activity 3: Biotoxins Survey 3.1 <i>Setting up of Biotoxins analyses</i>	1 year	All Member Countries, except Brunei, participated in the Biotoxins survey. Upon completion of the Regional Training Course in Singapore in 2010, Member Countries were requested to set up the training methods and analyses

<p>3.2 <i>Implementation of Biotoxins survey</i></p>	<p>facilities in their home countries.</p> <p>Indonesia, Malaysia, Myanmar, Singapore and Thailand would incorporate HPLC method testing into their Biotoxins Survey.</p> <p>The nine participating Member Countries had submitted their survey proposal and half-yearly progress report to MFRD in 2011.</p> <p>Most participating countries started their survey in January 2011 while Cambodia and Lao PDR commenced their survey in May 2011 and August 2011 respectively.</p> <p>The survey targeted at PSP monitoring in Green mussel (<i>Perna viridis</i>), with the exception of Indonesia and Vietnam which targeted PSP monitoring in Baby clam (<i>Meretrix</i> spp).</p> <p>Countries like Myanmar and Singapore had also expanded their scope of survey to include monitoring of ASP and DSP in Green mussel (<i>Perna viridis</i>).</p> <p>Majority of the countries used mouse bioassay as the screening method and HPLC as the confirmation method. However, due to the lack of proper infrastructures and facilities, Cambodia and Lao PDR sent their samples to Vietnam and Thailand for analysis, respectively.</p> <p>Thus far, results for PSP in the various species had generally been tested to be negative.</p>
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3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Biotoxins analysis and monitoring</p> <p>(2) Issues in the region at the beginning of the study:</p> <p>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.</p> <p>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.</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 (FAO, 2004).

In view of these, MFRD has proposed a project on biotoxins monitoring in ASEAN Countries 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.

3.2.2 Expected final goals of the program:

- 1) Upgrade regional laboratory capabilities and credibility for testing of DSP, PSP and TTX biotoxins through conduct of a regional training course on methodologies for Member Countries and 1-year survey in Member Countries;
- 2) 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; and
- 3) Improve knowledge and understanding on levels of biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region and facilitate exchange of information among Member Countries by establishing a directory of biotoxins experts and responsible persons/national authorities in each Member Country.

3.2.3 “Steps” toward achieving final goals:

<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 system in SEAFDEC Member Countries fisheries industry • 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 biotoxins detection and monitoring implementation • To facilitate the setting up of biotoxins analyses methods in ASEAN countries
<p>Step 3: Biotoxins Survey</p> <ul style="list-style-type: none"> • To set up analytical method, identify suitable sampling sites and propose sampling plan for the survey • To investigate the biotoxins level in ASEAN through the survey conducted by Member Countries • To compile the survey results into a Technical Report on Biotoxins Monitoring in ASEAN
<p>Step 4: End-of-Project Meeting</p> <ul style="list-style-type: none"> • To disseminate the Technical Report on Biotoxins Monitoring in ASEAN • To discuss the challenges faced during the project implementation and discuss for future projects

3.2.4 Activities in the current program:

(1) Current position of the program: Step 3
(2) Program duration: 2009 – 2012
<p>(3) Main activities</p> <ul style="list-style-type: none"> • To set up analytical method, identify suitable sampling sites and propose sampling plan for the survey • To investigate the biotoxins level in ASEAN through the survey conducted by Member Countries • To compile the survey results into a Technical Report on Biotoxins Monitoring in ASEAN

3.2.5 Progress and achievements of the current program:

(4) Main activities conducted in the current program	
<ul style="list-style-type: none"> • The Regional Technical Consultation will be organized for ASEAN Member Countries in 2009 to deliberate on the project scope, activities and time schedule as well as to provide an overview of biotoxins monitoring systems in ASEAN Member Countries. • Regional Training Course in Biotoxins Analyses will be conducted in 2010 to build up capacity in ASEAN Member Countries for biotoxins analyses and monitoring. • 1-year Biotoxins Monitoring Survey to be conducted in 2011. • Technical Report on Biotoxins Monitoring in ASEAN • Member Countries were trained in DSP and lipophilic toxins analysis using HPLC/M/MS, PSP toxins analysis using HPLC, TTX toxins using LC-MS/MS, PSP ELISA rapid method and DSP rapid method. These methods would be useful in assisting countries in setting up their Biotoxins survey. • Participating Member Countries had established their own system to conduct PSP monitoring in Green mussel or Baby clam (Indonesia and Vietnam). 	
(2) Main achievements till the end of 2011 (tentative)	
<ul style="list-style-type: none"> • The Regional Technical Consultation was successfully held from 26-28 August 2009 in Singapore and was attended by ASEAN Member Countries except Brunei. • The Regional Training Course in Biotoxins Analyses was successfully conducted in the Toxins Laboratory of the Veterinary Public Health Centre, Agri-Food and Veterinary Authority, Singapore from 28 June-7 July 2010 for 22 participants from all ASEAN Member Countries. • All ASEAN Member Countries except Brunei have submitted their proposals for the conduct of the biotoxins monitoring survey and have started their survey in January 2011 while Cambodia and Lao PDR commenced their survey only in May 2011 and August 2011 respectively. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcomes	Achievement rate (%)
1) Upgrade regional laboratory capabilities and credibility for testing of DSP, PSP and TTX biotoxins through: <ul style="list-style-type: none"> • Conduct of a regional training course on methodologies for Member Countries; • Conduct of 1-year survey in Member Countries. 	100%
2) 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.	40%
3) Improve knowledge and understanding on levels of biotoxins occurrences and incidences in fish and fisheries products in the ASEAN region.	70%
4) Facilitate exchange of information among Member Countries by establishing a directory of biotoxins experts and responsible persons/national authorities in each Member Country.	70%

3.2.6 Evaluation of program activities in 2011

<p>Upon attending the training course in 2010, each participating countries were requested to set up their own analytical method, to propose a sampling plan for their survey and to conduct a monitoring survey over a one-year period in 2011. This had helped the countries to enhance their analysis capability and to establish a monitoring system (if countries do not have one) for their home country. The results collected from this survey and from a regular monitoring system are useful in allowing ASEAN countries 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.</p>
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4. PROPOSED ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 4: Publication of Technical Report	Jan – Sep 2012	The participating countries would have to submit the results from their Biotoxins survey on a half-yearly basis and these results would be included in the final technical compilation at the end of the survey. MFRD would compile and publish the Technical Report on biotoxins monitoring in ASEAN.
Activity 5: End-of-Project (EOP) Seminar	3 days in 4 th quarter of 2012	MFRD would organize and conduct an End-of-Project (EOP) Seminar to present and disseminate the Technical Report on biotoxins monitoring in ASEAN.

4.2 Expected Outcomes in the Year 2012

MFRD would compile the results of the biotoxins survey from the nine participating countries and publish a technical report in the 3rd quarter of 2012. This would be followed by an End-of-Project (EOP) Seminar in the 4th quarter of 2012.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Traceability Systems for Aquaculture Products in the ASEAN Region
Lead Department:	Marine Fisheries Research Department (MFRD)
Lead Country:	Singapore
Total Duration:	5 years (2010-2014)
Proposed Budget:	USD 178,100

1. INTRODUCTION

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.

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).

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.

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.

2. PROGRAM

2.1 Objectives

- 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; and
- 2) Enhance regional capability on implementation of traceability systems for aquaculture products and promote their implementation in the region.

2.2 Program Description

MFRD will be the responsible SEAFDEC Department for the project and will manage and coordinate all project activities.

A Regional Technical Consultation will be organized for ASEAN Member Countries to provide an overview on implementation of traceability systems for aquaculture products in their countries and to discuss on the project and its activities. Two on-site training workshops on traceability systems for aquaculture products will be conducted by regional expertise with participating countries and commercial co-operants. The on-site training will preferably cover traceability systems for fish aquaculture and shrimp aquaculture. The expected outputs of the project include on-site training workshops and publication of the technical compilation on implementation of traceability systems for aquaculture products in the ASEAN region.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
Activity 2.1: 1 st Regional On-site Training Workshop on Traceability Systems for Aquaculture Fish	3 days	The workshop will be held in Vietnam on 28-30 Nov 2011. The 3-day training will be conducted on-site at a basa catfish farm and a processing factory where the fish are processed into fillets to enable the participants to learn how traceability is implemented throughout the whole production chain. The training will also engage regional expertise from Vietnam.

3.2 Evaluation of the Program Outcomes till the year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Traceability systems for aquaculture products</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</p>

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).

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.

3.2.2 Expected final goals of the program:

- 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.

3.2.3 “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 develop and compile technical information on traceability systems for aquaculture products in ASEAN region. The technical information will include implementation guidelines, difficulties faced and benefits of implementing traceability systems for aquaculture products.
<p>Step 5: End-of-Project Workshop</p> <ul style="list-style-type: none"> • To disseminate the Technical Compilation on traceability systems for aquaculture products in ASEAN region. • To discuss the challenges faced during the project implementation and discuss possible future projects.

3.2.4 Activities in the current program:

(1) Current position of the project: Step 2
(2) Project duration: 2010 -2014
(3) Main activities <ol style="list-style-type: none"> 1) Regional Technical Consultation in Traceability Systems for Aquaculture Products in ASEAN Region; 2) 1st and 2nd Regional On-site Training Workshops on Traceability Systems for Aquaculture Products in ASEAN Region; 3) Mid-Term Project Review Meeting; 4) Documentation and Publication of Technical Compilation; and 5) End-of-Project Workshop.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program <ul style="list-style-type: none"> • The Regional Technical Consultation on Traceability Systems on Aquaculture Products in the ASEAN Region from 12-14 October 2010. • 1st Regional On-site Training Workshop on Traceability Systems for Aquaculture Fish in ASEAN Region from 28-30 Nov 2011. 	
(2) Main achievements till the end of 2011 (tentative) <ul style="list-style-type: none"> • The RTC Meeting was successfully conducted held from 12-14 October 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 will be conducted in Vietnam from 28-30 Nov 2011 and will provide training on implementation of traceability system for aquaculture fish to the Member Countries and help build up their capability and knowledge in this area. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcome	Achievement rate (%)
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.	40%
2) Enhance regional capability on implementation of traceability systems for aquaculture products and promote their implementation in the region.	40%

3.2.6 Evaluation of program activities in 2011

The 1st Regional On-site Training Workshop will enhance the efforts in Member Countries to implement traceability systems for aquaculture fish through capacity building. The on-site training is a 3-day training program which includes lectures and site visits to an 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 training the participants would have a better understanding and knowledge on implementation of traceability systems for aquaculture fish.

4 PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 3:Mid-Term Project Review Meeting	2 days	The meeting will review the progress of the project and activities conducted. At the review meeting, participants will also be able to provide feedback on the on-site training and provide an update on the implementation status of traceability systems for aquaculture products in the ASEAN Region.

4.2 Expected Outcomes in the Year 2012

The Mid-term Project Review Meeting will provide a platform for the Member Countries to provide an update on the status and share information and experiences on implementation 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.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Utilization of Freshwater Fish for Value-added Products
Lead Department:	Marine Fisheries Research Department (MFRD)
Lead Country:	Singapore
Total Duration:	3 years (2011-2013)
Proposed Budget:	USD 84,660

1. INTRODUCTION

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. 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 Division (PHD) of the Agri-Food and Veterinary Authority (AVA) as the Collaborating Center for MFRD programmes, is proposing to conduct a one-year project each with Laos, Myanmar and Vietnam on utilization of freshwater fish using the MFRD Other Fund.

The project is in line with the following resolution and plan of action as endorsed at the ASEAN-SEAFDEC Conference of 2011:

Resolution 20: Optimise the utilisation 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 optimise the utilisation 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.

2. PROGRAM

2.1 Objectives

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

2.2 Program Description

The Post-harvest Technology Division (PHTD) 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 funded using the MFRD Other Fund and will be on a cost-sharing basis with the following countries: Lao PDR, Myanmar, Vietnam and Indonesia (following the request made by Indonesia at the 42nd Meeting of the SEAFDEC Council held in Luang Prabang, Lao PDR from 5 to 9 April 2010).

The project will be implemented through the following six activities over 3 years from 2011 to 2013;

- 2011: Activity 1: Project Inception and Planning Meeting
Activity 2: Regional Training Course on Processing of Value-Added Products
- 2012: Activity 3: Product Development and Processing Trials
Activity 4: Mid-term Evaluation and Progress Meeting
- 2013: Activity 5: Preparation and Publication of the Processing Handbook
Activity 6: End-of-Project Seminar

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
Activity 1: Project Inception and Planning Meeting	2 days	<p>The Project Inception and Planning Meeting was successfully held in MFRD/Singapore on 26-27 April 2011. The countries involved in this project are Indonesia, Lao PDR, Myanmar and Vietnam. Two representatives from each of the participating countries attended the meeting. One of the participants from Indonesia and Myanmar was from the private sector.</p> <p>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. At the beginning of the meeting, the participants presented an overview of the freshwater fisheries resources as well as the traditional freshwater fish products in their respective countries.</p>
Activity 2: Regional Training Course in Processing of Value-added Products		A Regional Training Course on processing of value added products using freshwater fish was organized and conducted in Singapore on 18-21 Oct 2011. There were a total of 15 participants – 2 each from the participating countries - the KPL and commercial cooperant; 2 participants from the Malaysian DOF and 4 industry participants from Singapore.

	<p>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 using simple, inexpensive equipment and technology suitable for the village level and small to medium-sized industry. The value added products to be developed are snack products and frozen comminuted fish products namely, fish crackers, fish “murukku”, fish sausage, fish patties, spicy fish paste (otah) and fish “siew mai”. Good manufacturing practices to ensure product safety and quality was also emphasized in the course. The participants were also instructed on how to conduct shelf-life studies and sensory analyses on the fish products.</p>
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3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Utilization of freshwater fish species for value-added products</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.</p> <p>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.</p> <p>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 goals of the program:

<ul style="list-style-type: none"> • To utilize selected 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 goals:

<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. • 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 cooperants, 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 2-3 value added products using selected 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 disseminate the handbook on the processing of the value-added products. • To discuss the challenges faced during the project implementation and discuss possible future projects.

3.2.4 Activities in the current program:

(1) Current position of the project: Step 2
(2) Project duration: 2011 -2013
<p>(3) Main activities</p> <ol style="list-style-type: none"> 1) Project Inception and Planning Meeting 2) Regional Training Course in Processing of Value-Added Products 3) Product development and processing trials 4) Mid-term Evaluation and Progress Meeting 5) Preparation and Publication of the Processing Handbook 6) End-of-Project Seminar

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program	
<ul style="list-style-type: none"> • The Project Inception and Planning Meeting to be held in Singapore in 2nd quarter of 2011. • The Regional Training Course on processing of value added products using freshwater fish will be conducted in MFRD/Singapore in the last quarter of 2011. 	
(2) Main achievements till the end of 2011 (tentative)	
<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. 	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative)	
Expected outcome	Achievement rate (%)
To utilize freshwater fish species for the development of value-added products	40%
To assist in upgrading the processing and packaging technology for freshwater fish products	30%

3.2.6 Evaluation of program activities in 2011

The Project Inception and Planning Meeting through the country reports provided a comprehensive overview and understanding of the freshwater fish resources and products in each of the participating countries. The meeting also involved private sector/industry participants who will be the commercial co-operants in the project. The industry participants provided valuable practical inputs during the planning process to identify the freshwater fish species to be utilized and the types of value-added products to be developed. The Regional Training Course provided the project participants with the knowledge and skills to develop their value added products in a safe and hygienic manner using simple, inexpensive equipment and technology suitable for the village level and small to medium-sized industry; and to conduct suitable shelf-life studies and sensory analyses on their products. Industry participation in the regional training course and in other project activities would be beneficial to the project as it would ensure that the processing technology and knowledge acquired will be more effectively transferred to the concerned industries in the participating countries.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 3: Product development and processing trials	1 year	Each participating country will conduct product development and processing trials to develop the 2-3 value added products using the indigenous freshwater fish species that was agreed at the Project Inception and Planning Meeting. Shelf-life studies on the products will also be conducted.
Activity 4: Mid-term Evaluation and Progress Meeting	2 days	A 2-day Mid-term Evaluation and Progress Meeting will be organized by MFRD and held in the 2 nd quarter of 2012 to discuss and evaluate the progress of the project and to plan for the subsequent activities <i>i.e.</i> the preparation and publication of the processing handbook and the End-of-Project Seminar. Two participants from each country will be invited to attend.

4.2 Expected Outcomes in the Year 2012

The four participating countries will develop and conduct processing trials (including shelf life studies) for 2-3 value added products using the indigenous freshwater fish species that was agreed at the Project Inception and Planning Meeting. The Mid-term Evaluation and Progress Meeting will be organized by MFRD and held in Singapore or one of the four countries to discuss and evaluate the progress of the product development and processing trials and plan for the subsequent activities *i.e.* the preparation and publication of the processing handbook and the End-of-Project Seminar.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Tagging Program for Economically-important Pelagic Species in the South China Sea and Andaman Sea
Lead Department:	MFRDMD, in collaboration with TD
Lead Country:	Malaysia
Total Duration:	2008 - 2012
Proposed Budget:	USD 70,100

1. INTRODUCTION

It is believed that pelagic fishes migrate for their ecological demand of spawning and feeding habits to the optimum environmental conditions on current, water temperature, salinity, chlorophyll and prey. This migration provides important information for stock identification and shared stock of pelagic fishes. In the Japanese Trust Fund II (JTF II) project on “Information Collection for Sustainable Pelagic Fisheries in the South China Sea” from 2002 to 2006, genetic study and morphometric analysis were conducted to identify sub-population and shared stock of the targeted small pelagic fishes. However, sub-populations of these fishes as management unit could not be confirmed clearly.

Tagging activity is one of the methods commonly used to study migration route of small pelagic fishes, which sometimes uncovers hidden migration routes. In the Gulf of Thailand, about 2,600 Short mackerels (*Rastrelliger brachysoma*) were tagged and released by the DoF of Thailand from 1960 to 1965. From the study, about 16% of the tagged fishes were recaptured. The recovery rate is remarkably high for the small pelagic fishes, and gave useful information on the migration pattern of the species. The DoF Malaysia has also carried out tagging activities for pelagic fishes in the Straits of Malacca and east coast of Peninsular Malaysia from 1990 to 1998. However, information on migration patterns of the small pelagic fishes in the Southeast Asian region is still quite fragmentary and inadequate to be used for the purpose of managing the fishery.

Therefore, study on migration patterns of small pelagic fishes in the region is an urgent need. Although trend of annual catch for the past 20 years shows that the status of the resource is still good, information of the resources is still lacking. The study will provide information for stock identification and more importantly, to confirm on the extent of sharing of the stock 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 #8 of Plan of Action (Accelerate the development of fisheries management plans based on an ecosystem approach, as a basis for fisheries conservation and management).

2. PROGRAM

2.1 Objectives

The objectives of this project are:

- 1) To examine the movement and migration routes of the targeted pelagic fishes (TPF) in the South China Sea (SCS) and Andaman Sea (AS);
- 2) To compare the growth patterns of the TPF in the SCS and AS;
- 3) To compare the results of growth patterns for the TPF between the tagging program and FiSAT analysis in the 1st phase of JTF II in the SCS;
- 4) To conduct genetic analyses for population study to confirm existence/absence of sub-populations in the region and for species identification; and
- 5) To suggest a management measures of purse seine fisheries in the SCS based on the obtained information and outcomes from the 1st and the 2nd phases of JTF II project.

2.2 Program Description

MFRDMD is the responsible SEAFDEC Department for this project to manage and coordinate all project activities in collaboration with TD. Brunei Darussalam, Cambodia, Indonesia, Malaysia, Myanmar, the Philippines, Thailand and Vietnam are involved in the tagging activities.

The project involves on-site training for tagging in each participating SEAFDEC Member Country, tagging implementation and genetic study in both the South China Sea and Andaman Sea. Tagging poster printed in national language was distributed throughout the countries involved to promote awareness on the project and to inform public on the reward given upon returning of recaptured tagged fish to the authority. Databases namely, “Data Management Software for Small Pelagic Fish” and “Data on Tagging” were developed and promoted as the main storage for all project data. The genetic study requires collection of tissue samples from most of the tagging sites and DNA works on these samples.

Analysis on the tagging and recapture data was done during the regional workshop in September 2011. Results obtained by the country from the workshop will be presented in the terminal regional technical consultation in June 2012. Outcome from the consultation will be compiled in the terminal report of the project that to be published at the end of 2012.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
Activity 1: Meetings/Workshops/Trainings Sub-Activity 1.3: Workshop on data analysis/The 4 th Core Expert Meeting	20-22 Sept 2011	The 4 th Core Expert Meeting was held in Kuala Lumpur, Malaysia to discuss the progress of the project imple-mentations in 2010 and 2011. The meeting discussed results on preliminary tagging data analysis and agreed on suggested improvement for the final analysis. The meeting also decided on the format and contents of the program terminal report, and formulated the final research plan for genetic study in the South China Sea and Andaman Sea for 2011-2012. The Standard Operational Procedure for tissue sample collection was distributed to the Member Countries.
Activity 2: Tagging Operation in the South China Sea and Andaman Sea Sub-Activity 2.4: Purchase materials for genetic study	Jan-Dec 2011	Materials such as chemicals and veils were purchased for genetic study.
Sub-Activity 2.5: Tissue sample collection for genetic study	Oct-Dec 2011	Samples from Kuantan, Malaysia have been collected. The other tissue samples will be collected with the aids of Member Countries for population studies of a targeted pelagic species. The target species are <i>Rastrelliger kanagurta</i> for SCS and AS, and <i>Decapterus maruadsi</i> for AS.
Activity 2.6: Genetic survey for population structure and species identification	Jan-Dec 2011	DNA was extracted from each collected tissue sample and analyzed both for population structure and species identification.

<p>Activity 3: Data Collection and Analysis Sub-Activity 3.1: Data collection and verification</p>	<p>Jan-Dec 2011</p>	<p>Information for the number of fish tagged and recaptured was carefully handled by all Technical Officers of the project of the participating SEAFDEC Member Countries. Data was verified before entering into the database that developed by SEAFDEC-TD. Work on data verification was conducted by all Technical Officers of the project.</p>
<p>Sub-Activity 3.2: Data compilation and analysis</p>	<p>Jan-Dec 2011</p>	<p>Information and data on number of fish tagged and recaptured will carefully be handled by the Technical Officers of the participating SEAFDEC Member Countries. The data will be verified before entering into the database that developed by SEAFDEC-TD and be analyzed.</p>
<p>Activity 5: FADs and Sardine Information Sub-Activity 5.2: Data verification and analysis</p>	<p>July-Dec 2011</p>	<p>Supplementary information on present status of fish aggregation device (FAD) operation and Sardine catch in the South China Sea were verified and analyzed based on the collected data in the first phase of Japanese Trust Fund II project from 2002 to 2006 for an appropriate management of purse seine fishery.</p>

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Resource management of small pelagic fishes in the South China Sea and Andaman Sea</p>
<p>(2) Issues in the region at the beginning of the study: Total catch of small pelagic fishes, such as Indian mackerels and round scads, consists more than 10% of the marine capture production in the Southeast Asian region. Not only these small pelagic fish is important as food resources, but also capture fisheries targeting these species are of fundamental importance to this region in terms of employment and livelihood of fishers. However, we are still negligent in the management of these pelagic fish resources. For sustainable use of these resources, formulation of a management plan of these resources and fisheries in the region with reference to the biological information of targeted species is crucial.</p>

3.2.2 Expected final goals of the program:

<ul style="list-style-type: none"> • To contribute for the formulation of a management measures of the purse seine fisheries and pelagic fish resources in the region with reference to the biological information of targeted species; • To achieve fishery management of the targeted small pelagic fish resources in the region to sustain the fisheries for the continuous food supply, employment and fishers' livelihood, based on the biological and economical analyses of the information and data.
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3.2.3 “Steps” toward achieving final goals:

<p>Step 1: Information collection for sustainable pelagic fisheries in the South China Sea</p> <ul style="list-style-type: none"> • To clarify the actual status of operation (including FAD) and catches of the purse seine fishery; • To estimate some resource indicators, such as landings, CPUE, catch composition in the purse seine fishery; and • To collect biological information of small pelagic fishes that is crucial for management of these species.
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<p>Step 2: Tagging program for economically important pelagic species in the South China Sea and Andaman Sea</p> <ul style="list-style-type: none"> • To know moving behavior and migration routes of small pelagic fishes; • To clarify subpopulation structures of these small pelagic fish that is crucial for management purpose through genetic study.
<p>Step 3: Formulation of recommendation for small pelagic fish management measures in the ASEAN region.</p> <ul style="list-style-type: none"> • To estimate status and trend of some pelagic fish resources; • To formulate management measures for sustainable use of these resources.

3.2.4 Activities in the current program:

(1) Current position of the program: Step 2-3
(2) Program duration: 2008-2012
<p>(3) Main activities</p> <ul style="list-style-type: none"> • Tag and recapture study of economically important small pelagic fishes to understand their migrating route and sub-population structures for their future management purpose in the South China Sea and Andaman Sea.

3.2.5 Progress and achievements of the current program:

<p>(1) Main activities conducted in the current program</p> <ul style="list-style-type: none"> • To prepare and to disseminate technique for tagging implementation of small pelagic fishes in each participating Member Countries (on-site training, formulation of SOP, purchasing of tagging materials, etc). • To implement tag and recapture study for targeted small pelagic fishes in eight Member Countries. • To analyze recovering data to understand the migrating routes and sub-population structures of the targeted small pelagic fishes. • To conduct genetics study to confirm on the existence of sub-population of the targeted small pelagic fishes. 													
<p>(2) Main achievements till the end of 2011 (tentative)</p> <ul style="list-style-type: none"> • Four Core Expert Meetings and demonstration of tagging experiment; • Implementation of the on-site trainings for tagging implementation in eight Member Countries; • Formulation of Standard Operating Procedure (SOP) for tagging small pelagic fishes in the region; • Making and dissemination of posters in each native languages to obtain well recovery of tagging fishes; • Promotion of the database software in Member Countries and improvement of it for tagging studies; • Implementation of tagging activities at selected study sites in each Member Country; • Some amount of tagged fish recovery; • Mitochondrial genetic information of small pelagic fishes; and • Preparation for publication of terminal report. 													
<p>(3) Outcomes during the program period and expected achievement rate till the end of 2010 (tentative)</p> <table border="1"> <thead> <tr> <th>Expected outcomes</th> <th>Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td>1) Preparation for tagging implementation in each Member Countries (on-site training, formulation of SOP, tagging material purchasing, etc.)</td> <td>100%</td> </tr> <tr> <td>2) Preparation for tagged-fish recovering and data compilation system</td> <td>100%</td> </tr> <tr> <td>3) Implementation of tag and recapture study for targeted small pelagic fishes</td> <td>100%</td> </tr> <tr> <td>4) Understanding of the migrating route of the targeted small pelagic fishes</td> <td>30%</td> </tr> <tr> <td>5) Understanding of the sub-population structure for management</td> <td>30%</td> </tr> </tbody> </table>		Expected outcomes	Achievement rate (%)	1) Preparation for tagging implementation in each Member Countries (on-site training, formulation of SOP, tagging material purchasing, etc.)	100%	2) Preparation for tagged-fish recovering and data compilation system	100%	3) Implementation of tag and recapture study for targeted small pelagic fishes	100%	4) Understanding of the migrating route of the targeted small pelagic fishes	30%	5) Understanding of the sub-population structure for management	30%
Expected outcomes	Achievement rate (%)												
1) Preparation for tagging implementation in each Member Countries (on-site training, formulation of SOP, tagging material purchasing, etc.)	100%												
2) Preparation for tagged-fish recovering and data compilation system	100%												
3) Implementation of tag and recapture study for targeted small pelagic fishes	100%												
4) Understanding of the migrating route of the targeted small pelagic fishes	30%												
5) Understanding of the sub-population structure for management	30%												

3.2.6 Evaluation of program activities in 2011 (2008 – September 2011)

In the South China Sea area, the achievement of tagging until September 2011 is 71% of the targeted 38,000 fishes to be tagged since 2008. As a whole, only Japanese scad (*Decapterus maruadsi*) that the tagged fishes (13,664) exceeded the target number (12,300). While, Short mackerel (*Rastrelliger brachysoma*) recorded only 85% achievement, Shortfin scad (*Decapterus macrosoma*) 62% and Indian mackerel (*R. kanagurta*) the most difficult species to be found and tagged, only 36%.

In the Andaman Sea area, 92% of the target 13,600 fishes to be tagged are successfully tagged. Short mackerel (*R. brachysoma*) recorded 98% achievement, while Indian mackerel (*R. kanagurta*) 88%.

In terms of recovery of released tagged fish, the South China Sea area recorded 1.18% that is slightly lower than the recovery percentage in the Andaman Sea at 1.27%.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 1: Meeting/Workshop/ Trainings	June 2012	Terminal Regional Technical Consultation will be held in Malaysia. The main purposes of the consultation are to compile country reports and regional report and to decide the remaining steps towards publication of terminal report. Complete report by country is to be produced by the country technical officer and to be submitted to SEAFDEC/MFRDMD in March 2012.
Activity 2: Tagging Operation in the South China Sea and Andaman Sea (Genetic study)	Jan-Dec 2012	Additional tissue samples will be collected with the aids of Member Countries both for population studies of two targeted pelagic species and for species identification. DNA will be extracted from the collected tissue samples and be analyzed both for population study and for species identification. Genetic data will be analyzed by computer software for genetic data analysis.
Activity 3: Data Collection and Analysis	Jan-Dec 2012	Information and data on number of fish tagged and recaptured will be carefully handled by the Technical Officers of the participating SEAFDEC Member Countries. The data will be verified before entering into the database that developed by SEAFDEC/TD and be analyzed. Country reports will be prepared by the technical officers of the participating SEAFDEC Member Countries and regional report will be prepared by SEAFDEC/MFRDMD staffs. Those reports will be edited by SEAFDEC/MFRDMD and terminal report will be printed and distributed to Member Countries.
Activity 5: FADs and Sardine Information	Jan-Dec 2012	Supplementary information on present status of fish aggregation device (FAD) operation and Sardine catch in the South China Sea will continue to be verified and analyzed based on the collected data in the first phase of Japanese Trust Fund II project from 2002 to 2006 for an appropriate management of purse seine fishery. Analyzed sardine related information will be published in the terminal report.

4.2 Expected Outcomes in the Year 2012

- 1) Compiled data on tagging and recaptured tag fish in SCS and AS.
- 2) Findings on tagging program in terms of growth estimates and migration pattern of TPF.
- 3) Genetic results.
- 4) Integrative interpretation of available data and information on small pelagic fishes in the terminal report.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Research and Management of Sea Turtles in Foraging Habitats in the Southeast Asian Waters.
Lead Department:	MFRDMD, in collaboration with TD
Lead Country:	Malaysia
Total Duration:	2010 - 2014
Proposed Budget:	USD 59,200

1. INTRODUCTION

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 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 program is aimed to conduct several research activities to collect information of 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.

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 on identification and biological data collection on sharks and rays in the region need to be strengthened. This program is also aimed to train technical officers in the participating Member Countries to be able to collect biological data on sharks and rays in the region and to provide basic biological data on sharks and rays in the region through research activities.

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)*. Elasmobranch 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)*.

2. PROGRAM

2.1 Objectives

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 is 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;
- 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;
- 6) To conduct a workshop on taxonomy and identification of sharks and rays in Southeast Asian waters and facilitate their biological studies in participating Member Countries; and
- 7) To study biology of major elasmobranch (sharks and rays) species, which will provide basic knowledge to conserve and enhance shark and ray populations in the region.

2.2 Program Description

SEAFDEC/MFRDMD in collaboration with TD will be the responsible Departments for this project, and will manage and coordinate all project activities. Technical Officers from selected SEAFDEC Member Countries will be invited for training of the ecological survey of sea turtle foraging habitats. The project involves research on sea turtle foraging populations, regional meeting/workshops and information collection on the sea turtles interaction with fishing. Regional training programs will be conducted to build up capacity in ASEAN Member Countries for conservation of sea turtles in the region. The project also involves a 5-day workshop on taxonomy and identification of sharks and rays in Southeast Asian waters, biological data collection at landing sites with an emphasis on reproduction, and Regional Technical Consultation to share data on research and management of sharks and rays in the region. High biodiversity in the region makes this project sophisticated and more than 100 species of elasmobranchs have been recorded. Biology-oriented Technical Officers from selected SEAFDEC Member Countries will be invited for a workshop for shark identification since they will be experts on sharks and rays in participating Member Countries.

The expected outputs for 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 incidental capture of sea turtles. The expected outputs for the project also include the biological information of sharks and rays in the region, which can be used for development of the management of sharks and rays in the region.

Management plans for conservation of sea turtles will be formulated by the end of the project.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Project/Activity Title	Duration	Remarks
Activity 1. Meeting/Workshop Sub-Activity 1.2: <i>The Regional Progress Meeting</i>	Nov 2011	The Regional Progress Workshop was held to discuss results of the 2010 survey in Brunei Bay, those of the 2011 survey in Mabul and Sipadan islands, and future procedures for publication of final report. The workshop was held in Malaysia.
Activity 2. Research in Sea Turtle Foraging Populations Sub-Activity 2.1: Training for scientific survey of foraging habitats	Sept 2011	Scientific survey of ecological parameters in a pilot foraging habitat of sea turtles (Mabul and Sipadan islands) was conducted in September. Water quality, such as salinity, temperature, turbidity, chlorophyll content, etc., was monitored. Technical Officers from Indonesia and Malaysia (Sabah) were invited for the training of the ecological survey. Tissue samples of 81 green and 3 hawksbill turtles were collected around Sipadan Island.

Sub-Activity 2.2: Genetic study	Jan-Dec 2010	A total of 28 tissue samples of green turtles were collected in Lawas foraging habitat (Sarawak, Malaysia) in January and February. The range size of curve carapace length (CCW) of the specimens was between 61 cm to 102 cm and the weight between 25 kg to 105 kg. Mitochondrial DNA markers had been used for the genetic analysis to reveal sea turtle subpopulation structures in the region. Six haplotypes (A3, C3, C4, D2, C5 and C14) was found) for DNA sequence data of 26/28 samples. The remaining two samples still in progress.
Sub-Activity 2.3: Tagging of sea turtles	Jan-Dec 2011	Implementation of inconel tagging was continued at the focused nesting sites of sea turtles in participating Member Countries and tag recovery had been monitored. A total of 100 green turtles were tagged in Peninsular Malaysia, 70 in Sarawak, Malaysia and 280 in Sabah, Malaysia. Purchasing on 1200 unit inconel tags was undertaken and the tags will be distributed to Vietnam and Myanmar. Report from Vietnam indicates that 30 individuals of green turtles were tagged in Vietnam mainly at Con Dao Island in Southern Vietnam. More than 70 adult female green turtles were tagged in the Philippines and approximately 50 adult female green turtles were tagged in Myanmar. Currently six countries of SEAFDEC Member Country had implemented tagging exercises on sea turtles. These countries are Cambodia, Indonesia, Malaysia, Myanmar, Thailand and Vietnam. Eighty % of the tagged are green turtles (<i>Chelonia mydas</i>).
Sub-Activity 2.4: Satellite Telemetry	Feb-Apr 2011	One juvenile green turtle was released in Lawas foraging habitat of Sarawak waters on 12 February 2011. From 12 February until 30 June 2011 the turtle with ID No.67589 is still swimming in Lawas waters of Brunei Bay with the distance between 5 and 34 km from the shore. This indicates that Lawas waters with seagrass bed are foraging habitats of this turtle.
Activity 3. Interaction between sea turtles and fishing Sub-Activity 3.1: Information Collection on the Sea Turtles Interaction with Fishing	Jan-Dec 2011	Experiment on the reaction of sea turtles to sound stimuli has been conducted at the Sea turtle conservation center located at Munnai Island. It is expected that the experiment will be completed by this year (2011), and its result will be reported.
Sub-Activity 3.2: Information dissemination	Apr-Dec 2011	Promotion and awareness raising on the use of c-hook in hook-and-line fishing in SEAFDEC Member Countries was continued.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Research and management of sea turtles in foraging habitats in the Southeast Asian waters
<p>(2) Issues in the region at the beginning of the study: Conservation of endangered marine animals in relation with fisheries is now matters of global concern. In the Southeast Asian region, six of seven species of sea turtle 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 behavior and genetic homogeneity, and on the status of incidental catch and habitat reduction related to their mortality. About 72 thousand tons of sharks and rays were captured in 2004 in Southeast Asia. High demands for</p>

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, the Philippines, Thailand and Vietnam. However, fisheries data in sharks and rays are still lamped 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 and to prepare management plans when needed. Identification of elasmobranch species is fundamental of biological data collection. Expertise on identification and biological data collection on sharks and rays in the region need to be strengthened.

3.2.2 Expected final goals of the program:

- To contribute for the formulation of a management plan of sea turtles inhabited in the ASEAN region with reference to the biological and ecological information;
- To contribute for 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 incidental capture of sea turtles;
- 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.

3.2.3 “Steps” toward achieving final goals:

<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 of current status of sea turtle nesting and conservation effort in the Southeast Asia; and • To study and distribute the turtle excluder devices (TEDs) for 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 study for nesting females in major nesting beaches to obtain ecological information of sea turtles such as migration route, foraging habitats, etc; • To conduct genetic analysis of nesting sea turtles to reveal subpopulation structures of sea turtles in the region; and • To study and distribute the usage of responsible fishing gear and practices, including C-hook instead of J-hook in several longline fisheries, gillnet fishing, etc. to reduce sea turtle by catch.
<p>Step 3: Research and management of sea turtles in foraging habitats in the Southeast Asian Water.</p> <ul style="list-style-type: none"> • To conduct sea turtle genetic, tagging, and satellite tracking study in their foraging habitats; • To compile ecological and biological information of sea turtles in the foraging habitats; • To conduct information collection of ecological parameters in pilot foraging habitats in the region; • To collect information of sea turtle poaching in the region; • To recognized 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 management plans for conservation of sea turtle populations in the region; • To conduct a workshop on taxonomy and identification of sharks and rays; • To collect biological data on sharks and rays at landing sites with an emphasis of their reproduction; • To conduct genetic analysis of un-sequenced shark and ray species; and • To compile biological data on sharks and rays in the region for conservation and management; • To identify experts on sharks and rays in the region for future cooperation.

3.2.4 Activities in the current program:

(1) Current position of the program: 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. • Workshop on taxonomy and identification of sharks and rays. • Field survey to collect ecological information of 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 gillnet and hook-and-lines. • Dissemination of the outcomes from research on interaction between sea turtles and fishing, including gillnet and hook-and-lines. • Formulation of management plans for conservation of sea turtle populations in the region. • Research on biology of sharks and rays. • Compilation of available biological data and identification of human resources on sharks and rays in the region.

3.2.5 Progress and achievements of the current program:

(1) Main activities conducted in the current program <ul style="list-style-type: none"> • The Regional Planning Meeting and Regional Progress Workshop. • Field survey to collect ecological information of 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 gillnet and hook-and-lines. • Dissemination of the outcomes from research on interaction between sea turtles and fishing, including gillnet and hook-and-lines. • Formulation of management plans for conservation of sea turtle populations in the region. 																	
(2) Main achievements till the end of 2011 (tentative) <ul style="list-style-type: none"> • The Regional Planning Workshop and Regional Progress Workshop. • 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 was continued at the focused nesting sites of sea turtles in participating Member Countries and tag recovery had been monitored. • Satellite telemetry studies were conducted for one juvenile green turtle in Malaysia. • Research on interaction between sea turtles and fishing, including sound stimuli and hook-and-line, was continued. 																	
(3) Outcomes during the program period and expected achievement rate till the end of 2011 (tentative) <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Expected outcomes</th> <th style="width: 40%;">Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td>1) Meeting/Workshop</td> <td>60%</td> </tr> <tr> <td>2) Field survey to collect ecological information of selected pilot foraging habitats of sea turtles</td> <td>100%</td> </tr> <tr> <td>3) Genetic study of foraging sea turtles to reveal sea turtle population structures in the region</td> <td>60%</td> </tr> <tr> <td>4) Conventional tagging and satellite tracking studies of sea turtles to reveal sea turtle migration patterns and their nesting/foraging habitats in the region</td> <td>100%</td> </tr> <tr> <td>5) Information collection of sea turtle poaching</td> <td>30%</td> </tr> <tr> <td>6) Research on interaction between sea turtles and fishing</td> <td>100%</td> </tr> <tr> <td>7) Dissemination of the outcomes from research on interaction</td> <td>100%</td> </tr> </tbody> </table>		Expected outcomes	Achievement rate (%)	1) Meeting/Workshop	60%	2) Field survey to collect ecological information of selected pilot foraging habitats of sea turtles	100%	3) Genetic study of foraging sea turtles to reveal sea turtle population structures in the region	60%	4) Conventional tagging and satellite tracking studies of sea turtles to reveal sea turtle migration patterns and their nesting/foraging habitats in the region	100%	5) Information collection of sea turtle poaching	30%	6) Research on interaction between sea turtles and fishing	100%	7) Dissemination of the outcomes from research on interaction	100%
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8) Formulation of management plans for conservation of sea turtle populations in the region	30%
9) Research on Biology of Sharks and Rays	20%
10) Compile available biological data and identify human resources on sharks and rays in the region	20%

3.2.6 Evaluation of program activities in 2011

Overall activities which scheduled in 2011 were implemented accordingly. Collecting tissue samples of green turtles in Lawas, Sarawak foraging habitat was conducted twice from 7 to 10 January and from 11-13 February 2011. Study on satellite telemetry was carried out at Lawas foraging habitat on 12 February 2011. A total of 27 tissue samples of green turtles were collected from Lawas foraging habitat. Laboratory exercises on DNA profiling on tissues sample from Lawas foraging habitat was completed. Training on Scientific Survey on Sea Turtle Foraging Habitat in Mabul and Sipadan Islands of Sabah, Malaysia was conducted from 26th September to 1st October 2011. More than 80 tissue samples of green turtles with various sizes were collected and as well as ecological parameters such as sea grass areas, water quality parameters and information on interaction between sea turtles and human activities also were collected. The regional workshop for review the activities in 2010 and 2011 will be conducted in early November 2011. The results and information obtained from both surveys (i) Lawas foraging habitat in 2010; and (ii) Mabul and Sipadan Islands foraging habitat in 2011 will be presented and discuss in the Regional Workshop. Standard Operating Protocol (S.O.P.) for conducting scientific survey on sea turtle foraging habitat will be prepared during the workshop and draft on Management Plan on Protecting and Conserving the Sea Turtle Foraging Habitat also will be prepared.

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.2 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
Activity 1. Meeting/Workshop	March 2012	A Workshop on Taxonomy and Identification of Sharks and Rays will be held at MFRDMD. Two biology-oriented Technical Officers from each selected SEAFDEC Member Country will be invited for the workshop on taxonomy and identification because taxonomic experience on fish identification is prerequisite. The main purpose of the workshop is to obtain biological expertise on shark and ray identification at landing sites in the region.
Activity 2. Research in Sea Turtle Foraging Populations	Jan-Dec 2012	During the scientific survey for ecological parameters in a pilot foraging habitat (Mabul and Sipadan islands), 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 will be used for the genetic analysis. Satellite telemetry study on sea turtles will be conducted in Malaysia.
Activity 3. Interaction between sea turtles and fishing	Apr-Dec 2012	Produce and disseminate the reports and publications based on the outputs from the activity implemented under Activity 3.
Activity 4. Action Plan for Managing Foraging Habitats of Sea Turtles	Oct-Dec 2012	Draft action plan for managing foraging habitats of sea turtles in the region will be formulated based on the scientific information. Under this sub-activity, information collection by attending a scientific meeting will be made. The action plan includes management on fishing activities that threaten adult sea turtles and abatement of egg poaching. Purpose

		of the action plan is to conserve and enhance sea turtle populations in the region.
Activity 5. Research on Biology of Sharks and Rays	Apr-Dec 2012	Biological data collection at a pilot landing site will be conducted in Malaysia. Our main interests will be at what age or size each species starts reproducing and how much is its fecundity.

4.3 Expected Outcomes in the Year 2012

- | |
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| <ol style="list-style-type: none"> 1) Through a workshop on taxonomy and systematic of sharks and rays in Southeast Asian waters, participated officers will be able to identify the major elasmobranch species; 2) Information on population structures of sea turtles in ASEAN region will be collected by the genetic study; 3) Information on migration and foraging grounds of sea turtles in ASEAN region will be collected by the satellite telemetry study; 4) Information collection on interaction between sea turtles and fishing, including sound stimuli and hook-and-line fishing through research/experiment and actual fishing trial; and 5) Biological data on sharks and rays at a pilot landing site will be collected. |
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PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Promotion of Sustainable and Region-oriented Aquaculture Practices
Lead Department:	Aquaculture Department
Lead Country:	The Philippines
Total Duration:	2010-2014

1. INTRODUCTION

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. 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 (the Bangkok Declaration 2001). In practice, broodstock and fry needed for the aquaculture of middle- and high-value commodities, which are major aquaculture products being exported to developed countries, depend mostly on coastal wild resources. This practice has seriously affected the sustainability of coastal resources, and the needs to protect the coastal resources have increasingly elevated these days. In response to the said necessity, SEAFDEC Aquaculture Department, in collaboration with Member Countries, has implemented the project entitled “Development of Technologies and Human Capacity Building for Sustainable Aquaculture” as part of the Program on the Promotion of Sustainable Aquaculture in the ASEAN Region under Japanese Trust Fund IV (TF-4) during 2005-2009.

In the TF-4, we have been focusing on “domestication” to attain the sustainable aquaculture as well as to mitigate the pressure on coastal resources by providing stable and reliable supply of quality seeds from domesticated broodstock. However, to facilitate not only the mitigation efficacy but also availability of the aquaculture products, development of technology for selective breeding also needs to be established as well as the continuing effort toward the improved domestication. Selective breeding is also expected to enable small-scale farmers to practice aquaculture with lower investment through introduction of new and improved strains and genetic improvement of commercially important aquaculture species, which is essential to the promotion of sustainable aquaculture in the region. In the present project TF-5 beginning from 2010, therefore, selective breeding of commercially important species was targeted as one of the goals.

Most aquaculture practices for commercially-important species consist of “Aquaculture with Feeding”. Aquaculture feeds are highly dependent on fish by-catch under unregulated fisheries. This has also seriously affected the sustainability of coastal resources. Moreover, improper feeding regimes using low quality feeds have led to environmental pollution and degradation. Development of efficient/low-pollution diets and optimum feeding regimes will minimize the negative impacts of aquaculture feeds on the environment. Furthermore, this will optimize growth, survival, reproductive performance and production of healthy animals, and consequently contribute to the supply of safe aquaculture products to the region. Thus, the development of environment-friendly feeds is crucial to the promotion of sustainable aquaculture in the region.

Intensive aquaculture systems have been adopted on a large scale to increase production. As a result, a number of serious problems have emerged, including environmental degradation and disease outbreaks, which continue to plague the aquaculture industry in the region. Aside from the progress in the studies on diseases and pathogens, a wide spectrum of technological views is needed to solve these problems. A stressful environment has been proven to be a crucial risk factor that can lead to disease outbreaks in the TF4 activity. Based on that, one of the best ways to prevent disease outbreaks is to design farm management practices that will minimize stressors in the culture system.

Because institutional investment on aquaculture development has mainly centered on “research” and “development”, importance of the sustainable and responsible aquaculture has not been adequately disseminated in rural communities yet. The successful adoption of aquaculture technologies in the

ASEAN region may pave the way to livelihood improvement and poverty alleviation of rural communities. However, there is a lack of human resource to mediate the transfer of knowledge and practices of sustainable aquaculture technologies between researchers and fisherfolk. There is also a lack of practical ordinances or policies on responsible aquaculture practices in the level of the local government units. These may constrain the extension and adoption of sustainable aquaculture technologies. To achieve sustainability in the region, a holistic approach that includes seminar/lectures/training should be implemented.

Specified training focusing on the culture of important fisheries commodities such as giant freshwater prawn, mud crab, and seaweed 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.

In summary, TF-5 practically aims to contribute not only to the promotion of sustainable aquaculture but also to the stable supply of safe aquaculture products through the region-oriented and environment-friendly manner.

2. PROGRAM

2.1 Objectives

The objectives of the Program are to: (1) 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; (2) develop environment-friendly and cost-effective practical feeds using ingredients available in the 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 lesser developed countries in the region through demonstration, training, lecture/seminar and publication activities.

2.2 Program Description

The Aquaculture Department of SEAFDEC will be responsible for this project and will manage and coordinate all project activities. Other ASEAN Member Countries which have been identified as core countries in the project will be involved in implementing the relevant activities on a cost-sharing basis.

The present project involves five major activities. The first one aims at 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. The development of technology for the mass production of carrageenophytes *Kappaphycus* spp. plantlets with improved traits is also included in this activity as well as the development of hatchery technology of emerging species with a pressing need to develop breeding, seed production and culture techniques.

Efficient and low pollution feeds for various stages of commercially important aquaculture species such as milkfish, grouper, mud crab, black tiger shrimp and freshwater prawn using feed ingredients available in the region as replacement for imported fish meal is focused in the second activity. Likewise, surveys of the availability and quality assessment of feed resources in the Philippines and selected developing countries in Southeast Asia (Cambodia, Laos and Myanmar) are conducted. Guidelines on proper feeding management to obtain optimal feed performance and to reduce the negative impacts of improper feeding on the environment will be established.

Based on the analysis of risk factors and other epidemiological data gathered so far, a management scheme to prevent or control shrimp diseases will be designed in the third activity. Efficiency of the designed scheme will be tested by means of simulated tank and pond experiments which will be verified by farm trials. The project will analyze the socio-economic impact of the transfer and adoption of aquaculture technologies in selected sites as the fourth activity. The institutional and socio-economic factors that help or hinder the adoption of the technology are identified.

As the fifth activity, the results of the various studies in the project will be disseminated through the conduct meetings, training courses, demonstration farm, lecture/seminar especially in the lesser developed ASEAN Member Countries and publication of manuals and/or textbooks.

All the activities/sub-activities involved in this project are in line with the Resolution and Plan of Action, which were endorsed in ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 held at Bangkok in June 2011.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1. Activities Achievements in the Year 2011

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

Sub-activity 1.1 Selective breeding of mud crabs *Scylla serrata*

Based on the various formalin levels tested, 30 and 40 ppm were found to be a good method for larval quality assessment at 3h. For the starvation test, percent survival values of replicates overlapped with those obtained from poor quality batches of larvae although there was significantly higher mean survival in good batches of larvae. For the challenge test, the mean cumulative mortality was highest in crab juveniles exposed to 10^8 (90.5%), followed by 10^7 (52.4%), 10^5 (47.6%) and 10^6 (33.3%) cfu *Vibrio harveyi*/ml after 10 days. Selective harvesting started on the 4th month. Females that attained functional or morphological maturity (wide and dark abdomen; ≥ 450 g BW) were transferred to maturation tanks for evaluation of reproductive performance.

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

A total of 95 females and 92 males from Bohol, Southern Davao, and Antique were used as base population. Although collection was done in February 2010, maturation was only achieved from September 2010 to early part of February 2011. One female rematured and two females had repeated spawning. Of the 13 spawnings, only 10 resulted in nauplii production. However, 5 of these batches of nauplii did not reach PL (post larvae) 15 stage, especially all those that hatched from January to early February 2011. No maturation was observed since mid February this year. Juveniles of the 5 F1 batches have grown to 5-10g. Viral analysis revealed that some stocks were positive for WSSV at the second step of the nested PCR analysis. Infected stocks were isolated and rejected. The median lethal dose of *Vibrio harveyi* used ranged from 3×10^2 to 3×10^5 cfu/shrimp. A control group injected with shrimp saline was also included. Results indicated that the highest test concentration of 3×10^5 cfu/shrimp resulted in more than 50% survival even after 2 weeks of rearing. Thus, another run was conducted using higher doses of up to 3×10^6 cfu/shrimp. Results gave a computed median lethal dose of $3 \times 10^{5.65}$ cfu/shrimp.

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

From last year's run, it was determined that the breeding performance of the OC (SEAFDEC/AQD-BFS hatchery-domesticated breeders) and NC (newly collected wild spawners) stocks in different spawning enclosures (cage and tanks) showed no significant difference in terms of fecundity, PL production *etc.* However with regard to growth, one trial conducted in tanks showed the NC strain performed better than the old hatchery stock (OC). This could be an indication that domestication is beginning to have an adverse effect on prawn growth. This year, a broodstock management scheme was used to improve or minimize the impact of domestication on the prawn hatchery stocks. Within strain and reciprocal crosses between the two prawn strains were stocked in tanks for breeding and growth assessment. Monthly samplings are being done to assess the efficacy of the method.

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

Culture conditions in the laboratory were optimized. Explants from cultured *Kappaphycus* were grown in the laboratory and tanks. Seaweeds will be transferred to cages when they reach 5 cm long. Approximate date of transfer is September 2011. In November, if seaweeds are healthy, seaweeds will be transferred to the farm.

Sub-activity 1.5 Development of hatchery technology of emerging species

Monthly monitoring of gonadal maturation was done for Pompano *Trachinotus blochii* and Kikiro *Scatophagus argus*. Mature oocytes were observed in Pompano since January. Kikiro starts to mature starting in June during the onset of rainy season. Experiment to determine hormone concentration was conducted in Pompano (1000 IU, 500 IU, 250 IU, 100 IU). Based on the result of our preliminary experiment highest fertilization rate was obtained in 500 IU. To determine the optimum salinity requirement for larval rearing of pompano (newly hatched larvae to day 5), different salinities were tested (5, 10, 15, 20, 25, 30 ppt). High survival rates were observed in 25 and 30 ppt.

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

Sub-activity 2.1 Development of efficient and low pollution feeds for grow-out and broodstock

Feeding experiments were done to investigate the effect of partial fishmeal replacement with cowpea meal (*i.e.* 0, 15, 30, and 45%) in diets of grow-out *Macrobrachium rosenbergii*. Preliminary results showed that although no significant differences were found among any of treatments, prawns fed the 45% cowpea meal-based diet showed the best performance for all the parameters evaluated (*i.e.* mean final weight, % weight gain, SGR and survival rate). Confirmatory feeding trials on *M. rosenbergii* will be performed in tank- and lake-based cages.

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

The proximate nutrient component of feed ingredient samples from 2010 and the additional 28 feed ingredient samples collected during the period were all analyzed. The samples included those obtained from Palawan and from Myanmar which were obtained during a trip for another activity. Results of feed ingredient survey will be reviewed and about 5 feed ingredients will be selected based on its availability and levels of important nutrients.

Activity 3. Establishment of managing technology of aquaculture environment

Tank experiments confirmed low temperature and low salinity as WSSV risk factors. Viral load in WSSV experimentally infected shrimp cultured in small tanks with tilapia decreased from 10^1 to 10^0 WSSV/mg sample, while those in control increased to 10^5 .

A total of 224 shrimp farmers from 5 provinces were interviewed: 79 from Pampanga, 47 from Bataan, 33 from Zamboanga del Sur, 35 from Zamboanga Sibugay, and 30 from Lanao del Norte. Majority of the farmers in the first 4 provinces mentioned were into extensive shrimp polyculture with milkfish, tilapia and/or crab. Shrimp was polycultured with milkfish in Lanao del Norte. Three farmers into *P. monodon* monoculture using the greenwater technology claimed good production despite presence of WSSV in adjacent farms.

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

Using the sustainable livelihoods framework (DFID, 2004) as a model, an interview schedule was made to assess the factors that enhance or constrain the adoption of the technology. The questions were built around the five livelihood assets, namely, social capital, financial capital, natural capital, human capital, and physical capital. Household survey on sixty non-cooperators was made in two sites. Initial findings showed that Guimaras respondents relied mostly in fishing, while those in Dumarao were mostly engaged in farming. Most (92%) of them had positive attitude towards aquaculture. However, 2/3 of them preferred limited culture operations in their locality. Only thirty cooperators (Dumarao) were interviewed. The cooperators claimed that aquaculture (tilapia culture) gave them a chance to still use their submerged farmlands productively.

Activity 5. Technology extension and demonstration

Sub-activity 5.1 Giant freshwater prawn production training program

A training course on freshwater prawn breeding and farming was conducted from 21 March-1 April. This session was supposed to be held in late 2010 but was moved to the first quarter of 2011 (a typhoon that damaged the roof of the prawn hatchery facility at Binangonan Freshwater Station, SEAFDEC/AQD). Seven participants (one each from Cambodia, Indonesia and Malaysia and four from the Philippines) attended the course.

Sub-activity 5.2 Regional dissemination of mud crab farming program

Arrangements were made to conduct the international training course on mud crab culture focusing on hatchery in Myanmar scheduled from 26 September to 1 October 2011. Resource persons are scientists/researchers of SEAFDEC/AQD and the Department of Fisheries, Myanmar.

Sub-activity 5.3 Regional dissemination black tiger shrimp farming program

No Activity in 2011

Sub-activity 5.4 Marine fish hatchery training program

The training course was conducted as scheduled on 20 June-26 July 2011 with 10 participants from Cambodia (1), China (2), India (1), Singapore (3), Sri Lanka (1), and the Philippines (2). Of the 10 participants, 3 had GOJ-TF fellowship grant. The training course was implemented smoothly and participants were able to experience the larval rearing of several species of marine fish such as milkfish, grouper, seabass, snapper, pompano, and rabbitfish which timely spawned during the training duration. A new topic which was included in the course content was "Food safety in production and handling of marine fishes".

Sub-activity 5.5 Abalone hatchery training program

The training course was conducted from 07-27 July 2011 with 9 participants from Cambodia (1), Thailand (1), and Philippines (7). Of the 9 participants, 3 were funded by GOJ-TF. In addition to relevant topics related to abalone seed production and grow-out culture, topics on Stock Enhancement of Threatened Species, and Food Safety in Abalone Production and Processing were added into the training content. Practical session on planting of seaweeds at IMS was also included in consideration to the comments made by the previous trainees, due to the fact that seaweeds are important food source for abalone.

Sub-activity 5.6 Seaweed farming training program

(No Activity in 2011)

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

The on-line course started on 21 March until 22 July 2011 with 10 participants from Brunei Darussalam (1), Cambodia (1), Indonesia (2), Malaysia (1), Myanmar (1), Thailand (1), Guyana (1), and Philippines (2). Of the 10 participants, 8 had GOJ-TF training fellowship grant. Before the 1st long exam was given, one Filipino participant working in Malaysia dropped out because he got a new job not anymore related to aquaculture. At first, most of the participants actively participated in the learning activities and discussion board/forum, however, as the course progressed there were some who failed to do so. Reminders were sent to the participants and to those who persistently failed to participate, and their respective supervisors/council directors were notified.

To improve the course, there were comments/suggestions from the participants that it would be best if concepts and information be presented in more concise manner, shorter but clearer. In addition, it was stated that information overload is mentally taxing and tends to put students out of focus or lose interest.

Sub-activity 5.8 Rural aquaculture program

The training of trainers on community-based freshwater aquaculture for remote rural Areas of Southeast Asia has been scheduled on 11-20 October.

Activity 6. Publication

Material(s) for publication will be selected and published.

Activity 7. Annual progress meeting and international workshop

Sub-activity 7.1 Annual progress meeting

Annual meeting will be held in 2012 to review the project achievements.

Sub-activity 7.2 International workshop

(No Activity in 2011).

Activity 8. Coordination by Project Leader

In response to the recommendation by the evaluator in 2010 that the sustainable aquaculture group should actively exchange ideas/ opinions and collaborate closely with each other, periodical meetings were carried out and opportunities were enhanced to give constructive opinions to each other on their activities. Semi-annual meeting was held on 3 August to confirm the progress of respective activities and sub-activities.

3.2. Evaluation of the Program Outcomes Till the Year 2011

3.2.1. Theme and Issue

<p>(1) Theme: Promotion of Sustainable and Region-Oriented Aquaculture Practices</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>
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3.2.3 “Steps” toward achieving final goals:

<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; and • 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; and • Transfer of technical through capacity building to Member Countries.

Step 3:

- 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; and
- Workshop/seminar.

3.2.4 Activities in the current project:

(1) Current position of the project: Step 1

(2) Total project duration: 2010-2014

(3) Main activities

- 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; and
- Technology extension and demonstration.

3.2.5 Progress and achievements of the current project:

(1) Activities conducted in the current project

- 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; and
- To verify and disseminate the project achievements especially in the lesser developed countries in the region through demonstration, training, lecture/seminar and publication activities.

(2) Achievements at this moment

- The dipping test of larvae into 30 and 40 ppm formalin solution for 3 hrs was proved to be a good method of batch quality assessment for mud crab *Scylla serrata*. Since dose dependent cumulative mortality was confirmed by injection of *Vibrio harveyi* in the range of 108-0 CFU/ml to mud crab, the challenge test using *V. harveyi* could be expected to be another effective method for quality assessment.
- The challenge test using *V. harveyi* for black tiger shrimp *Penaeus monodon*, gave a computed median lethal dose of $3 \times 10^{5.65}$ CFU /shrimp, showing that this test could also be effective for quality assessment of *P. monodon*.
- A broodstock management scheme, comprising of a) reciprocal mating where males from line one will be paired off with females from the other line and *vice versa* and b) frequent broodstock replenishment, was used to improve or minimize the impact of domestication on the giant freshwater prawn *Macrobrachium rosenbergii* hatchery stocks and on-going to validate.
- Culture conditions for *Kappaphycus* sp. in the laboratory were optimized. Preliminary experiments on administering hormone to Pompano (1000 IU, 500 IU, 250 IU, and 100 IU) showed the highest fertilization rate was obtained in 500 IU. To determine the optimum salinity requirement for larval rearing of pompano (newly hatched larvae to day 5), different salinities were tested (5, 10, 15, 20, 25, 30 ppt) and high survival rates were observed at 25 and 30 ppt.

<ul style="list-style-type: none"> • Feeding experiments investigating the effect of partial fishmeal replacement with cowpea meal (<i>i.e.</i> 0, 15, 30, and 45%) in diets of grow-out <i>M. rosenbergii</i> preliminarily showed that although no significant differences were found among any of treatments, prawns fed the 45% cowpea meal-based diet had the best performance for all the parameters evaluated (<i>i.e.</i> mean final weight, % weight gain, SGR and survival rate). • The proximate nutrient component analyses for feed meal samples obtained in Palawan showed high proportions of crude protein (>50%), ash content (>35%) with crude fat levels of less than 4%. Samples from Myanmar showed a variety of feed ingredients of plant origin, including steamed and full-fat soybean meals and also cakes (where crude fat had been removed or extracted) of peanut, sesame and ground nut. Feed ingredients from Myanmar of plant origin were high in CP and CF and these were not commonly found in the Philippines. • Tank experiments confirmed low temperature and low salinity as white spot syndrome virus (WSSV) risk factors. Viral load in WSSV experimentally infected shrimp cultured in small tanks with tilapia decreased from 101 to 100 WSSV/mg sample, while those in control increased to 105. • Cooperators in Dumarao, representing an inland freshwater fishery, responded that technology provided opportunity for them to use their submerged farmlands for aquaculture venture. They ranked tilapia culture second (30%) to farming (50%) as the most important household occupational activity that contributes to their household income and food. • Four training courses: giant freshwater prawn production; aqua-nutrition online; marine fish hatchery; and abalone hatchery, were implemented in the first half of 2011, and two courses: mud crab culture; rural aquaculture, will be implemented in the second half of 2011. 	
(3) Expected outcome during the project period and expected achievement rate till the end of next year	
	Expected outcome
	Achievement rate (%)
1)	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
2)	To develop environment-friendly feeds for marine fish and crustaceans from regionally available ingredients
3)	To establish managing technology of aquaculture environment
4)	To assess and analyze impact of transfer and adoption of sustainable aquaculture technologies for fisherfolk in the region
5)	To disseminate and demonstrate the aquaculture technology

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

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

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

Sub-activity 1.1 Selective breeding of mud crabs Scylla serrata

The selection process at various phases of culture will be applied in subsequent generations. The response of mud crabs to selection on growth, reproductive performance and disease resistance will be evaluated. Analysis of genetic diversity of succeeding generations and possible identification of genetic markers for the selected beneficial traits will be initiated.

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

Monitoring of the survival and growth curves of the existing batches will be continued until broodstock size is attained. The resulting broodstock will be evaluated based on reproductive performance which will be compared with that of the base population. Improved performance will be one criterion for selection. F2 will be produced from the selected stocks from each family. Larval performance of the F2 stocks will be compared with the F1 through stress tests.

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

A new prawn stock from a different source shall be used to improve the performance of the current hatchery stock. The best broodstock management strategy (reciprocal mating scheme or broodstock replenishment) developed and identified in year 2011 will be adopted. Once completed, the results of the study will be written and published in a scientific journal and the technology will be disseminated to prawn hatchery operators/farmers through training or popular publications (manuals).

Sub-activity 1.4 Mass production of plantlets with improved traits

(This sub-activity will finish at the end of 2011.)

Sub-activity 1.5 Development of hatchery technology of emerging species

Monthly monitoring of gonadal maturation of both Pompano *Trachinotus blochii* and Kikiro *Scatophagus argus* will be continued to establish the spawning cycle. Optimum sex ration for spawning will be determined in Pompano. Experiments for spawning induction will be done in Kikiro if there are available males. Experiments to determine optimum conditions for larval rearing will be done especially in Kikiro (photoperiod, light intensity, and turbidity).

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

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

The digestibility of cowpea meal in diets of *M. rosenbergii* will be determined. The feeding experiment on broodstock giant freshwater prawn will be continued. Studies on other marine species (*i.e.* milkfish) will be proposed to test new diet formulations for this species. Growth performance and the effect of feeding of various diets to this species will be evaluated.

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

The digestibility of nutrients (crude protein and crude fat) in selected feed ingredients will be conducted on the commonly cultured species in the region (milkfish and/or tilapia). Results from this work and together with published works on these species will be used in formulating digestible diets for optimal feed performance.

Activity 3. Establishment of managing technology of aquaculture environment

Farm management techniques used by commercial shrimp farmers will be compared in terms of input, production and disease occurrence. Different farm practices will be analyzed to determine/identify which among the protocols prevent or control diseases of all etiologies. Based on the identified protocols/ practices, a farm management scheme will be designed to prevent or control shrimp disease. Risk factors and other epidemiological data gathered from TF 4 will also be taken into consideration in making the design. Designed management scheme to prevent or control shrimp diseases will be verified in small ponds that had previous disease history especially WSSV infection. Trials will be done during the wet/cold and dry/warm seasons/months. Different water/soil parameters and shrimp health will be monitored.

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

Study on impact analysis of technologies transfer and adoption will finalize analyses of field data based on details of production of growers.

Activity 5. Technology extension and demonstration

Sub-activity 5.1 Giant freshwater prawn production training program

There are several commercially valuable freshwater prawn species particularly under the Genus *Macrobrachium*, giant freshwater prawn. This sub-activity will extend and demonstrate the production technique of *Macrobrachium* spp. to the trainees.

Sub-activity 5.2 Regional dissemination of mud crab farming program

(No Activity in 2012)

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

(No Activity in 2012)

Sub-activity 5.4 Marine fish hatchery training program

Aquaculture of high-value marine fish continues to develop rapidly in Southeast Asia. This sub-activity implements a month-long training program to demonstrate the broodstock and spawning techniques, larval and nursery rearing techniques, nutrition and health management in grouper, seabass, snapper, etc.

Sub-activity 5.5 Abalone hatchery training program

Fundamental and essential hatchery and grow-out technologies on the donkey's ear abalone *Haliotis asinina* will be disseminated through a training course. In addition, topics on stock enhancement, and food safety in abalone production and processing were added into the training content.

Sub-activity 5.6 Seaweed farming training program

(No Activity in 2012)

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

A balanced diet for fish is important in ensuring fast growing, healthy, and disease-free fish and shrimps as well as minimizing environmental impacts of feeding. This sub-activity will offer the essential and fundamental information on fish nutrition, feed formulation, feed management and economics of feeding. The learner is expected to formulate and prepare diets for aquaculture, apply proper feeding management and practices, and develop cost-efficient diets for cultured species.

Sub-activity 5.8 Rural aquaculture program

To promote and disseminate appropriate community-based freshwater aquaculture technology for remote rural areas of Southeast Asia, SEAFDEC/AQD under this sub-activity will conduct a Training of Trainers on Community-based Freshwater Aquaculture for fisheries extension officers responsible for development/implementation of technology transfer of freshwater aquaculture in support of rural development for poverty alleviation and sustainable livelihood.

Activity 6. Publication

Manuals, posters, pamphlets and flyer describing the sustainable aquaculture will be published and distributed.

Activity 7. Annual progress meeting and international workshop

Sub-activity 7.1 Annual progress meeting

The project achievement implemented by study leaders will be reviewed by external evaluators.

Sub-activity 7.2 International workshop

(No Activity in 2012)

Activity 8. Coordination by the project leader

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 the present project under TF-5 will promote sustainable aquaculture in Southeast Asia.

4.2 Expected Outcomes in the Year 2012

The envisaged outcomes for the third year are to: 1) promote selective breeding technologies in mud crab, black tiger shrimp, and giant freshwater prawn; 2) demonstrate digestibilities of cowpea meal in diets of *M. rosenbergii* and of crude protein and fat in selected ingredients of environment-friendly feeds of milkfish and tilapia; 3) design best farm management scheme for shrimp culture to manage technology of aquaculture environment; 4) analyze field data on impact analysis of technologies transfer and adoption based on details of production of growers; and 5) implement training courses on giant freshwater prawn, aqua-nutrition online, marine fishes, abalone, mud crab and rural aquaculture in order to enhance region-oriented sustainable aquaculture.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Resource Enhancement of Internationally Threatened and Over-exploited Species in Southeast Asia through Stock
Lead Department:	Aquaculture Department
Lead Country:	The Philippines
Total Duration:	2010-2014

1. INTRODUCTION

Resource conservation of diminishing populations of the CITES-listed threatened and endangered species as well as the high value, commercially important but over-exploited species has been a pressing issue in the Southeast Asian region. Replenishing depleted resources may be done by regulating fishing effort, restoring degraded nursery and spawning habitats and/or through stock enhancement. The Southeast Asian Fisheries Development Center (SEAFDEC) is an intergovernmental organization established to promote sustainable fisheries development in the region. To address the issue on resource conservation, especially of the threatened or endangered species, 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 4 (TF-4) since 2005. Under this project, SEAFDEC Aquaculture Department (AQD) has been conducting studies on basic methodologies of seed production and/or release strategies for seahorse, Napoleon wrasse, sea cucumber, giant clam, donkey’s ear abalone and angelwing clams that are CITES-listed and/or over-exploited species.

Although stock enhancement is an effective approach that can sustain or enhance depleted resources, basic technologies and information on stock enhancement are still lacking in the Southeast Asian countries. Based on the progress of the former Program (TF-4) and the up-to-date concept and policies of stock enhancement, the proposed project aims at replenishing resources of internationally threatened and over-exploited species in Southeast Asia through environment-friendly stock enhancement. In addition, the project will promote to transfer basic technologies and information on stock enhancement to member countries through training courses. The program will contribute both to the world-wide concern on the resource conservation of the said species and to the sustainable utilization and exploitation of natural coastal resources in the region through environment-friendly manners.

2. PROGRAM

2.1 Objectives

The objectives of the Program are to: (1) establish resource enhancement strategies of CITES species and regionally over-exploited species; (2) establish stable seed production technologies appropriate for release with genetic consideration; (3) develop stock enhancement strategies including site assessment, stock release, monitoring and recapture, taking into consideration impact of release on wild population and other species; (4) develop a sustainable utilization and exploitation of natural coastal resources through stock enhancement; (5) establish guidelines and demonstration sites, and to conduct seminars/lectures on stock enhancement practices in Southeast Asia; (6) assess and evaluate the socioeconomic impacts of stock enhancement to fishery stakeholders and management strategies suitable for adoption in fishing communities; and (7) transfer basic technologies and information on stock enhancement to member countries.

2.2 Program Description

The Aquaculture Department of SEAFDEC will be responsible for this project and will manage and coordinate all project activities.

The present project will try to restore stock levels of some species listed in CITES (sea horse *Hippocampus* spp. and Napoleon wrasse *Cheilinus undulatus*) and those heavily-exploited but economically-important species in Southeast Asia (sea cucumber *Holothuria scabra*, donkey's ear abalone *Haliotis asinina*, and mud crabs *Scylla* spp.) through stock enhancement program and to enhance community-based management of the stocks and socioeconomic strategies. Adaptive measures supporting endeavor of replenishment of tropical aquatic resources under the changing environment such as climate change will be also covered in the present project.

SEAFDEC/AQD will achieve an environment-friendly and sustainable stock enhancement program through the establishment of seed production technologies that take into account the preservation of the genetic diversity and release procedures so that unintended negative impacts of stock release on the wild populations and the other species should be minimized. In this project, therefore, information about the population of the species concerned, their habitats and fisheries conditions will be gathered prior and subsequent to any attempts of stock release.

An effective stock enhancement program can be accomplished by establishing release strategies such as tagging methods, optimum size-at-release, site selection, conditioning animals prior to release, and construction of artificial shelters. These strategies can improve survival of the released animals in the wild.

A holistic stock enhancement program can be complemented through socio-economic studies that will identify appropriate community-based strategies for successful implementation of stock enhancement program. The proposed project will also include on-site seminars/lectures for various stakeholders to enhance local awareness about and cooperation in stock enhancement activities.

The efficacy of resource enhancement largely depends on environmental capacity. Nowadays however, degradation of natural habitats for tropical aquatic life rapidly deteriorates due to a changing environment, particularly through climate change. To maximize the effectiveness of resource enhancement, this project will seek adaptive measures to maintain a healthy environment.

The expected outputs of the project will include the establishment of strategies and guidelines of stock enhancement through sustainable, responsible and environment-friendly approach. The significant achievements of the project will be disseminated to ASEAN Member Countries to promote environment-friendly resource enhancement in the Southeast Asian region.

All the activities/sub-activities involved in this project are in line with the Resolution and Plan of Action, which were endorsed in ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 held at Bangkok in June 2011.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

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

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

- 1) Seahorses were stocked in illuminated sea cages in March 2011 but resulted to mass mortalities due to strong waves and turbid water. Another batch was stocked in May 2011. Monitoring is on-going.
- 2) Elastomer tags study not yet implemented.
- 3) Construction of bamboo pens was delayed due to availability of bamboo poles. Seahorses were stocked in the pen on July 28, 2011.
- 4) Preparation of questionnaires and coordination with station head of Taklong Marine Reserve on-going.

Sub-activity 1.2 Stock enhancement of Napoleon wrasse, Cheilinus undulates

Visit was made to Palawan Aquaculture Corporation, Coron, Philippines, in April to do feeding experiment and monitor gonadal maturation of Napoleon wrasse.

Activity 2. Stock enhancement of regionally over-exploited species

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

Hapa raised 3,250 juveniles were released to ocean nursery, and hatchery raised sandfish juveniles were transferred to sea culture pens in June and July 2011. Sandfish population was surveyed in February and June 2011. Wild broodstock from Sagay were collected for spawning trial in TMS and larvae were produced in March and April 2011.

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

From January 2011, a total of 55 abalone have been collected from all 10 transects. Of these, 56.4% were wild, 1.8% recaptured-wild and 41.8% recaptured-hatchery released in August 2010. Recent findings showed that abalone also have preference to bleached massive corals and dead mushroom corals. Initial results of the genetic variability analysis of abalone samples showed that, of the 155 samples, both haplotype and nucleotide diversities were lower in hatchery-bred abalone than their wild conspecifics.

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

From the commencement of the study in July 2010, a total of 13,454 crabs have been collected weighing 1.67 tons and comprised of 81.56% *S. olivacea*, 18.34% *S. tranquebarica* and 0.10% *S. serrata*. For the first half of 2011 at 10 sampling days per month, a total of 6,984 crabs have been identified, measured and weighed. Of these, 80.25% were *S. olivacea*, 19.67% *S. tranquebarica* and 0.07% *S. serrata*. Mud crab yield from 60 days of sampling was 968.20 kg. Analysis of all crabs sampled from July 2010-June 2011 showed that they have significant negative correlation with temperature. *S. olivacea* had significant negative correlation with temperature while *S. tranquebarica* significant positive correlation. Catchability of *S. olivacea* was significantly higher during full moon than new moon while *S. tranquebarica* during new moon

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

The study implemented the community-based resource enhancement demo-site in Brgy Molocaboc to improve awareness and participation of stakeholders. The BFARMC members constructed pens and hapa cages for cucumbers and buoy markers for the abalone demo-site with supervision from AQD. Consensus building meetings settled multiple use conflicts in inter-tidal flats. Participation of BFARMC will continue through monitoring of the juveniles and “guarding” of the demo-site with advise from SEAFDEC/AQD. Information dissemination activities for fishers and traders will be enhanced.

With reference to findings on genetic characteristics of AQD abalone stocks and depending on Program direction, the planned periodic release of abalone juveniles and ranching of sea cucumber seeds in the demo-site may continue for a year as appropriate. Livelihood options are being planned to complement resource enhancement goals and in preparation for successful exit strategies.

Activity 3. Training course

The training course was conducted on 12-20 July 2011 with 5 participants from Cambodia (1); Myanmar (1); Sudan (1); Philippines (2). Lectures and practicals not only on seed production of quality seeds for release, seed production in the hatchery, larval rearing, selection of good quality seeds and nursery rearing, but also on marine ecosystems & coastal resource management, habitat resources management/ enhancement/restoration, site assessment were done. Introduction on stock enhancement in ecosystems of mangroves, seagrass, seaweeds and coral reefs together with topics on community-based strategies & governance, socio-bio-economic strategy and education & information dissemination were also included.

Activity 4. Publication

Material(s) for publication will be selected and published.

Activity 5. Annual progress meeting and international workshop

Sub-activity 5.1 Annual progress meeting

Plans for holding the annual progress meeting with external evaluators have been made. The schedule will be finalized based on the availabilities of all evaluators.

Sub-activity 5.2 International workshop

No Activity in 2011.

Activity 6. Coordination by Project Leader

Through consultation with study leaders and actual site-observation by the project leader, the enforcement of the socio-economic study was recognized.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Resource enhancement of internationally threatened and over-exploited species in Southeast Asia through stock release

(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/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 goals 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 managed sea ranching and socioeconomic strategies;
- To establish adaptive measures supporting resource enhancement for a changing environment; and
- To disseminate and demonstrate resource enhancement practices.

3.2.3 “Steps” toward achieving final goals:

Step 1:

- 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; and
- Implementation of training course.

Step 2:

- Development of release technology and establishment of spawning induction technology;
- Habitat and population profiling, releasing experiments, and seminars and on-site training; and
- Analyses of relationships between environmental factors and biological characteristics Dissemination of resource enhancement practices.

Step 3:

- 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; and
- Workshop/seminar.

3.2.4. Activities in the current project:

(1) Current position of the project: Step 1
(2) Total project duration: 2010-2014
(3) Main activities <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>; and - Stock enhancement of Napoleon wrasse, <i>Cheilinus undulates</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.; and - 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:

(1) Activities conducted in the current project <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, monitoring and recapture, 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 guidelines and demonstration sites, and to conduct seminars/lectures on stock enhancement practices in Southeast Asia. • To assess the socioeconomic impacts of stock enhancement to fishery stakeholders, and to identify and evaluate socioeconomic approaches and management strategies suitable for adoption in fishing communities. • To transfer basic technologies and information on stock enhancement to Member Countries.
(2) Achievements at this moment: <ul style="list-style-type: none"> • Growth of seahorse <i>Hippocampus comes</i> reared in illuminated sea cages were compared among different stocking density groups (15, 25 and 50/m²). There was no significant difference in daily growth rate (DGR) in stretched height (0.28-0.39 mm/day) and body weight (8.22-11.91 mg/day) among group, although the highest and lowest DGRs were observed in 25/m² and 50/m², respectively. • No experiment on seed production technology in Napoleon wrasse <i>Cheilinus undulates</i> was able to be performed, because of the very low hatching rate (< 1.0%) and the inadequate quality and quantity of the larvae enough for the experimental run. • Broodstock of sandfish <i>Holothuria scabra</i> obtained from Molocaboc Island were brought to Tigbauan Main Station for induced spawning and juvenile production. Two larval batches were produced in March and April and were reared to juvenile stage. In Molocaboc Island, the sandfish floating ocean nursery and broodstock pen were ready with collaboration with the BFARMC officers in May, juveniles (>5mm) totaling 3,250 were transported from the TMS sandfish hatchery & Igang Marine Station to the ocean nursery in Molocaboc in June and July. • From January 2011, a total of 55 abalone <i>Haliotis asinina</i> have been collected from all 10 transects. Of these, 56.4% were wild, 1.8% recaptured-wild and 41.8% recaptured-hatchery released on August 2010. Wild abalone were recaptured up to a maximum of 278 days post

<p>release while the second released abalone up to 294 days. All recaptured abalone were caught from the transect where they were originally released. Abalone habitat preference parallels the findings in previous years showing high positive correlation of abalone number with dead branching corals with encrusting algae.</p> <ul style="list-style-type: none"> • Mud crab yield from 60 days of sampling was 968.20 kg. Individual daily yield ranged 0.48-7.17 kg. Individual catch per unit effort (CPUE) in terms of quantity (crab gear-1 day-1) ranged 0.10-1.38 while in terms of biomass (g gear-1 day-1) ranged 9.60-213.54. Analysis of all crabs sampled from July 2010-June 2011 showed that they have significant negative correlation with temperature. <i>S. olivacea</i> had significant negative correlation with temperature while <i>S. tranquebarica</i> significant positive correlation. Catchability of <i>S. olivacea</i> was significantly higher during full moon (means±S.E. = 78.9±1.0%) than new moon (73.3±1.1%) while <i>S. tranquebarica</i> during new moon (26.7±1.1%) than full moon (20.9±1.0%). • The community-based resource enhancement was implemented using demo-site in Brgy Molocaboc to improve awareness and participation of stakeholders. Drafting of guidelines and schedule for managing and “guarding” the abalone and sea cucumber demo-site were done in April. The tagged abalones were released on 9 June, participated by Sagay Marine Reserve (SMR) staff, Brgy Molocaboc local government units (LGU), SEAFDEC/AQD, BFARMC officers, and the fishers, men and women of the Barangay. 	
(3) Expected outcome during the project period and expected achievement rate till the end of next year	
Expected outcome	Achievement rate (%)
1) To establish mass production technology and broodstock management, and to develop methodology of stock enhancement practice of internationally threatened species (species listed in CITES)	60%
2) To establish release strategies of regionally over-exploited species and to verify the effectiveness of community managed sea ranching and socioeconomic strategies	60%
3) To establish adaptive measures supporting resource enhancement for a changing environment	30%
4) To disseminate and demonstrate resource enhancement practices	60%

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

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

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

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

1) Continue observation of efficacy of elastomer tags on seahorses; 2) Continue monitoring of seahorses in pens; 3) Continue site assessment and monitoring of Taklong Island, Guimaras for release of seahorses; and 4) Collection of seahorse tissue samples for genetic analysis.

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

Procure breeders to be stocked in Tigbauan Main Station, SEAFDEC/AQD. If breeders will be available, they will be conditioned to breed in captivity. Monthly monitoring will be done to check gonadal maturation. If larvae will be available, experiments on feeding preferences will be conducted. Experiments to determine optimum conditions for larval rearing will be also done (light intensity, photoperiod, and aeration level). If breeders will not be available we will explore other method to enhance the population of Napoleon wrasse in the wild such as case study of cage culture of Napoleon wrasse in Tawi tawi. Site assessment and stock assessment will be done around the cage area in Sibuto, Tawi tawi. Determine the quality and types of habitat around area. Genetic analysis of captured wild juvenile and breeders in cages will be done to establish that the method they practice in Tawi tawi can be a good alternative method to enhance the population of Napoleon wrasse in certain area.

Activity 2. Stock enhancement of regionally over-exploited species

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

1). Target to raise an accumulated total of > 5,000 release size juveniles in 2012 to be freed in sea ranching site; 2) Collaborate with Socio-economic Team to draft an ordinance on size regulation for sandfish in Molocaboc Island; 3) Monitor sandfish population in sea ranching site and vicinity with local partners and possibly undertake experimental harvests; and 4) Undertake an assessment with the local partners on the viability of community managed sea ranching and nursery rearing as an economic and a management strategy to sustain the sea cucumber fishery in the Island.

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

Continue monitoring of wild and released stocks in Sagay; genetic analysis of samples sent to Tohoku University.

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

Monthly monitoring of crab landings in the new site for baseline assessment of wild population; collection of samples for genetic analysis.

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

Verifying the efficacy of the community-based stock management strategies through information, education and communication (IEC) as well as abalone demo-site activities will be continued. In addition new challenges and trails for introducing culture technologies of abalone and seaweed, *Gracilaria*, will be given not only to complement the stock management strategies, but also to secure livelihood development. Penetration and acquirement of culture technology transferred to the community will be monitored. Appropriate management scheme for the culture system is encouraged to be established in the community through IEC. The adoption of the abalone catch-size regulation in Brgy Molocaboc is scaled-up into a city-wide regulation, and its compliance is monitored. Similar size regulation for sea cucumber will be introduced to local stakeholders, including traders.

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

Sub-activity 3.1: Adaptive measures for coral replenishment

Coral reefs possess important functions as nursery, feeding, and/or spawning grounds for numerous aquatic species including internationally threatened and over-exploited species in Southeast Asia. However, recent changes to the environment due to climate change threaten the healthy functions of coral reefs. To maximize efforts to enhance the populations of the said species, coral survival and growth must be secured. The physiological performance of corals is linked to the type (clades) of zooxanthellae they possess as symbionts. The coral-zooxanthellae symbiosis can be disrupted by various stressors. Warming resulting in reef-wide bleaching events due to expulsion of these symbiotic zooxanthellae is one of the most serious stressors. However, there are no known methods and/or technologies that may be used to avoid or mitigate these events effectively. This sub-activity shall investigate and clarify the thermal tolerance of selected tropical coral species through analyses of coral-zooxanthellae symbiosis. Future applications of these activities may include efficient assessments of vulnerability to climate change of potential sites for resource enhancement and possible development of seed production technology for zooxanthellae-coral pairs that are more resilient to thermal stress. In 2012, relationships between the ambient temperature in selected coral reef sites and the symbiont density will be analyzed. In addition, methodologies in categorizing coral symbionts will be evaluated and zooxanthellae clades associated with specific coral species shall be identified.

Activity 4. Training course

(No Activity in 2012)

Activity 5. Publication

(No Activity in 2012)

Activity 6. Annual progress meeting and international workshop

Sub-activity 6.1 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.

Sub-activity 6.2 International workshop

(No Activity in 2012)

Activity 7. Coordination by the project leader

The project leader will coordinate and encourage the research and dissemination, and also facilitate information exchange not only between activities but also among member countries so that the present project under TF-5 will promote environment-friendly resource enhancement technology in Southeast Asia.

4.2 Expected Outcomes in the Year 2012

The envisaged outcomes for the third year are 1) refinement of sea-pen culture and reproduction technologies of CITES-listed species; 2) baseline information on regionally over-exploited species and fisheries community; and 3) information on coral-dinoflagellate symbiosis under different environments.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Accelerating Awareness and Capacity-building in Fish Health Management in Southeast Asia
Lead Department:	Aquaculture Department
Lead Country:	The Philippines
Total Duration:	2010-2014

1. INTRODUCTION

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. The concept of “healthy and wholesome” holistic approach to aquaculture was one of the six themes under Sustainable Aquaculture during the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security in the New Millennium: “Fish for the People” that was held in Bangkok in November 2001. Aquaculture in Asia 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.

There is also a growing pressure for developing countries to meet the various standards required by the global market. 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 to enhance health of important aquatic species in Southeast Asia fisheries and aquaculture, but also the urgent acceleration of awareness and capacity building in fish health management in Southeast Asia. The latter would provoke small farmers and family-based enterprises composing a large sector of aquaculture in Southeast Asia 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.

Of the technical aspect, the establishment of preventive management strategies should be pointed out as one of the most important development 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 other than chemotherapy, to prevent fish disease is increasing worldwide so as to guarantee food safety. This has accelerated studies on vaccination in recent years. However, at present, there are only a few commercially available vaccines for aquaculture animals, especially for shrimp, due to technical problems with vaccine production and delivery. 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 use of probiotic bacteria has advanced in the last decade with the main objective of preventing bacterial diseases. The use of probiotic bacteria as a vaccine carrier could also contribute to increased productivity and food safety.

Regarding parasitic diseases, especially the study and expertise on mollusk diseases are yet 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, pertinent data on the parasite fauna in Southeast Asian countries, especially Cambodia, Lao PDR and Myanmar, have not been fully investigated, while

comprehensive studies in the Philippines have already been conducted. Thus, the study investigating the occurrence of parasite fauna of mollusks and freshwater fish should be undertaken, especially for new or emerging disease. The need for a regional survey on parasites in freshwater fishes which are potentially harmful to humans was also emphasized during the 41th Meeting of the Council of the Southeast Asian Fisheries Development Center.

In the Government of Japanese Trust Fund V (TF-5), the present project on Fish Health Management focuses on the acceleration of delivery of information and awareness-building among the aquafarmers. At the same time, research and technology development should remain as significant activities to sustain SEAFDEC's role as "A Leading Fish Disease Technology Center in the Region". An integrated fish-health-care system expected to be established through this project will ensure a holistic approach to a stable supply of safe aquaculture products.

2. PROGRAM

2.1 Objectives

The objectives of the Program 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.

2.2 Program Description

The Aquaculture Department of SEAFDEC will be responsible for this project and will manage and coordinate all project activities.

The Aquaculture Department of SEAFDEC initiated the Fish Disease Projects by Japanese Trust Fund in response to many request for intensive research in fish health problems. Phase I (2000 to 2004) focused on technologies to control diseases through timely and accurate recognition, sound diagnostic capabilities, and control measures for various diseases. Phase II (2005-2009) focused on disease surveillance activities based on the results of the earlier program.

This project involves the following: 1) compilation of 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 develop and produce learning materials to further disseminate and sustain the activity; 2) investigation on the parasite fauna in abalone and freshwater fish and its diagnosis, pathology and host-parasite relationship; 3) refinement and application of molecular diagnostic methods 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; 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; and 6) evaluation of various carriers for shrimp vaccination and to establish practical delivery methods and efficacy under field conditions.

Thus this project on fish health management, which could be designated as Phase III (2010-2014), focuses on the acceleration of delivery of information and awareness-building among the aquafarmers. Particularly, the rationale of the present project is on the greater dissemination of the said knowledge, especially to the Member Countries whose fish health management capacity still needs to be developed and improved. Dissemination activities especially in Myanmar, Cambodia, Laos PDR and the Philippines need to be enhanced and accelerated because technical and administrative systems to carry out the tasks and duties necessary for the efficient control of diseases and for consumer protection are still inadequate.

At the same time, research and technology development should remain as significant activities to sustain SEAFDEC's role as "A Leading Fish Disease Technology Center in the Region". An

integrated fish-health-care system expected to be established through this project will ensure a holistic approach to a stable supply of safe aquaculture products.

Project monitoring and evaluation will include annual progress reports, regular meetings and workshop.

All the activities/sub-activities involved in this project are in line with the Resolution and Plan of Action, which were endorsed in ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 held at Bangkok in June 2011.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

3.1.1 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

Preparation of documents under 1.2 for uploading to the website. Following the Myanmar survey, a parallel survey was conducted in four regions in Luzon, Philippines. As in Myanmar, the Luzon survey confirmed the lack of proper awareness of fish health management concepts as well as environmental and food safety issues among small-scale fishfarmers. The surveys also highlight the need for hands-on training to build their technical capacities rather than other modes of delivery. Thus, new information were disseminated through on-site training courses conducted in Myanmar on parasite detection with emphasis on zoonotic pathogens /parasite fauna with zoonotic potential. A poster is being developed for parasite monitoring in AQD stations. This will also be distributed to target countries when printed.

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

Tissue samples of tilapia were collected from different regions of the Philippines: Region II-Cagayan Valley (60 fish); Region III-Central Luzon (120 fish) and Region IV-A Southern Tagalog (60 fish) in March 2011 for the analysis of zoonotic parasites by muscle compression and pepsin-HCL artificial digestion techniques. Results showed that tissue filtrates from fish samples from mentioned above yielded negative results for zoonotic parasites. Further, no significant parasitic infestations of the skin mucus and gills were observed. Zoonotic parasites were not detected among the tilapia samples collected from different provinces of Luzon, Philippines. Completed results have been forwarded to BFAR Philippines.

Analysis of fish (tilapia) samples for zoonotic parasites from Region VI is ongoing. Collection of freshwater fish samples from Regions VII (Cebu), X (Bukidnon) and XI (Davao) will be collected on the 3rd and 4th Quarter of 2011. On-site basic training on Freshwater Fish Health Management in Lao PDR will be conducted on the 3rd or 4th Quarter of 2011.

3.1.2 Innovative research to guarantee food safety and sustainable production

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

WSSV plasmid as positive control was already developed while for VNN plasmid is on-going. This plasmid development is part of the optimization of the q-PCR methods. Optimization of q-PCR method for WSSV using infected tissue was already completed while using the plasmid is on-going. WSSV isolate was already tissue-passed thrice and the infected tissue material is ready for the preliminary infection experiment in determining the threshold level of the virus and in the susceptibility of different shrimp species. Development of plasmid as positive control, optimization of q-PCR methods and partly LAMP for other shrimp and fish viruses will continue. Preliminary run will be conducted on the susceptibility of *P. monodon* and *P. vannamei* to WSSV.

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

Continued monitoring of nodavirus-neutralizing antibody titres in the sera of vaccinated (Vac) sea bass pre-broodstocks were conducted 2, 4 and 6 months after the 3rd booster vaccination in October 2010.

Neutralizing antibody titers in the sera of 2 (n=10), 4 (n=7), and 6 (n=13) months post-booster Vac sea bass ranged from 1:7764 ~ 1:2480 (mean: 12796), 1: 6442 ~ 1:10240 (7961), and 1: 3162 ~ 6310 (4152), respectively. On the contrary, all parallel controls, *i.e.* unvaccinated (UVac) sea bass pre-broodstocks, have neutralizing antibodies <1:40. Matured Vac (3 females and 6 males; ratio 1:2) and UVac (1 female and 2 males) sea bass were intramuscularly injected with luteinizing hormone releasing hormone (LHRH) at 100 µg/ kg body weight last 24 May 2011. Similarly, parallel UVac fish (1 female: 2 males) were injected with the same dose of LHRH. Spawned eggs (pooled 100g) from both Vac and UVac fish were then collected, washed in sterile seawater (SSW) 3 times, and subsequently subjected to betanodavirus detection by RT-PCR amplification and cell culture isolation. Both samples were negative for betanodavirus detection by cell culture isolation. On the contrary, eggs from UVac fish were found positive (nested) for betanodavirus by RT-PCR amplification. Furthermore, both eggs from Vac and UVac spawners were subjected to seroneutralization assay for the detection of maternal neutralizing antibodies. Mean neutralizing antibody titres of 1: 192 and <1: 40 (mean of 5 replicates) were respectively detected in the eggs of Vac and UVac fish. Collection of blood samples from the caudal vein of Vac and Uvac for seroneutralization assay will be continued from July until December 2011. Moreover, second induce spawning will also be conducted.

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

Bacteria were isolated from the intestine of cultured tilapia and carp in Feb 2011 at the Binangonan Freshwater Station. Five and 6 bacterial strains were isolated from tilapia (n=21) and common carp (n=29). Antiviral screening was conducted following the method of Kamei et al (1987). All bacterial strains tested did not exhibit anti-nodavirus activity. Five and 3 bacterial strains were also isolated from the intestine of common carp (n=20) and bighead carp (n=7), respectively. These strains did not also exhibit anti-nodavirus activity. Seven bacterial strains were also isolated from 17 cultured *Siganus guttatus* (MBW: 350 g), collected from Igang Marine Station (IMS). All isolates tested did not otherwise exhibit anti-nodavirus activity. *Ulva pertusa* were collected from fish net cages in IMS. Collected seaweeds were washed in sterile seawater and shade dried, cut into small pieces and powdered in a mixer grinder. Extraction was conducted using ethanol and the resulting extracts were concentrated to dryness with a rotary evaporator. The extract was dissolved in sterile NSS and tested against *Escherichia coli* (ATCC 25922), *Staphylococcus aureus* (ATCC 25923), *Pseudomonas aeruginosa* (ATCC 27853), *Vibrio alginolyticus* (isolated from eye of diseased pompano), and *Vibrio harveyi* (isolated from kidney of diseased sea bass). Amoxicillin (10 µg) served as control. Antibacterial assay was conducted using the cup-well method. Aqueous extract at 10⁵ µg showed maximum inhibition (31 mm) against *S. aureus*, higher than the antibacterial activity (28 mm) of the control (Amoxicillin). Growth of *S. aureus* was otherwise inhibited when exposed to 5 × 10⁴ µg (27 mm), 2.5 × 10⁴ µg (24 mm), 1.25 × 10⁴ µg (20 mm), 6.25 × 10³ µg (12 mm), and 3.125 × 10³ µg (4 mm). Similarly, *V. alginolyticus* showed inhibition zones of 32 mm and 29 mm when exposed to 10⁵ µg and 5 × 10⁴ µg of aqueous extracts, respectively. In addition, a minimal inhibition zone of 6 mm was noted in *Vibrio* sp. exposed to the highest dose of the aqueous extract tested. On the contrary, no antibacterial activity was noted in *E. coli* and *P. aeruginosa* exposed to the highest dose of the extract. The antibacterial and antiviral activities of the extract will be tested against other *Vibrio* spp. and betanodavirus, respectively.

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

A 2010 trial showed improved survival to a formalin-inactivated WSSV vaccine. Tank trials are being conducted to test different delivery vehicles for a recombinant sub-unit vaccine. To prepare laboratory-scale quantities of the recombinant vaccine for use in various vaccine+carrier complexes, a transformed BL21 *E. coli* cells was produced. The bacterial cells, upon induction with IPTG, were able to produce the recombinant VP28 protein in a previous trial. A preliminary test run previously conducted showed the vaccine without carrier to be protective, but the delivery needs optimization. In the meantime, WSSV-screened *P. monodon* postlarvae obtained from a private hatchery tested nested-step positive following one month culture in tanks. PCR-screened (WSSV and IHNV) juveniles were obtained from a private farm and are being acclimated in tanks.

Parasitic and shell diseases of abalone (*Haliotis asinina*) in Philippines

The screening for parasites and shell diseases of abalone reared in cage grow-out (n=260) (IMS) and in the wild (n=60) (Sabang, Guimaras) was continued from January to June 2011. Approximately 75% of cage grow-out abalone and 50% of wild abalone had brown shell blisters on the internal surface of their shells. Mudworm-related lesions, including burrows, cracked shells, sponges and barnacles were detected in cage

grow-out and wild abalone. Gross examination revealed shells fouled with the presence of burrowing polychaetes, belonging to the family Serpulidae (prevalence, 48%), Spionidae (prevalence, 55%) and Dorveillidae (prevalence, 76%) were found in grow-out stock. In addition, Serpulidae were found in 42%, Dorveillidae in 23% and Spionidae in 15 % of the wild abalone examined. Values of the condition index (CI) calculated monthly showed significantly decline in CI found in heavily infected abalone.

Parasitological screening of hatchery-reared abalone is ongoing. Histological slide preparation and analysis of these samples are currently ongoing. Cohabitation experiments of uninfected and infected abalone by shell-boring polychaetes and their effect on the health of abalone will be conducted.

3.1.3 Dissemination of Output of the Project

Publication of new information into popular materials

VNN Manual will be reproduced and distributed to government field officers in target countries. Drafts of flyers on VNN, WSSV, pathogens with zoonotic potential, development of vaccines for economically important marine species and shrimp, epidemiology and WSSV risk factors are being prepared.

Reproduction and distribution of VNN Manual and printing and distribution of flyers to small-scale fishfarmers will be done.

Maintenance and updating of website contents

Preparation of documents under 3.1 for uploading to the website. Uploading of PDF of documents under 3.1 to the website.

3.1.4 Annual progress meeting and international workshop

Annual progress meeting: No Activity in 2011

International workshop: The preparatory meetings on the international workshop started from end of July. Based on the availability of resource persons, the workshop will be held on 1st and 2nd March 2012.

3.1.5 Coordination by Project Leader

Semi-annual meeting was held on 5 August to confirm the progress of respective activities and sub-activities. Project leader will encourage study leaders for their progress of the activities/ sub-activities. Project achievements will be monitored periodically. Annual progress report will be prepared.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Accelerating awareness and capacity-building in fish health management in Southeast Asia</p> <p>(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 including Japan. 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 to enhance health of important aquatic species in Southeast Asia fisheries and aquaculture, but also the urgent acceleration of awareness and capacity building in fish health management in Southeast Asia.</p>
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3.2.2 Expected final goals 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 the parasite fauna in 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 goals:

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 parasites in freshwater fish in Cambodia, Lao PDR and Myanmar.
- 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.

Step 2:

- 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.

Step 3:

- Plan and implement guided research and information dissemination.
- Completion of baseline information on 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 1
(2) Total project 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; and - 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; and - Parasitic and shell diseases of abalone (<i>Haliotis asinina</i>) in the Philippines. • Dissemination of output of the project through publication and international workshop.

3.2.5 Progress and achievements of the current project:

<p>(1) Activities conducted in the current project</p> <ul style="list-style-type: none"> • 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 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, those 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.
<p>(2) Achievements at this moment:</p> <ul style="list-style-type: none"> • Following the Myanmar survey done in 2010, a parallel survey was conducted in four regions in Luzon, the Philippines. As in Myanmar, the Luzon survey confirmed the lack of proper

awareness of fish health management concepts as well as environmental and food safety issues among small-scale fishfarmers. The surveys also highlight the need for hands-on training to build their technical capacities rather than other modes of delivery. Thus, new information were disseminated through on-site training courses conducted in Myanmar on parasite detection with emphasis on zoonotic pathogens /parasite fauna with zoonotic potential.

- Tissue samples of tilapia were collected from different regions of the Philippines for the analysis of zoonotic parasites. Zoonotic parasites were not detected among the tilapia samples collected from different provinces of Luzon, Philippines. Completed results have been forwarded to BFAR Philippines. On-site basic training on Freshwater Fish Health Management in Lao PDR has been scheduled on 11-14 October 2011.
- WSSV plasmid as positive control was already developed while for VNN plasmid is on-going. This plasmid development is part of the optimization of the q-PCR methods. Optimization of q-PCR method for WSSV using infected tissue was already completed while using the plasmid is on-going. WSSV isolate was already tissue-passed thrice and the infected tissue material is ready for the preliminary infection experiment in determining the threshold level of the virus and in the susceptibility of different shrimp species.
- Neutralizing antibody titers in the sera of 2 (n=10), 4 (n=7), and 6 (n=13) months post-booster Vac sea bass ranged from 1:7764 ~ 1:2480 (mean: 12796), 1: 6442 ~ 1:10240 (7961), and 1: 3162 ~ 6310 (4152), respectively. On the contrary, all parallel controls, *i.e.* unvaccinated (UVac) sea bass pre-broodstocks, have neutralizing antibodies <1:40. Spawned eggs (pooled 100g) from both Vac and UVac fish were then collected and subsequently subjected to betanodavirus detection by RT-PCR amplification and cell culture isolation. Both samples were negative for betanodavirus detection by cell culture isolation. On the contrary, eggs from UVac fish were found positive (nested) for betanodavirus by RT-PCR amplification.
- Bacteria were isolated from the intestine of cultured tilapia and carp. All isolated bacterial strains tested did not exhibit anti-nodavirus activity. *Ulva pertusa* were collected from fish net cages in IMS. Extraction was conducted using ethanol. The extract was dissolved in sterile NSS and tested against *Escherichia coli* (ATCC 25922), *Staphylococcus aureus* (ATCC 25923), *Pseudomonas aeruginosa* (ATCC 27853), *Vibrio alginolyticus* (isolated from eye of diseased pompano), and *Vibrio harveyi* (isolated from kidney of diseased sea bass). Aqueous extract at $10^5 \mu\text{g}$ showed maximum inhibition (31 mm) against *S. aureus*, higher than the antibacterial activity (28 mm) of the control (Amoxicillin). Growth of *S. aureus* was otherwise inhibited when exposed to $5 \times 10^4 \mu\text{g}$ (27 mm), $2.5 \times 10^4 \mu\text{g}$ (24 mm), $1.25 \times 10^4 \mu\text{g}$ (20 mm), $6.25 \times 10^3 \mu\text{g}$ (12 mm), and $3.125 \times 10^3 \mu\text{g}$ (4 mm). Similarly, *V. alginolyticus* showed inhibition zones of 32 mm and 29 mm when exposed to $10^5 \mu\text{g}$ and $5 \times 10^4 \mu\text{g}$ of aqueous extracts, respectively. In addition, a minimal inhibition zone of 6 mm was noted in *Vibrio* sp. exposed to the highest dose of the aqueous extract tested. On the contrary, no antibacterial activity was noted in *E. coli* and *P. aeruginosa* exposed to the highest dose of the extract.
- A 2010 trial showed improved survival to a formalin-inactivated WSSV vaccine. Tank trials are being conducted to test different delivery vehicles for a recombinant sub-unit vaccine. To prepare laboratory-scale quantities of the recombinant vaccine for use in various vaccine+carrier complexes, a transformed BL21 *E. coli* cells was produced. The bacterial cells, upon induction with IPTG, were able to produce the recombinant VP28 protein in a previous trial. A preliminary test run previously conducted showed the vaccine without carrier to be protective, but the delivery needs optimization.
- The screening for parasites and shell diseases of abalone reared in cage grow-out showed approximately 75% of cage grow-out abalone and 50% of wild abalone had brown shell blisters on the internal surface of their shells. Mudworm-related lesions, including burrows, cracked shells, sponges and barnacles were detected in cage grow-out and wild abalone. Gross examination revealed shells fouled with the presence of burrowing polychaetes, belonging to the family Serpulidae (prevalence, 48%), Spionidae (prevalence, 55%) and Dorveillidae (prevalence, 76%), were found in grow-out stock. In addition, Serpulidae were found in 42%, Dorveillidae in 23% and Spionidae in 15 % of the wild abalone examined. Values of the condition index (CI) calculated monthly showed significantly decline in CI found in heavily infected abalone.

(3) Expected outcome during the project period and expected achievement rate till the end of next year

Expected outcome	Achievement rate (%)
<ul style="list-style-type: none"> • To accelerating awareness about fish health management in resource-deprived countries through industry-wide capacity building. 	60%

<ul style="list-style-type: none"> To guarantee food safety and sustainable production through innovative research. 	60%
<ul style="list-style-type: none"> To disseminate output of the project. 	60%

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

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

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

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

Using a survey questionnaire, fishfarmers and key persons will be interviewed and their farming practices will be documented to know the status of fish health management in small-scale aquaculture in Cambodia, their level of awareness of fish health management concepts and other production-related issues, and capacity-building needs. Information dissemination on primary aquatic animal health care will be implemented through AQUA-Health Online training course to boost staff capability. Dissemination of new information through various media will continue to further sustain the activity.

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

Parasite fauna especially those with zoonotic potential of both wild and cultured freshwater fish will be investigated and on-site basic training course on freshwater fish health management with emphasis on fish parasites will be implemented in Cambodia. Parallel sampling will also be done in some regions in the Philippines where freshwater fish farming activities are widely practiced will be chosen as sampling areas. In addition, formulation of prophylactic, prevention and control methods of these zoonoses will be conducted.

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

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

WSSV plasmid as positive control was already developed and that for VNN plasmid is on-going. The q-PCR and LAMP methods for the remaining shrimp (IHHNV, TSV and IMNV) and fish viruses (Iridovirus and KHV) will be continuously developed and optimized. The susceptibility experiment of different shrimp species to WSSV also will be implemented.

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

Induced spawning of sexually matured sea bass and pompano will be conducted during the spawning season. Eggs, newly hatched larvae, and post-larvae from both vaccinated and unvaccinated fish will be subjected to NNV detection by RT-PCR and cell culture isolation. Also, the betanodavirus-neutralizing antibody titer in eggs and newly-hatched larvae will be determined. Importantly, the duration and degree of protection conferred by maternal antibodies in offspring will also be investigated.

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

The antibacterial and antiviral properties of the extract from *Ulva pertusa* was confirmed in 2011 activities. They will be further tested using other fish bacterial and viral pathogens in 2012. Importantly, the practical applications of the extract will be tested in vivo via the oral and injection routes of administration.

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

For sustainable shrimp production, reduction of virus-associated mortality is a crucial challenge in shrimp culture. This needs technical development of practical delivery of vaccine with suitable carriers, because the vaccine must be protective, and yet the delivery needs optimization for better efficacy under farm conditions. Various booster vaccination schemes (immersion followed by oral delivery through the feed or oral delivery all throughout) will be tested and challenge experiments are conducted to clarify effective dosage and vaccine-to-carrier ratios using live and inactivated recombinant bacteria, probiotic (LAB) bacteria, lipid vesicles and chitosan.

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

Screening of parasites in different stages of hatchery-reared abalone and from the wild will be continued. In addition, this study will also investigate the pathogenicity of shell-boring polychaetes and parasites through experimental infection (cohabitation) to determine their effect on the health and growth of cultured abalone. Different methods of prevention will also be conducted and established.

Activity 3. Dissemination of Output of the Project

Sub-activity 3.1 Publication of new information into popular materials

Outputs from the project will be disseminated through manuals, flyers, field guides, etc. among the member countries. These documents will be made available to all stakeholders to maintain a high level of awareness of the issues, challenges, and possible solutions to problems pertaining to fish health management in small-holder aquaculture.

Sub-activity 3.2 Maintenance and updating of website contents

(No activity in 2012)

Activity 4. Annual progress meeting and international workshop

Sub-activity 4.1 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.

Sub-activity 4.2 International workshop.

No activity in 2012

Activity 5. Coordination by the project leader

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 the present project under TF-5 will promote awareness and capacity-building in fish health management in Southeast Asia.

4.2 Expected Outcomes in the Year 2012

The envisaged outcomes for the third year are as follows: 1) information dissemination on primary aquatic animal health care through AQUA-Health Online training course; 2) on-site seminars on fish health management and survey on parasite fauna of freshwater in Cambodia; 3) development and optimization of q-PCR and LAMP methods for remaining shrimp (IHHNV, TSV and IMNV) and fish viruses (Iridovirus and KHV); 4) demonstration of betanodavirus-neutralizing antibody titer in eggs and newly-hatched larvae and determination of the duration and degree of protection conferred by maternal antibodies in offspring in sea bass and pompano; 5) clarification of antibacterial and antiviral properties of the extract from ulva; 6) evaluation of various booster vaccination schemes; and 7) the pathogenicity of shell-boring polychaetes and screening of parasites in different stages of hatchery-reared abalone and from the wild.

PROGRAM DOCUMENT

Program Category:	Program under the Fisheries Consultative Group of the ASEAN-SEAFDEC Strategic Partnership (FCG/ASSP) Mechanism
Program Title:	Food Safety of Aquaculture Products in Southeast Asia
Lead Department:	Aquaculture Department, in collaboration with MFRD
Lead Country:	The Philippines
Total Duration:	2010-2014

1. INTRODUCTION

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. Government regulations are becoming stricter on the uncontrolled use of chemicals due to their adverse effects on human health, the environment and the development of pathogen resistance. Many chemicals have already been banned and the use of some is being regulated. The spectrum of allowable chemicals for aquaculture is becoming narrower, with the trend towards the use of environment friendly mitigating agents geared to a more responsible approach to aquaculture.

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. Moreover, there are very limited data available on the withdrawal period of antibiotics and the presence of chemical residues in aquaculture products from the region, a considerable portion of which are exported to developed countries. 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 that will allow farmers to increase production of safe food using the environment-friendly technologies that will be developed by implementing the proposed project. 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. PROGRAM

2.1 Objectives

The objectives of the Program 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) Investigate the status of antibiotics and chemical use in aquaculture in Southeast Asian countries; and (4) Compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture to the ASEAN region.

2.2 Program Description

The Aquaculture Department of SEAFDEC will be responsible for this project and will manage and coordinate all project activities. Other ASEAN Member Countries, which have been identified as core countries will be contacted for possible collaboration on the surveillance of chemicals usage/regulation, and the analysis of the target chemicals under a cost-sharing basis.

Surveillance activity of chemical contaminants such as pesticides, mycotoxins and antibiotics will be continued based on the results of TF4. The expected outputs for the project will include the establishment of guidelines on appropriate administration and withdrawal of chemicals that are easily adopted by the fish farmers in the ASEAN region. The guidelines will also be useful for some possible action or policy formulations by governments of the ASEAN Member Countries. Seminars and lectures on food safety awareness for stakeholders will be conducted annually. Project monitoring and evaluation will include annual progress report/meeting, publication of project achievements and International Workshop.

All the activities/sub-activities involved in this project are in line with the Resolution and Plan of Action, which were endorsed in ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 held at Bangkok in June 2011

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Achievements in the Year 2011

3.1.1 Withdrawal period of antibiotics in milkfish, *Chanos chanos* and some freshwater fish species cultured in the tropics

Preparation of antibiotic-mixed diet (with oxytetracycline and oxolinic acid), medicated diet feeding for 10 days and post- medicated diet feeding for 45 days were completed. Oxolinic acid was extracted and analyzed from the muscles of the fish during the 10-day accumulation period and until the 18th day of the withdrawal period. The project will continue the extraction and analysis of oxolinic acid, as well as the oxytetracycline until the end of the 45 days post-medicated diet feeding.

3.1.2 Surveillance of chemical contaminants in aquaculture products and feeds

Aquaculture products in cages and ponds from Palawan province included the following species: grouper, snapper, sea bass, milkfish and shrimp. About 85% of samples including in 2010 have been analyzed for OXA. Four samples were confirmed OXA positive. The detector of HPLC was repaired and no work on OTC was done. Standard for organochlorine pesticides was checked on our GC-ECD and few samples were analyzed for the residue. Determination of OXA and OTC in samples will be continued.

3.1.3 Investigation of the situation of antibiotics/chemicals usage and regulations in aquaculture

A copy of the draft ASEAN guidelines from DOF Malaysia has been requested which will prevent TF5 from unnecessarily duplicating what has already been accomplished by DOF Malaysia in coming up with guidelines on chemical use in aquaculture in the ASEAN. The draft ASEAN guidelines on chemical use will be obtained from DOF Malaysia.

3.1.4 Guidelines on appropriate administration and regulation of antibiotics/other chemicals

Guideline preparation/publication: (No activity in 2011)

Training course/e-Learning: International Seminar on Food Safety in Aquaculture in Southeast Asia was held on 22 January 2011 Tigbauan, SEAFDEC/AQD. A total of 51 participants from 6 member countries. The following topics were discussed: 1) Food safety in aquaculture in Southeast Asia – principles, issues, problems, future outlook; 2) Good aquaculture practices: Current knowledge and future priorities; 3) Fish health, nutrition & food safety in aquaculture; 4) Hazard Analysis Critical Control Point (HACCP); 5) Technological tools-biological, chemical and physical evaluations; 6) Food safety management systems – policy and regulations; and 7) Food safety program in aquaculture: training and information needs and strategies.

3.1.5 Dissemination of food safety awareness and manual publication

Drafts on the flyers on good aquaculture practices, HACCP, and food safety management systems are being prepared. Flyers on good aquaculture practices, HACCP, and food safety management systems in aquaculture will be completed.

3.1.6 Annual progress meeting and international workshop

Annual progress meeting: The annual progress meeting with external evaluators will be held. The schedule will be finalized based on the availabilities of all evaluators.

International workshop: (No Activity in 2011).

3.1.7 Coordination by Project Leader

The present project activities were reviewed and their further progresses were encouraged through interviews with study leaders. Semi-annual meeting was held on 4 August to confirm the progress of respective activities and sub-activities.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

<p>(1) Theme: Food safety of aquaculture products in Southeast Asia</p> <p>(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 that will allow farmers to increase production of safe food using the environment-friendly technologies.</p>
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3.2.2 Expected final goals of the project:

<ul style="list-style-type: none"> • 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 investigate the status of antibiotics and chemical use in aquaculture in Southeast Asian countries; and • To compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture to the ASEAN region.

3.2.3 “Steps” toward achieving final goals:

<p>Step 1:</p> <ul style="list-style-type: none"> • Literature survey & method validation; • Acquisition of reagents, sample collection in Philippines and analysis of samples; • Surveillance of antibiotics/chemicals usage; and • Training course.
<p>Step 2:</p> <ul style="list-style-type: none"> • Administration trial & analysis; • Sample collection in other countries and analysis of samples; • Continued surveillance of antibiotics/chemicals usage; and • Continued training course and preparation of e-Learning.

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 /publication and e-Learning.

3.2.4 Activities in the current project:

(1) Current position of the project: Step 1
(2) Total project duration: 2010-2014
(3) Main activities <ul style="list-style-type: none"> • Withdrawal period of antibiotics in milkfish and some freshwater fish species cultured in the tropics. • Surveillance of chemical contaminants in aquaculture products and feeds. • Investigation of the situation of antibiotics/chemicals usage and regulations in aquaculture. • Guidelines on appropriate administration and regulation of antibiotics/other chemicals.

3.2.5 Progress and expected outcome of the project:

(1) Activities conducted in the current project <ul style="list-style-type: none"> • To establish guidelines on the proper usage of antibiotics and chemicals for farmers; • To survey and monitor the chemical contaminants in aquaculture products and feeds especially in developing ASEAN Member Countries; • To investigate the status of antibiotics and chemicals usage in aquaculture in the ASEAN countries; and • To promote food safety awareness from farm to fork following the established guidelines. 	
(2) Achievements at this moment <ul style="list-style-type: none"> • The drug residues on muscles in tilapia were evaluated up to the 18th day withdrawal period only. Concentration of OXA decreased rapidly after Day 1 of the withdrawal period, from 2.94±1.031 to 0.13±0.015 ppm on the 3rd day and dipped further to 0.06±0.011 ppm on the 6th day until it reached 0.018±0.006 on the 18th day. • Confirmed positive for OXA were tilapia sample from a cage in Batangas and bangus sample from a brackish water pond from south Palawan. Confirmed positive were also grouper samples from two sea cages in Palawan. In Negros Occidental, all samples were negative for OXA except for shrimp samples which are being processed for analysis. • A copy of the draft ASEAN guidelines from DOF Malaysia has been requested which will prevent TF5 from unnecessarily duplicating what has already been accomplished by DOF Malaysia in coming up with guidelines on chemical use in aquaculture in the ASEAN. • International Seminar on Food Safety in Aquaculture in Southeast Asia was held on 22 January 2011 Tigbauan, SEAFDEC/AQD. A total of 51 participants from 6 member countries attended. The following topics were discussed: 1) Food safety in aquaculture in Southeast Asia – principles, issues, problems, future outlook, 2) Good aquaculture practices: Current knowledge and future priorities, 3) Fish health, nutrition & food safety in aquaculture, 4) Hazard Analysis Critical Control Point (HACCP), 5) Technological tools-biological, chemical and physical evaluations, 6) Food safety management systems – policy and regulations, and 7) Food safety program in aquaculture: training and information needs and strategies. 	
(3) Expected outcome during the project period and expected achievement rate till the end of next year	
Expected outcome	Achievement rate (%)
• To contribute in the establishment of guidelines on the production of safe aquaculture products from Southeast Asia	60%
• To determine the presence and levels of commonly used chemicals in aquaculture in aquaculture products such as fish and shrimps	60%
• To investigate the status of antibiotics and chemical use in aquaculture in Southeast Asian countries	60%
• To compile and disseminate SEAFDEC guidelines on the use of antibiotics and chemicals in aquaculture to the ASEAN region	60%

4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

4.1 Planning of the Project Activities

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

Activity 1. Withdrawal period of antibiotics in milkfish, *Chanos chanos* and some freshwater fish species cultured in the tropics

Withdrawal period of antibiotics will be evaluated in grouper, a high value marine fish. Planned activities are medicated feed preparation, feeding experiments, extraction and analysis of the antibiotics from fish muscles during and after medicated-diet feeding. The result of this study, along with similar studies done previously on shrimp, milkfish and tilapia, will contribute to the establishment of guidelines for the production of safe aquaculture products in Southeast Asia.

Activity 2. Surveillance of chemical contaminants in aquaculture products and feeds

Commercial feed samples will be analyzed to check presence of antibiotics. The analyses of antibiotic residues and pesticides (20 organochlorine pesticides) residues in the remaining aquaculture products samples will be continued. Inexpensive methods of determining antibiotics in samples will be explored to bring down cost of analyses.

Activity 3. Investigation of the situation of antibiotics/chemicals usage and regulations in aquaculture

Guidelines for antibiotics/chemicals usage and regulations will be crafted as soon as the draft on the ASEAN guidelines on chemical use is available. The draft ASEAN guidelines would need to be supplemented so that a comprehensive guideline can be realized.

Activity 4. Guidelines on appropriate administration and regulation of antibiotics/other chemicals

Sub-activity 4.1 Guidelines preparation/publication

(No Activity in 2012)

Sub-activity 4.2 Training course/e-learning

A training course promoting food safety awareness among stakeholders will be implemented.

Activity 5. Dissemination of food safety awareness and manual publication

(No activity in 2012)

Activity 6. Annual progress meeting and international workshop

Sub-activity 6.1 Annual progress meeting

(No activity in 2012)

Sub-activity 6.2 International workshop

International Workshop entitled "Food Safety of Aquaculture Products in Southeast Asia" will be convened.

Activity 7. Coordination by the project leader

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 the present project under TF-5 will promote food safety of aquaculture products in Southeast Asia.

4.2 Expected Outcomes in the Year 2012

The envisaged outcomes for the third year are to: 1) determine the withdrawal period studies in grouper; 2) explore a new method of determining antibiotics in samples as well as to continue analyzing of antibiotics and chemicals in feed and aquaculture product samples; 3) craft TF5 guidelines as soon as the draft on the ASEAN guidelines on chemical use is available; and 4) to implement International Workshop on “Food Safety of Aquaculture Products in Southeast Asia”.

NON-FUNDED FCG/ASSP PROGRAMS IN 2011-2012

Program Title	Responsible Department	2011	2012
1. The Use of Indicators for Sustainable Development and Management of Capture Fisheries in the ASEAN Region	MFRDMD	N	X
2. Development of Integrated Inland Fisheries Management in ASEAN Countries	MFRDMD	N	X
3. Capacity Improvement of Fisheries Community for Fisheries Management and Alleviation of Poverty ¹⁸	TD/SEC	N	X

N = No activity implemented due to the unavailability of funding support

X = The 19th ASWGFi recommended the program to be removed list of 2012 programs

¹⁸ This program will be linked with the pipeline project on “Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management” prepared by TD in collaboration with SEC

Annex 9

**PROGRAMS OF ACTIVITIES UNDER OTHER PROGRAMS
FOR THE YEAR 2011-2012**

Program Title	Responsible Department	2011	2012
1. Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program (<i>Appendix 1</i>)	TD	Y	Y
2. Promotion of Inland Small-scale Fisheries Management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches (<i>Appendix 2</i>)	TD	Y	X
3. Safety at Sea for Small Fishing Boats (<i>Appendix 3</i>)	TD	Y	Y

Y = The program implemented during the year

X = The program was completed in 2011, but extended until 2012

PROGRAM DOCUMENT

Program Category:	Other Program
Program Title:	Cetacean Research in Southeast Asian Waters: Cetacean Sighting Program
Lead Department:	Training Department
Total Duration:	2008-2012

1. INTRODUCTION

Cetacean is one of the most distinctive and highly specialized orders of mammals meant whale, dolphins, and porpoises. They include the largest animal that has ever lived, the blue whale; the highly intelligent and communicative dolphins; the tusked narwhals and blind river dolphins and singing humpback whale, nearly eighty living species in all. Most species are marine but some dolphin species are found in both marine and freshwater such as Irrawaddy dolphin (*Orcaella brevirostris*) which is distributed in near shore tropical and subtropical marine waters, often associated with estuaries and mangrove forest. They also occur far upstream in the Ayeyarwady (formally Irrawaddy) river system of Myanmar, Makhakam river of Indonesia, and Mekong river system of Lao PDR, Cambodia, and Vietnam.

At present, information on composition of abundant of cetacean species in the Southeast Asian waters are still not sufficient. Most of cetacean research has been conducted based on the field observation, and stranded specimens recording at shore. Not many research works has been conducted by sighting survey. With regards to the survey plan of SEAFDEC research vessels in the Southeast Asia waters, cetacean species such as dolphin and whale were often found by sighting. Every year, more than 5000 nm the research vessel, namely M.V. SEAFDEC 2 has sailed to many sea areas in the region. In order to collect scientific information on the distribution and composition of cetacean species in Southeast Asian waters, the cetacean research by SEAFDEC was initiated since 2008.

2. PROGRAM

2.1 Objectives

The objectives of this project are to:

- 1) Develop regional inventory of all cetacean namely whale and dolphin found in the Southeast Asian Waters through the cetacean sighting program using SEAFDEC research vessels;
- 2) Gather information on the accidentally death of cetacean on the coastal area of the region;
- 3) Gather information on the cetacean sighting program existed in the Southeast Asian countries;
- 4) Enhance human resources capacity on the cetacean research works in the region; and
- 5) Disseminate information on species distribution in relation to the coastal and marine habitat/ecosystem in the Southeast Asian waters.

2.2 Program Description

In last two decades, cetacean distribution in the Southeast Asian water is very limited. Systematic study on whale and dolphin biology in the Member Countries has initiated in early 1990 by foreign researchers in collaboration with national academic institutions. At present, information has been obtained through stranded specimens and direct sighting surveys. Most of research works have been conducted mainly by responsible national agencies.

In Southeast Asian waters, many questions are raised up that “do we have large cetacean such as whale rather than dolphin coming near to the coastal area”. As it is noted that most of large cetacean are highly migratory species in the ocean and not often found around the continental shelf or coastal zone. However, the large cetacean has been found (stranded) and recorded frequently in the coastal areas in

the Southeast Asian waters. And one of the concerns raised up by the Member Countries during SEAFDEC Council Meeting was that the present declining of pelagic fish stock in the coastal area might have interaction with the large cetacean feeding behavior.

Therefore, for better understanding on cetacean distribution and interaction with fisheries from a regional perspective, this project provides a series of technical meetings and on-the-job trainings on the cetacean research work and its survey methodology. The program of activity includes the support of the cetacean sighting program by using SEAFDEC research vessels and others in close collaboration and coordination with the Member Countries and other responsible national agencies, such as the using of M.V. DA-BFAR of the Philippines, R.V. Chulabhorn and R.V. Mahidol under Department of Fisheries Thailand and Department of Marine and Coastal Resources – Thailand.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

3.1 Activities Achievements in the Year 2011

Activity Title	Duration	Remarks
1. Workshop/Consultation visit and preparation work	Nov	Organization of the Regional Workshop on Information Gathering of the Ocean Cetacean Research in the Southeast Asian Waters
2. Information gathering/ collection and actual survey	June~July	Information collection onboard cetacean sighting program by using FR.V. Mahidol, (Department of Fisheries, Thailand) and M.V. SEAFDEC 2
3. Data analysis and information dissemination	Dec	1)Media; and 2)Publication of the proceeding of the training workshop.

3.2 Evaluation of the Program Outcomes Till the Year 2011

3.2.1 Theme and issues:

(1) Theme: Information collection on cetacean in the Southeast Asian waters

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

- Only few information available for cetacean research program and activities implemented/ implementing in the region.
- Insufficient information of large cetacean in coastal habitat in the region.
- Inadequate coordination among relevant agencies at both national and regional levels on cetacean research and sighting program.

3.2.2 Expected final goals of the program:

- Regional inventory of the cetacean species (including inventory of stranding/death of cetaceans in the Southeast Asian waters).
- Information on whale and dolphin watching hotspots in the Southeast Asian waters.
- Better knowledge and understanding on large cetacean in coastal habitat and their interaction with fishing.

3.2.3 “Steps” toward achieving final goals:

Step 1: Review of information and data collection

- Information/data collection based on existing program/initiative in the region, and through technical consultation.

Step 2: Establishment of the inventory of the cetacean species and their abundance in the Southeast Asian waters

- Organization of the regional technical consultation/workshop for information collection and establishment of a core expert group on cetacean.
- Establishment of the inventory of the cetacean species and their abundance in the Southeast Asian waters.

<p>Step 3: Information exchange among national/regional experts on cetacean for its conservation, and information dissemination</p> <ul style="list-style-type: none"> • Establishment of a sharing mechanism at regional level for updating information and coordination among relevant initiatives related to cetacean research. • Publication of the list of cetacean abundance in the Southeast Asian waters.
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3.2.4 Activities in the current program:

(1) Current position of the program: Step 1, 2, and 3
(2) Project duration: 2008-2012
<p>(3) Main activities:</p> <ul style="list-style-type: none"> • Workshop and consultation visit for preparation works on whale sighting program; • Information gathering and actual survey by research vessels; and • Data analysis and information dissemination.

3.2.5 Progress and achievements of the current program:

<p>(1) Main activities conducted in the current program</p> <ul style="list-style-type: none"> • Workshop and consultation visit for preparation works on whale sighting program. <ul style="list-style-type: none"> - Organization of the 1st Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Region, TD, 30-31 July. - Organization of the 2nd Regional Workshop on Information Gathering and Oceanic Cetacean Research in the Southeast Asian Region, TD, November 2011. • Information gathering and actual survey by research vessels. <ul style="list-style-type: none"> - In the process of preparation for sending TD's staff to join actual cetacean sighting program on the research vessels, the Philippines and Thailand. • Data analysis and information dissemination. <ul style="list-style-type: none"> - Analyzing of data collected from the 1st and 2nd Regional Workshop on Information Gathering and Cetacean Research in the Southeast Asian Region. • Organization of the regional workshop on information gathering of the ocean cetacean research in Southeast Asian water (scheduled in late 2011). 									
<p>(2) Main achievements till the end of 2011</p> <ul style="list-style-type: none"> • Information on whale and dolphin found in the Southeast Asian Waters through actual sighting program (by SEAFDEC) and from information exchange among expert and researcher in the region. • Information on whale and dolphin hotspot in the Southeast Asia. • Draft Cetacean Identification techniques. • Information on the declining of Irrawaddy dolphin population in Mekong river. • Set of recommendations for future program/activity related to cetacean research program in the Southeast Asian Countries. • Establishment of cetacean specialist network in the Southeast Asia. 									
<p>(3) Outcomes during the program period and expected achievement rate till the end of 2011</p> <table border="1"> <thead> <tr> <th>Expected outcome</th> <th>Achievement rate (%)</th> </tr> </thead> <tbody> <tr> <td>1) Workshop and consultation visit for preparation works on cetacean sighting program</td> <td>100%</td> </tr> <tr> <td>2) Information gathering and actual survey by research vessels</td> <td>100%</td> </tr> <tr> <td>3) Data analysis and information dissemination</td> <td>100%</td> </tr> </tbody> </table>		Expected outcome	Achievement rate (%)	1) Workshop and consultation visit for preparation works on cetacean sighting program	100%	2) Information gathering and actual survey by research vessels	100%	3) Data analysis and information dissemination	100%
Expected outcome	Achievement rate (%)								
1) Workshop and consultation visit for preparation works on cetacean sighting program	100%								
2) Information gathering and actual survey by research vessels	100%								
3) Data analysis and information dissemination	100%								

3.2.6 Evaluation of program activities in 2011:

<p>Data recording from sighting surveys carried out by SEAFDEC and other collaborative agencies has been compiled. System of database for species abundance of cetacean in the region was discussed. As method for coastal cetacean observation and survey was already packaged, the workshop on information gathering of the oceanic cetacean research will be carried out in the region (scheduled in Nov 2011).</p>
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4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

The project activities will be implemented as follow:

Activity 1: Workshop/Consultation Visit and Preparatory Works on Cetacean Sighting Program

Activity includes participation of project staff to relevant events (*e.g.* the meeting to be organized by International Whale Commission) in order to promote SEAFDEC activities related to cetacean program and to exchange information among the cetacean scientists.

Activities 2: Support Information Gathering/Collection and Actual Survey

It is planned that the project can support the cetacean sighting activity for information gathering during the cursing of SEAFDEC's research vessels, namely M.V. SEAFDEC and M.V. SEAFDEC 2. It is envisaged that 2~3 cruises will be carried out in the year 2012. The activity under this category will also include the support participation of the project staff to the sighting survey by using national research vessels. The specific objectives of this activity are to: (i) carry out the cetacean sighting program in collaboration with the Member Countries; (ii) carry out the practical training to ship personnel onboard research vessels to enhance their knowledge and skill in cetacean sighting; and (iii) exchange knowledge among experts on the cetacean sighting program.

Activity 3: Data Analysis and Information Dissemination

The information/data collected through the project implementation will be compiled. It is planned that list of cetacean and their abundance in the Southeast Asian Waters will be documented. The outputs of the project implementation *i.e.* SEAFDEC activities in related with cetacean sighting, Manual/Handbook on Cetacean Identification and Appropriate Techniques in Population Assessment will be published and disseminated.

4.1 Planning of the Project Activities

Project/Activity Title	Duration	Remarks
1. Workshop/Consultation visit and preparation work		Participating to the international cetacean events organized by international organization <i>e.g.</i> International Whale Commission (IWR), The Institute of Cetacean Research in order to promote SEAFDEC activities on cetacean from 2008-2011.
2. Information gathering/ collection and actual survey		Continuation of the information collection onboard cetacean sighting program by using M.V. SEAFDEC 2 and/or other research vessels on cetacean abundance. Review available documents/references related to cetacean research.
3. Data analysis and information dissemination	Jun~Dec	1) Media; and 2) Publication of the proceeding of the training workshop.

4.2 Expected Outcomes in the Year 2012

Data collected through the sighting program carried out by M.V. SEAFDEC, M.V. SEAFDEC 2, and others will be compiled and input into the database system. Information on the hotspot based on project implementation will be disseminated through project website. Training manuals and materials produced for sighting survey, photo-identification techniques for dolphin observation/stock assessment, etc., will be packaged for references. Overview on the cetacean interaction with fisheries will be outlined.

PROGRAM DOCUMENT

Program Category:	Other Program
Program Title:	Promotion of Inland Small-scale Fisheries Management Through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches
Lead Department:	Training Department
Lead Country:	Lao PDR and Myanmar
Total Duration:	2008-2011
Proposed Budget:	USD 20,000

1. INTRODUCTION

Since the adoption of the FAO Code of Conduct for Responsible Fisheries in 1995, SEAFDEC has implemented various activities to promote responsible fisheries in Southeast Asia. Starting with the regionalization of the global code into regional contexts and production of Regional Guidelines for Responsible Fisheries in Southeast Asia from 1998 to 2006 (covering responsible fishing operations, responsible aquaculture, responsible fisheries management, and responsible fisheries post-harvest practices and trade); this was followed by translation of the guidelines to national languages and provisions of HRD activities to support the implementation of responsible fisheries in the region. In addition, the principle of responsible fisheries has also been embedded in SEAFDEC programs of activities from formulation until their implementation.

In June 2007, SEAFDEC was informed of the endorsement by the FAO Council nominating SEAFDEC as the recipient of the Margarita Lizarraga Medal Award for the biennium 2006-2007. This award is given to SEAFDEC for its efforts in promoting the adoption of the Code of Conduct for Responsible Fisheries (CCRF) in the ASEAN Region.

SEAFDEC still further promote the concept of CCRF by implementing on various regional programs. Most of the CCRF implemented programs have focused in the coastal and marine fisheries. Very few programs were implemented in the inland areas remarkably in Lao PDR and Myanmar. Therefore SEAFDEC, using Japanese unspent from MoFA proposes to promote of inland small-scale fisheries management through rights-based fisheries and co-management towards institutional building and participatory approaches concept to those two countries as pilot projects. It is expected that the outcomes from those two pilot countries could be fulfill the gap in implementation of the CCRF, in addition the outcomes could also apply and benefit to all SEAFDEC Member Countries.

2. PROJECT

4 Years (2008-2011)

2.1 Objectives

- 1) To promote the practice of rights-based fisheries and co-management to improve inland small-scale fisheries management in ASEAN Member Countries;
- 2) To strengthen a fishing community organization and its institution to take leading role in practicing rights-based fisheries and co-management for achieving inland small-scale fisheries management;
- 3) To establish sustainable inland small-scale fisheries resource management entity at local levels; and
- 4) To alleviate poverty in inland small-scale fishing communities.

2.2 Program Description

The main objectives of the program are to test and demonstrate the community-based co-management for sustainable inland small-scale fishery resources applicability integrated with approach in alleviation of poverty in inland communities. The project deploys pragmatic activities to stimulate and encourage people's participation as well as to build people's capacity for involvement in inland small-scale fisheries resource management and community development. The people's participation is an initial empowerment to contribute to the institution of a local management body to vigorously lead community development and inland small-scale fisheries resource management.

The activity will also focus to the stakeholders for strengthening the fishing community institutional organizations or groups so as for them to understand and enable them to implement the application of inland small-scale fisheries management by using right-based and co-management in fisheries management. In addition, complementary efforts will be exerted aimed at improvement of their lively hood. The project aimed to mobilization of expertise from SEAFDEC Departments and member countries into the project site implementation activities.

3. PROGRESS OF ACTIVITIES IN THE YEAR 2011

Briefly explain major achievements of projects and activities conducted in the year 2011. This section is inapplicable for the newly proposed program.

Project/Activity Title	Duration
<p>Activity 2:Case study on the promotion of rights-based fisheries and co-management for strengthening an integrated inland small-scale fisheries management implementation</p> <p><i>Sub-activity 2.2: Workshop/Seminar on rights-based fisheries and co-management for inland small-scale fisheries management with local fisheries officers and stakeholders</i></p> <ul style="list-style-type: none"> • The workshop title will be “Stakeholder of Duya inn Reservoir Consultative Workshop” • Venue: Duya Inn, Hinthada, Myanmar • Participant: Local fishermen in Duya Inn reservoir, fisheries officer of DOF Myanmar, TD staffs and resources person. • Duration: 19 -20 April 2011 • Objective: <ul style="list-style-type: none"> - To enhance capacity building of local stakeholder on concept of co-management and rights-based fisheries for better inland small-scale fisheries development and management - To practice and form co-management institution of stakeholder and local government agencies for better inland small-scale fisheries development and management <p>This activity delivers to community meeting to let the community people itself recognize its own community and practice related to right-based fisheries and co-management, and also restores the results of fish conservation area to community and sharing information between local stakeholders and governmental agencies concerned. The workshop will enhance users' consensus on the self-regulatory use of fisheries resources and on the reduction of conflict between resource users.</p>	<p>April</p>
<p>Activity 3: End of Project Regional Workshop/ Seminar, The regional workshop on the promotion of Inland Small-scale Fisheries management through Rights-based Fisheries and Co-management Towards Institutional Building and Participatory Approaches Project: transferring Lesson-learn and Experience.</p> <ul style="list-style-type: none"> • Venue: Phetchaburi province, Thailand • Participant : SEAFDEC Member Countries, Staffs of SEAFDEC Secretariat, Training Department, Aquaculture Department, Marine Fisheries Research Development and Management Department and , and resource persons . • Duration: 14 -15 September 2011 • Objective: 	<p>September</p>

<ul style="list-style-type: none"> - To report and deliver lesson-learned, experience, output gained from the project implementation executed in Lao PDR and Myanmar to other ASEAN Member Countries. - To report promotion and improvement of capacity building of local stakeholders and fisheries officials empowering into both inland fisheries resource management and community economic development toward concept and practice of co-management and rights-based fisheries. - To share, exchange opinion and experience on promoting and practicing either linkage or network of fisheries communities implementing and managing demarcated areas of conservative zone as applicable means for enhancing inland fisheries resources applying into other ASEAN Member Countries. 	
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4. PROPOSED FUTURE ACTIVITIES FOR THE YEAR 2012

This program ended in 2011.

PROGRAM DOCUMENT

Program Category: Other Program
Project Title: Safety at Sea for Small Fishing Boats
Lead Department: Training Department
Duration: 2011

1. INTRODUCTION

There are over a million small fishing boats operating in the Southeast Asian region. Such big number could easily pose high risks in fishing operations. Although some fishers and crew could be very skillful as accomplished sailors, and possessing great amount of knowledge on weather and sea conditions, accidents involving fishing boats still continue to happen. This is coupled with natural disasters that occurred unexpectedly due to the effects of climate change and global warming.

Two workshops on safety at sea were organized by SEAFDEC/TD in collaboration with the SEAFDEC Member Countries in 2003 and 2010. The recommendations from those workshops included the establishment of a collaborative mechanism among relevant agencies, organizations and authorities for the improvement and promotion of safety at sea for small fishing boats and human security such as the living conditions of fishers on fishing boats through the preparation of regional guidelines for safety at sea of small fishing boats for Southeast Asia. Moreover, considering the recommendations as over-all framework, the Workshop also suggested that appropriate regional programs on Safety at Sea could be developed by the respective Southeast Asian countries. In addition to this, the implementation of safety at sea for small fishing boats should be continued implementation to reduce accidents from fishing operations.

2. MAIN OBJECTIVES

- 1) To promote safety at sea for small fishing boats to reduce accidents from fishing operation; and
- 2) To awareness human capacity building for safety at sea of small/ medium scale fishing boats.

3. EXPECTED OUTPUTS

- 1) The representative from Member Countries will be more suitable trained to build up human capacity and awareness on safety at sea management and aspects; and
- 2) The representative from Member Countries will be as a trainer and extension on safety at sea to fisherman in their country.

4. PROGRESS AND STATUS

Project/Activity Title	Duration	Remarks
1. Production of poster on safety at sea (Thai version)	Completed	
2. Production of poster on alleviation of accident in the sea	Completed	
3. Production on safety guideline for fishing boats (Thai version)	On progress	
4. 3 rd Regional Technical Workshop on Safety at Sea and Optimize Energy use for Small Fishing Boats	19-22 December	

REVIEW OF SEAFDEC PIPELINE PROJECTS

INTRODUCTION

In response to the policy change of annual contribution from the Member Countries to SEAFDEC, the Center's programs of activity starting from the year 2007 and onwards will be funded from irregular funding sources. The paper attempts to review progress and efforts by the Secretariat and the Departments in developing project proposals for funding and/or partnership arrangement.

SEAFDEC PIPELINE PROJECTS

Based on on-going preparation and negotiation with donor/partner agencies, the following are current status of the pipeline projects:

Islamic Development Bank (IDB)

- Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management (2011-2012) (*Appendix 1*).

ASEAN

- Climate Change and its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation towards Food Security (*Appendix 2*).

UNEP/GEF/SCS

- Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand (2010-2014) (*Appendix3*) <under the communication with relevant countries to submit the Letter of endorsement for implementation and secure the Budget under the Biodiversity in each country, the Philippines submitted the Letter of Endorsement in October 2010>.

FAO/GEF (REBYC-II CTI)

- Strategies for Trawl Fisheries By-catch Management (*Appendix4*).

Suggested Actions by the Committee

The Committee is invited to consider the progress of pipeline projects and where appropriate provide comments for further development and finalization of the projects with respective donors or partner agencies.



ASEAN Cooperation Project Document

Project Purpose Code:

Project Title: Enhancing Coastal Community Resilience for Sustainable Livelihood and Coastal Resources Management

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.

Sponsoring ASEAN Body

Sectoral Committee/Main Body: ASEAN Sectoral Working Group on Fisheries (ASWGFi)

Meeting Number/Date:

Working Group/Sub-Committee:

Meeting Number/Date:

Proponent's Name and Address: Southeast Asian Fisheries Development Center (SEAFDEC)

Date of Preparation: 16 January 2009

Proposed Funding Source: Islamic Development Bank (IDB)

Project budget

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

Information below to be completed by the PCU

Recommendation of Secretary-General/Project Appraisal Committee

PAC Meeting Number/Date:

Endorsements:

Approval of ASEAN Standing Committee

Meeting Number/Date:

Endorsements:



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; and
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 *Appendix 1-1*

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 *Appendix 1-2*

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_i) 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

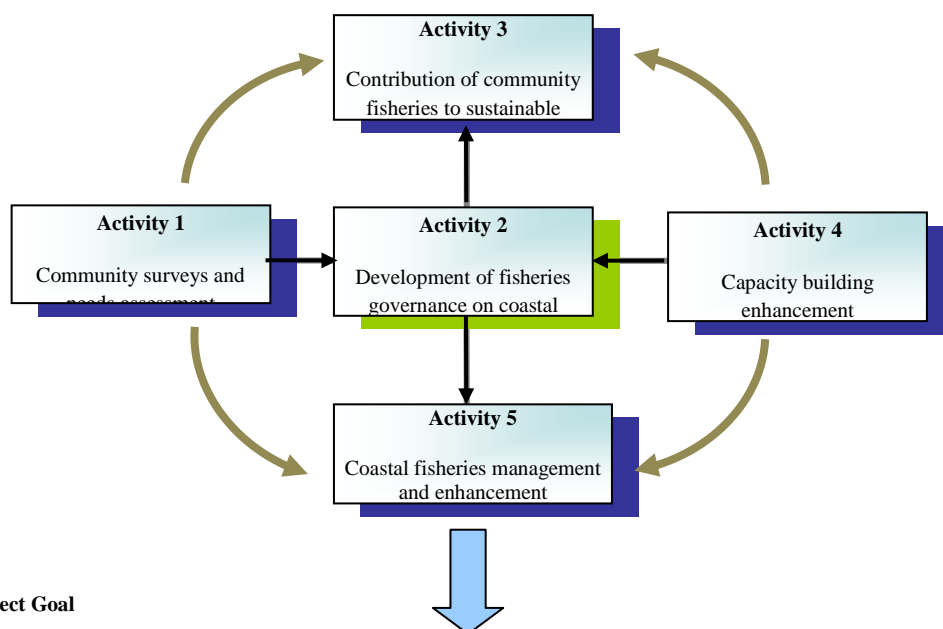
This activity aims to secure means of fisheries livelihood in fishing communities as well as to increase incomes and provide job opportunities particularly outside the fisheries sector. Three strategies will be adopted, namely: fisheries post-harvest technology transfer, responsible fisheries and environment-friendly 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.



1. Establishment of sustainable livelihood opportunities and 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 friendly to the environment
3. Strengthening of community fisheries organizations in the region's Muslim fishing communities for community economic development and coastal resource management

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 Secretariat 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 *Appendix 1-3*.

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.

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 1 community survey and need assessment			
1. Need assessment			
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
Community survey			
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

Expected output	Indicators	Source of verification	Risks
Monitoring & Survey			
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 record related to	- limitation of stakeholder concerned and participation
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

Expected output	Indicators	Source of verification	Risks
	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			
Training arrangement			
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	50% of local residence participated in the	- district or provincial annual reports	- limitation of stakeholder concerned

Expected output	Indicators	Source of verification	Risks
management	activity	- result of base line survey - result of workshop - other report or record related to	and participation
Extension program			
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

Expected output	Indicators	Source of verification	Risks
5.2 promotion of fish releasing and fish aggregating device installation	20% of fishers access and benefit	<ul style="list-style-type: none"> - Dept of Fisheries - district or provincial annual reports - result of base line survey - result of workshop - other report or record related to 	<ul style="list-style-type: none"> - 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	<ul style="list-style-type: none"> - Dept of Fisheries - district or provincial annual reports - result of base line survey - result of workshop - other report or record related to 	<ul style="list-style-type: none"> - natural disaster - limitation of geographic factors - limitation of stakeholder concerned and participation
	1% of coastal areas has no interruption	<ul style="list-style-type: none"> - Dept of Fisheries - district or provincial annual reports - result of base line survey - result of workshop - other report or record related to 	<ul style="list-style-type: none"> - natural disaster - limitation of geographic factors - limitation of stakeholder concerned and participation
6. Project evaluation and reporting	<ul style="list-style-type: none"> 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 	<ul style="list-style-type: none"> - national and provincial economic report - district or provincial annual reports - result of base line survey - result of workshop 	<ul style="list-style-type: none"> - natural disaster - change of poverty line

PROPOSED INDICATIVE WORK PLAN

Project Activity	1 st Year				2 nd Year				3 rd Year			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
1. Community survey and needs assessment <ul style="list-style-type: none"> • community development and coastal resource management • fisheries governance development and management • baseline survey • fish marketing surveys • impacts of climate change/natural disasters surveys • monitoring and evaluation surveys on project implementation and upon termination 												
2. Development of fisheries governance on coastal management <ul style="list-style-type: none"> • problem-solving and situation analysis with involvement of former and/or newly established community fisheries organizations • formulation of plans and activities on coastal resource management and sustainable livelihood with participation of community fisheries organizations • support for the functions and networking of community fisheries organizations in the area of conflict management • ad hoc meeting for special issues and activities 												
3. Contribution of community fisheries to sustainable livelihood <ul style="list-style-type: none"> • Workshop on identifying possible approaches to improve community livelihoods for women's groups and fisher groups • Promotion of various fisheries products and micro credit schemes • Promotion of coastal aquaculture, cage culture and shell culture • Promotion of eco-tourism, sports fishing and home stay • Promotion of cooperative dry goods grocery store 												

Project Activity	1 st Year				2 nd Year				3 rd Year			
	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4	Q 1	Q 2	Q 3	Q 4
5. Coastal fisheries management and enhancement <ul style="list-style-type: none"> • aquatic resources and habitat enhancement and rehabilitation through traditional fisheries management and practices • promotion of fish releasing and fish aggregating device installation • enforcement of rules and regulations on new habitat improvement tools by resource users and stakeholders 												
6. Project Evaluation and Reporting												

Appendix 1-3 of Annex 10

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

EXPENDITURE	ACT 1	ACT 2	ACT 3	ACT 4	ACT 5	BUDGET
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

CLIMATE CHANGE AND ITS IMPACTS ON FISHERIES AND AQUACULTURE: ADAPTATION AND MITIGATION TOWARDS FOOD SECURITY

Concept Note

Background

The fisheries sector has long been a main source of protein for the population of the ASEAN Member States (AMS). Fisheries, aquaculture and their allied industries also play a very important role in national and regional economies. Not only is the health of the fisheries sector crucial to ensure food security in the Southeast Asian region, it is also for critical for ASEAN livelihoods. It has been estimated, however, that fishing stocks are roughly a tenth of what they were a decade ago, and continue to diminish at an alarming rate.

During the past several decades, the growing international, regional and national demand for fish and fisheries products has led to continual development and modernization of fishing technology. Unfortunately this increased demand and the corresponding technology response has resulted in the over-exploitation of fishery resources in Southeast Asia. The lack of awareness and knowledge of responsible fishing technologies and practices in fisheries, combined with the use of illegal and destructive fishing methods and gear (*e.g.* non-selective fishing gear) are seriously threatening the sustainability of fishery resources and the integrity of the coastal, marine and in-land water ecosystem and environment.

Compounding these problems is climate change, which is already affecting Southeast Asia. Southeast Asia is one of the world's most vulnerable regions to climate change; at risk economically and climatically due to its geography, its long coastlines, and the high concentration of population and economic activity in coastal areas. ASEAN's heavy reliance on agriculture, fisheries, forestry and other natural resources further exacerbates the impact of climate change on the region. The increase in the frequency and the intensity of extreme weather events has huge consequences including, among others, flooding and sea level rise, higher water temperature, higher ocean acidity, change in species composition and distribution, coral bleaching, degraded reefs, and the increase in storms and cyclones. In addition, as a consequence of salt water intrusion and the deterioration of fresh water, former farmers are turning to the sea as an alternative livelihood, thus putting more pressure on already scarce fishery resources. The implications of climate change on ecosystems, livelihoods and food security indicate that a combined response that includes responsible fishing and aquaculture practices as a part of adaptation and mitigation measures is required urgently.

The current status of the fishery resources and aquatic ecosystem in the ASEAN region is now a serious concern. To ensure long-term food security in the ASEAN region in accordance with the:

- *ASEAN Integrated Food Security (AIFS) Framework* and *Strategic Plan of Action (SPA-FS)* adopted by the ASEAN Leaders at the 14th Summit in March 2009, that addressed the issue of climate change impacts on food security, and the
- *ASEAN Multi-Sectoral Framework on Climate Change: Agriculture and Forestry Towards Food Security*" (AFCC Framework), which agreed at the ASEAN High-Level Workshop on the ASEAN Multi-Sectoral Framework on Climate Change and Food Security held in September 2009, that:

A project on "Climate Change and its Impacts on Sustainable Fisheries and Aquaculture: Adaptation and Mitigation towards Food Security" should be implemented in the ASEAN Region. This project will focus on responsible fishing technologies and practices as a means to ensure the continued contribution of the fishing and aquaculture sectors to food security in ASEAN, and will strive for greater regional collaboration and commitment towards resource sustainability through climate change adaptation and mitigation measures. Activities undertaken will prioritize developing the knowledge base with respect to fisheries and aquaculture, addressing policy, programmes and implementation

frameworks at national and regional international levels, capacity building and supporting enabling mechanisms.

Objectives

The overall objective of the project is to address and respond to the dual challenges of rapidly diminishing fish and other aquatic stocks and climate change to ensure the continued contribution of the fisheries sector to food security. The specific objectives of the project are as follows:

A. To raise awareness on responsible fisheries practices and climate change impacts (on and from the sector) in collaboration and cooperation with ASEAN Member States and other organizations at the regional and international levels by:

1. building capacity for human and institutions involved in fisheries and ecosystem management, as well as the other relevant sectors, in understanding and responding to the impacts of climate change and the need for adaptive measures;
2. integrating climate change mitigation and adaptation measures/strategies into the economic and social development policy framework for fisheries (inland and marine fisheries and aquaculture);
3. strengthening national and regional information and knowledge sharing, communication and networking on climate change and food security; and
4. enhancing cooperation in the implementation of adaptation and mitigation measures.

B. To increase the use of responsible fisheries practices and technologies, adaptive and mitigation measures and promote technologies to save energy and the use of alternative/clean sources of energy in fisheries.

Expected Outcomes

Envisaged outcomes of the project:

Fisheries better able to contribute to ASEAN food security

1. Increased regional multi-sectoral cooperation and collaboration;
2. ASEAN fishing, aquaculture and allied industries are better prepared to adapt to climate change;
3. ASEAN fishing, aquaculture and allied industries undertake climate change mitigation measures including energy efficiency programs;
4. Capacity of government officials and fishers in the application and adoption of responsible fisheries technology and practices is enhanced; and
5. Impacts of unsustainable fisheries practices on the coastal marine and inland ecosystem is reduced.

Rationale for the Approach:

In the ASEAN region, there are currently numerous initiatives, programs and projects completed, underway or in planning that concern the sustainability of the fishing sector. These various efforts are either wholly or partially devoted to sustainable fishing and aquaculture; fishing as an aspect of food security; climate change impacts of and on fishing and aquaculture; and the adaptation of coastal communities and the fishing sector to climate change, among others. Most of the activities under these initiatives, however, tend to be national, bilateral, or international, with the Coral Triangle Initiative a notable regionally oriented exception.

In the past, the symbiotic relationship between fish, food security and climate change has not been generally accommodated in the design of such programs. Now, however, with the population increasing, the effects of climate change impacting food prices and production, the continually growing market demand for fisheries and aquaculture products, and the rapidly shrinking supply of stock, there is an immediate and urgent need to think and act more holistically. For example, institutional support in

ASEAN for fisheries through SEAFDEC incorporates four technical assistance areas, with climate change and food security are understood as underlying factors that help direct the research and training.

The challenge is to better communicate these issues inter ASEAN; accommodate the reality of the co-dependent nature of these issues into policy decisions; synthesize the information to inform decision makers; and integrate these interwoven concepts into the stakeholder mainstream by raising awareness in current initiatives and programs as well as new programs being planned.

Proposed Approach

The project will be implemented to strengthen capacity of the ASEAN Member States in addressing climate change and its impact on and from fisheries and aquaculture in line with AIFS Framework (Strategic Thrust 6) and the AFCC Framework.

An ASEAN public private sector Action Task Force: Catalyzing the creation of an ASEAN Action Task Force on Fishing, Food Security and Climate Change will be central to achieving a coordinated regional effort. Hosted by and coordinated through SEAFDEC, this proposed regional task force will be comprised of the public and private sector entities engaged in or with fishing, aquaculture and allied industries across the member states.

The Decade Resolution and 5 year plan of action developed and adopted during the *ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020 “Fish for the People 2020: Adaptation to a Changing Environment”* are expected to address capacity and technology challenges. The preparatory consultations, dialogs and meetings for the Conference brought together stakeholders from many sectors. From this base, a coalition of like minded champions representing the many facets of the fisheries and aquaculture sectors will be identified and encouraged to step up to form a regional ASEAN Action Task Force to guide a more integrated sustainable approach for ensuring the continued contribution of the fisheries sector to food security.

This ASEAN Action Task Force can bring to bear valuable private sector resources and the public sector political will to both expedite and better coordinate communication and/or collaboration on the numerous national, bi-lateral and international initiatives on sustainable fishing, food security, and adaptation to climate change that are underway, in development, or in early planning. As an informal advisory group, the Action Task Force can also serve, as needed, as a sounding board for ASEAN Senior Officials, providing a unique regional real-time perspective on the status of the fishing and aquaculture industries, and the efficacy of current policies and programs.

Activity 1 – Establish an ASEAN public private sector Action Task Force as a regular mechanism for public private sector dialog, exchange and sector strategy implementation.

Under this ASEAN Action Task Force on Fishing, Food Security and Climate Change, sub-activities will support the AFCC components. TORs for additional sub-activities can be presented to the Task Force for review and approval.

Component 1: Integration of climate change mitigation and adaptation strategies into the economic and social development policy framework for fisheries

Activity 2: Identify and share best practices: In close collaboration with regional and local private sector champions and not for profits, responsible fisheries best practices, including best practices in mitigation and adaptation for fisheries and aquaculture operations, will be identified. These measures and best practices will be disseminated and promoted through jointly conducted ASEAN regional fora. Effective strategies will be considered for incorporation into guidelines for national development strategies, policies and programs for fisheries. Information will feed into workshop under component 3.

Component 3: Strengthening of national and regional information and knowledge sharing, communication and networking on sustainable fisheries, climate change and food security

Strategic Thrust 2: Strengthen national and regional cooperation, coordination, consultation and communication on the impacts of and response to climate change on fisheries towards food security (AEC A6 and A7).

Strategic Thrust 4: Strengthen regional partnerships and coordination with ASEAN partners on climate change and food security (AEC 7).

Activity 3: Conduct high level regional consultations and workshop: With the ASEAN Action Task Force, ASEAN-SEAFDEC will conduct regional consultations to exchange information and experiences among ASEAN Member States on the outcomes of the projects/programs initiatives implemented in AMS around food security, fisheries and climate change. These consultations and workshops, which will direct link to the AFCC thrusts, will serve to strengthen national and regional cooperation, coordination, consultation and communication on the impacts of and response to climate change on fisheries and aquaculture towards food security. These workshops will include best practice examples of climate resilient community-based aquaculture and livelihood programs, and will also help develop regional guidelines to facilitate national activities for the development of local food security initiatives.

Workshop Follow-on- Develop, produce and disseminate materials, in collaboration and cooperation with AMS and other regional and international organizations, that show the direct linkage between sustainable fisheries and aquaculture practices, climate change and food security.

Project Implementation and Administration:

The initial phase of this project covers a 1-year period from 2011-2012. The project activities will be implemented under the ASEAN-SEAFDEC Strategic Partnership (ASSP) arrangement that will provide a regional framework on cooperation and coordination on climate change issues relevant to fisheries and food security in the ASEAN region as the ASSP assists the ASEAN Member States in promoting sustainable fisheries development. Project progress and achievements will be reported as part of the implementation of AIFS Framework and the SPA-FS.



PROJECT IDENTIFICATION FORM (PIF)
PROJECT TYPE: Full-sized Project
THE GEF TRUST FUND

* See guidelines for definition of milestones.

Submission Date: July 2010

PART I: PROJECT IDENTIFICATION

GEF PROJECT ID¹⁹: PROJECT DURATION: 60 months

GEF AGENCY PROJECT ID:

COUNTRY (IES): Cambodia, Indonesia, Philippines, Thailand, and Viet Nam

PROJECT TITLE: Establishment and Operation of a Regional System of Fisheries *Refugia* in the South China Sea and Gulf of Thailand

GEF AGENCY (IES): UNEP, (select), (select)

OTHER EXECUTING PARTNER(S): Departments of Fisheries in the participating countries; Southeast Asian Fisheries Development Center (SEAFDEC)

GEF FOCAL AREA (S)²⁰: Multi-focal areas

GEF-4 STRATEGIC PROGRAM(S): BD-Ob1;BD-Ob.2; IW-Ob.2; IW-Ob-3

NAME OF PARENT PROGRAM/UMBRELLA PROJECT (if applicable):

A. PROJECT FRAMEWORK

INDICATIVE CALENDAR*	
Milestones	Expected Dates mm/dd/yyyy
Work Program (for FSP)	Nov. 2010
CEO Endorsement/Approval	June 2011
Agency Approval Date	Sept. 2011
Implementation Start	Oct. 2011
Mid-term Evaluation (if planned)	Sept. 2013
Project Closing Date	Sept 2015

¹⁹ Project ID number will be assigned by GEFSEC.

²⁰ Select only those focal areas from which GEF financing is requested.

Project Objective: The overall objective of the project is to operate and expand the network of fisheries *refugia* in the South China Sea and Gulf of Thailand for the improved management of fisheries and critical marine habitats linkages in order to achieve the medium and longer-term goals of the fisheries component of the Strategic Action Program for the South China Sea.

Project Components	I, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing		Total (\$) c = a + b
				(M \$) a	%	(M \$) b	%	
1. Identification and Management of Fisheries and Critical Habitat Linkages in the South China Sea and Gulf of Thailand	TA	<p>1.1 Effective operation of the regional system of fisheries <i>refugia</i> for the management of priority, transboundary, fish stocks and endangered species, including: boundaries for 23 <i>refugia</i> sites delineated;</p> <p>1.2 implementation of fisheries management systems in 23 fisheries <i>refugia</i> that are consistent with the FAO Code of Conduct for Responsible Fisheries and the Regional Guidelines for Responsible Fisheries in Southeast Asia; and</p> <p>1.3 fishing communities, particularly artisanal fishermen and women involved in inshore gleaning and processing, empowered to enforce agreed management rules in the fisheries <i>refugia</i>.</p>	<ul style="list-style-type: none"> • Maps and site characterizations for 23 fisheries <i>refugia</i> sites and additional 30 known fish spawning and nursery areas. • Fisheries management plans for 23 <i>refugia</i> sites. • Management team and community-based volunteer network at each site. • 6 national and 1 regional fisheries and biodiversity conservation databases, including: status of priority fish, crustacean, and mollusk species; distribution and abundance of fish eggs and larvae; and location and management status of coastal habitats, fisheries <i>refugia</i>, MPAs, and critical habitats for threatened and endangered species. 	1,8	34	3,50	66	5,30

Project Components	I, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing		Total (\$) c = a + b
2. Improving the Management of Critical Habitats for Fish Stocks of Transboundary Significance	STA	2.1 Improved integration of habitat and biodiversity conservation considerations in the management of fisheries in the South China Sea and Gulf of Thailand, including: enhanced scientific understanding of fish stock and habitat links; and endorsement by Ministers of Fisheries of policy and regulatory frameworks governing the fisheries sector that incorporate measures for sustainable use of fish habitats and biodiversity; and 2.2 reduced use of destructive fishing gear and practices in areas of critical fisheries habitats.	<ul style="list-style-type: none"> • Regional model of fish egg and larvae distribution. • Regional and site level models of ecosystem carrying capacity and sustainable fishing effort levels by fishing gear type. • 6 national reports on legal/institutional aspects of <i>refugia</i>. • 6 sets of national guidelines for establishing and operating <i>refugia</i>. • 120 quarterly national reports on fish stocks and habitats. • 6 national reports on, and regulations/ordinances for, use of responsible fishing gear and practices in priority refugia. • 1 regional and 6 national action plans for management of priority fisheries <i>refugia</i> and associated biodiversity. 	1,5	40	2,25	60	3,75

Project Components	I, TA, or STA ^b	Expected Outcomes	Expected Outputs	Indicative GEF Financing ^a		Indicative Co-Financing		Total (\$) c = a + b
3. Information Management and Dissemination	TA	<p>3.1 Enhanced uptake of good practices in integrating fisheries management and biodiversity conservation in the design and implementation of regional and national fisheries management systems.</p> <p>3.2 Improved community acceptance and cost-effectiveness of area based approaches to marine management.</p> <p>3.3 Compiled knowledge and experiences about the project shared with other GEF projects and GEF Sec, and available on IW: LEARN.</p>	<ul style="list-style-type: none"> Regional education and awareness centre on links between fisheries, habitats, and biodiversity, and associated regional Information and Education Campaign (IEC). Public awareness and outreach programmes on fish stock – habitat links at 23 sites. Report on indicators and standardised methods for information and data collection for <i>refugia</i> management. Development of 6 national language web portals on fisheries <i>refugia</i> and maintenance of the regional Fisheries <i>Refugia</i> Information Portal http://refugia.unepscs.org and linked to the International Waters Learn Program (IW: LEARN). Participation at the International Waters conferences; three to four experiences notes and tracked project progress reported using the GEF-V IW tracking tool. 	0,75	33	1,50	66	2,25
4. Project management				0,45	31	1,0	69	1,45
Total project costs				4,5	35	8,25	65	12,75

^a List the \$ by project components. The percentage is the share of GEF and Co-financing respectively of the total amount for the component.

^b TA = Technical Assistance; STA = Scientific & Technical Analysis.

B. INDICATIVE CO-FINANCING FOR THE PROJECT BY SOURCE and by NAME (in parenthesis) if available, (\$)

Sources of Co-financing	Type of Co-financing	Project
Project Government Contribution	In kind	3,315,000
Project Government Contribution	Cash	1,785,000
GEF Agency(ies)	Select	
Bilateral Aid Agency(ies)	Select	
Multilateral Agency(ies) (SEAFDEC)	Cash	3,150,000
Private Sector	Select	
NGO	Select	
Others	Select	
Total Co-financing		8,250,000

C. INDICATIVE FINANCING PLAN SUMMARY FOR THE PROJECT (\$)

	Previous Project Preparation Amount (a)[1]	Project (b)	Total	Agency Fee
			c = a + b	
GEF financing		4,500,000	4,500,000	450,000
Co-financing		8,250,000	8,250,000	
Total	0	12,750,000	12,750,000	450,000

D. GEF RESOURCES REQUESTED BY AGENCY (IES), FOCAL AREA(S) AND COUNTRY(IES)¹

GEF Agency	Focal Area	Country Name/	(in \$)		
		Global	Project (a)	Agency Fee (b) ²	Total c=a+b
UNEP	Biodiversity	Cambodia	600,000	60,000	660,000
UNEP	Biodiversity	Indonesia	600,000	60,000	660,000
UNEP	Biodiversity	Philippines	600,000	60,000	660,000
UNEP	Biodiversity	Thailand	600,000	60,000	660,000
UNEP	Biodiversity	Viet Nam	600,000	60,000	660,000
UNEP	International Waters	Regional	1,500,000	150,000	1,650,000
Total GEF Resources			4,500,000	450,000	4,950,000

¹ No need to provide information for this table if it is a single focal area, single country and single GEF Agency project.

² Relates to the project and any previous project preparation funding that have been provided and for which no Agency fee has been requested from Trustee.

PART II: PROJECT JUSTIFICATION

A. State the issue, how the project seeks to address it, and the expected global environmental benefits to be delivered:

The South China Sea and Gulf of Thailand are located at a global centre of shallow water marine biological diversity. The marine habitats of this area support fisheries that are significant in terms of food security, export income for riparian countries. Critical habitats, such as mangrove swamps, coral reefs, seagrass beds, and estuaries act as nursery areas, spawning grounds, and feeding sites for transboundary species during critical phases of their life-cycles.

Fishing has been identified by the UNEP/GEF Regional Working Groups for the Habitat Sub-Components of the South China Sea Project as a factor contributing to the continued loss of marine habitats and biodiversity in the South China Sea. Southeast Asian fisheries are characterized by high levels of coastal community dependence on fish for food and income, excessive and increasing levels of fishing effort, and diminishing availability of fisheries resources. The small size of vessels which are largely owner operated, and the multitude of landing points and land-based distribution networks poses problems of regulation and control that differ significantly from temperate fleets.

The effects of intensive inshore fishing include: declining availability and biomass of fish species of global and transboundary significance; changes in community structure due to direct reductions of populations representing specific trophic levels of the community (*e.g.* predator or prey); capture mortality of rare and endangered species; large catches of juvenile fish; and the degradation and loss of habitats and associated non-target biodiversity. The widespread use of inappropriate and destructive fishing gear and practices, such as the use of demersal trawls and push nets in seagrass areas, and the use of poisons and explosives to catch fish in coral reef areas, is of increasing concern with respect to the degradation and loss of habitats and biodiversity as a result of fishing. This situation has led to an urgent need for new and innovative fisheries management approaches in the region, particularly those aimed at limiting the loss of habitats and biodiversity, and ensuring the sustainable use of biodiversity by the fisheries sector.

The fisheries *refugia* initiative established under the UNEP/GEF project entitled “Reversing Environmental Degradation in the South China Sea and Gulf of Thailand” is unique in that it represents the first attempt to establish a regional network of integrated fisheries and habitat management areas in Southeast Asia supported by national habitat action plans (NAPs) and fisheries policies. Furthermore, regional fisheries organizations, including the Southeast Asian Fisheries Development Center (SEAFDEC) and FAO’s Asia-Pacific Fisheries Commission (APFIC) have acknowledged the unique role of the multi-lateral, intergovernmental Project “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” in building partnerships and enhancing communication between fisheries and environment sectors in the region for the improved management of the environmental aspects of fisheries. Fisheries *refugia* in this context are defined as “spatially and geographically defined, marine or coastal areas in which specific management measures are applied to sustain important species during critical stages of their life cycle, for their sustainable use”, and it is also compatible with FAO’s Ecosystem Approach to Fisheries (EAF).

This project aims to expand the network of fisheries *refugia* in the South China Sea and Gulf of Thailand for the improved management of fisheries and critical marine habitats. Based on the draft SAP and NAPs developed under the South China Sea Project, 5 participating countries have included establishment and management of fisheries *refugia* in national fisheries policies and plans (Cambodia, Indonesia, Philippines, Thailand, and Vietnam). All countries have expressed the need for further scientific research, cross sectorial co-ordination, guidelines regarding the process of establishing and managing fisheries *refugia*, and establishment of mechanisms for regional exchange of information and lessons learnt. Activities in the project will focus on ensuring adequate cross sectorial consultation between fisheries and environment departments in the designation and management of fisheries *refugia*. This is particularly important in relation to the designation by Ministries of Environment of Marine Protected Areas to ensure that such areas are congruent with habitat areas of critical

significance to fish stocks. This will involve the establishment of institutional mechanisms to effect the integration of habitat and marine biodiversity conservation considerations into fisheries management.

This initiative is considered of significance because of the potential fisheries and biodiversity conservation benefits associated with effect fisheries and habitat management at the local level. Fisheries management leading to sustainable levels of exploitation in the region, due to the importance of fisheries to food security, and maintenance of livelihoods. The management approaches developed and fostered through this project may also assist in curbing the trends in regional fisheries towards over-capacity and over-exploitation; the use of destructive fishing gear and practices; habitat destruction and pollution; and illegal fishing.

The decadal rates of decline in total area of critical habitats such as seagrass, coral reefs, and mangroves in the South China Sea and Gulf of Thailand are currently estimated at 30%, 16%, and 16% respectively. Fishing is a contributing factor to the loss and degradation of particularly seagrass and coral reef habitats and the expected outcome of this project of global significance is the reduction in the rates of loss of globally significant habitats and biodiversity in priority fisheries *refugia* due to fishing.

B. Describe the consistency of the project with national/regional priorities/plans:

The FAO Code of Conduct for Responsible Fisheries recognises that, fisheries have the potential to alter the structure, biodiversity, and productivity of marine ecosystems, and recommends that innovative ecosystem-based approaches to fisheries management should be incorporated into existing regional and national fisheries management frameworks where possible. ASEAN and SEAFDEC adopted the “*UNEP/GEF Regional Guidelines on the Use of Fisheries Refugia for Sustainable Capture Fisheries Management in Southeast Asia*” in April 2006 which were published in May 2006 as part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia for the implementation of the FAO Code of Conduct for Responsible Fisheries. In this connection, the 2008 Intergovernmental meeting of the SEAFDEC Council urged SEAFDEC member country governments to develop projects and initiatives aimed at ensuring more ecosystem-based approaches to fisheries management in the region.

During the period 2007-2008, the concept of fisheries *refugia* has been included in the following fisheries policies and plans of partner Member Countries as a priority tool for improved fisheries habitat management: Fisheries Law of Cambodia; South China Sea Fisheries Management Zone Plan in Indonesia; the Comprehensive National Fisheries Industry Development Plan in the Philippines; Thailand’s Marine Fisheries Policy; and the National Plan for the Management of Aquatic Species and Habitats in Viet Nam. This represents the first time regional consensus has been reached on how to build the resilience of Southeast Asian fisheries to the effects of high and increasing levels of fishing effort by enhancing the knowledge and capacity amongst stakeholders of ecosystem and fishery linkages, as a basis for integrated fisheries and ecosystem/habitat management.

Describe the consistency of the project with GEF strategies and strategic programs:

This proposal is aligned with two GEF Biodiversity Strategic Objectives, namely: Strategic Objective 1 to improve sustainability of Protected Area Systems through improvement of fishing communities livelihoods and revenue using sustainable use approaches to managing fish stocks and critical habitats; and Strategic Objective 2 on Mainstreaming Biodiversity in Production Landscapes/Seascapes and Sectors, by using the innovative concept of fish *refugia*, the project will enhance the understanding of the effectiveness of different forms of marine biodiversity protection and how to combine conservation goals with generation of local benefits in the fisheries sector at both the national and regional levels.

The project will also contribute to the International Waters Strategic Objective 2: Catalyze multi-state cooperation to rebuild marine fisheries in the South China Sea and Gulf of Thailand Large marine ecosystems and specifically Outcome 2.1 in implementing the fisheries component of the approved South China Sea Strategic Action Program. In that the *refugia concept* is an innovative approach to reconciling the demands of marine biodiversity with the often conflicting demands for enhanced fisheries products the project will contribute significantly to Outcome 2.3. The project will also

contribute significantly to IW Strategic Objective 3 on portfolio learning since this is the first attempt to involve fisheries and environmental managers in jointly managing demersal fish stocks and the marine and coastal habitats upon which these stocks depend. The project will play a catalytic role in addressing transboundary water concerns by assisting countries to restore and sustain coastal and marine fish stocks and associated biodiversity that will be jointly implemented with the Biodiversity focal area and support policy, legal and institutional reforms and multiagency partnerships that contribute to WSSD targets for sustaining fish stocks.

C. Justify the type of financing support provided with the GEF resources:

Co-financing for the project will come from the fisheries sector of participating governments both central and provincial governments and from the Southeast Asian Fisheries Development Center (SEAFDEC, an intergovernmental organization and the regional executing entity for the project. It is anticipated that on the ground activities in the 13 identified *refugia* will be largely funded by national governments with some GEF biodiversity funds and that the GEF IW funds will provide *inter alia* the costs of regional co-ordination, and the sharing and transfer of lessons learned.

D. Outline the coordination with other related initiatives:

This project is designed to build on achievements of the fisheries component of the UNEP/GEF Project Entitled “Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand” (South China Sea Project) in establishing a regional system of fisheries *refugia*. The achievements include *inter alia*: the publication of UNEP/GEF Regional Working Group on Fisheries’ Guidelines on the Use of Fisheries *Refugia* for Sustainable Capture Fisheries Management in Southeast Asia as part of the ASEAN-SEAFDEC Regional Guidelines for Responsible Fisheries in Southeast Asia; identification of 52 locations in the South China Sea known as critical spawning and nursery habitats for fish species of transboundary significance; regional agreement on the inclusion of 14 sites in an initial system of fisheries *refugia*; production of a regional fisheries *refugia* information base; and prioritization of an additional nine sites from the remaining 38 sites for which further information is required. The project represents the implementation phase of the fisheries component of the revised regional Strategic Action Program.

This project is linked to the network and institutions and experts of the UNEP administered Regional Seas Program and the Action Plan for the Protection and Development of the Marine and Coastal Areas of the East Asian Region. Involvement of SEAFDEC as an Executing Agency aims to establish greater political support and enhanced mainstreaming of fisheries habitat and ecosystem considerations with broader fisheries management initiatives in Southeast Asia. Such broader initiatives include ASEAN, SEAFDEC, and APFIC programs on the use of subsidies in fisheries, overcapacity, illegal and unregulated fishing, co-management, and rights-based approaches to fisheries management.

The UNEP/GEF Regional Working Group on Fisheries and SEAFDEC has noted the importance of close coordination with the proposed FAO/GEF Project on “*Strategies for Fisheries By-catch Management*”. Similarly there is regional agreement that testing the *refugia* system in the South China Sea where significant preparatory work has been undertaken will provide a sound basis for the transfer of knowledge and experience on the use of *refugia* to fisheries habitat initiatives of the Western and Central Pacific Fisheries Commission and the Sulu-Sulawesi Marine Eco-Region program in the adjacent coral triangle area. The project will also be implemented in close collaboration with the proposed coastal fisheries management project of the SEAFDEC-SIDA mechanism for the same time period (2009-2014). The latter project has been designed to link closely with actions of the fisheries component of the revised Strategic Action Programme for the South China Sea and Gulf of Thailand which this project aims to implement.

E. Discuss the value-added of GEF involvement in the project demonstrated through incremental reasoning :

There is considerable global concern for the ecosystem effects of fishing, particularly the loss of habitats and coastal and marine biodiversity as a result of fishing. In Southeast Asia this concern is intensified by the fact that most stocks of economically important fish species are considered to be fully fished or overexploited. Increasing global demands for fisheries products; and the dependence of coastal communities on fish for food and income results in a continued increase in fishing effort. This has caused fishing down of the marine food chain in the region, coupled with an increasing dependence of the artisanal sector on small pelagic species due to declining availability of demersal species. Declining fish availability, coupled with over-capacity and the dependence of the small-scale sector on coastal fisheries for income generation has led to the use of destructive fishing practices by some fishermen in order to maintain incomes and food production in the short-term.

An emerging theme from the South China Sea Project is the need for improved management of the key threats to fish stocks and habitats from fishing. The main barriers in reducing the levels of the threats include:

- a) low level understanding amongst stakeholders, including fisherfolk, scientists, policy makers, and fisheries and habitat managers of ecosystem and fishery linkages;
- b) existing low level community acceptance of “protected” area-based approaches to marine management (Several past conservation initiatives in the region, particularly those associated with Marine Protected Areas, have promoted the complete closure of areas to fishing which is a futile if not impossible task in Southeast Asia. Such closures have been promoted in terms of potential fisheries benefits, however have often not included fishing communities and managers in the selection and management of areas.);
- c) limited information regarding fish life-cycle and critical habitat linkages, and the role marine habitats play in sustaining fisheries; and
- d) low level experience in national fisheries/environment departments and ministries in development of integrated approaches to fisheries and habitat management.

By addressing these issues and expanding the use of the fisheries *refugia* approach through the establishment and operational management of a network of fisheries *refugia* sites, the project will result in significant incremental benefit compared to the ‘no action’ option. Anticipated incremental benefits include: demonstration of sustainable use of fish stocks and habitats at fisheries *refugia* sites; improved community acceptance and cost-effectiveness of area based approaches to marine management; establishment of policy and regulatory frameworks governing the fisheries sector that incorporate measures for the sustainable use of fish habitats and biodiversity; and multi-lateral political commitments to enhance co-operation on fish stock and habitat management. It is anticipated that the experiences gained in this region will be suitable for application in other large marine ecosystems such as the Yellow Sea where over-fishing and the use of inappropriate fishing gear are significant impediments to more sustainable exploitation of fish stocks, their habitats, and associated biodiversity.

F. Indicate risks, including climate change risks, that might prevent the project objective(s) from being achieved, and if possible including risk mitigation measures that will be taken:

Successful cross-sectorial co-ordination of activities between the fisheries and environment sectors in the participating countries is a key assumption. Many past marine protected areas in the region have been promoted in terms of their potential to improve the state of fisheries and their habitats, but have rarely included mechanisms to ensure the effective integration of fisheries considerations into management. In contrast, fisheries departments and ministries largely focus on achieving sustainable yields from fish stocks in the light of high community dependence on, and participation in small-scale fisheries. Experience in the South China Sea Project suggests that the risks that this assumption will not be met seems small as the fisheries *refugia* concept has provided an adequate platform for building the partnerships and enhancing communication between the environment and fisheries sectors to date. The *refugia* concept was used successfully in 2006 to resolve a long running conflict between the

fisheries and environment sectors in the Philippines regarding the utilisation of fish stocks in areas of critical habitats in the Visayan Sea. Past experiences suggest therefore that this assumption will be met.

A second assumption is that small-scale fishing communities will support the initiatives and interventions proposed. At present many small-scale fishing communities, fisheries managers, and local government officials in the region equate area-based (zoning) approaches to fisheries management as the equivalent of no-take Marine Protected Areas. The latter are often viewed as unacceptable at the community level since they are rarely designed in locations of importance to the life-cycle of important fish species and neither improves fish stocks, nor the community's income. The net result of such activities has been the loss of fishing areas for small-scale fishers and non-compliance with fisheries management measures in the "protected" areas. The outcomes of extensive community and stakeholder consultations in the participating countries during 2005 and 2006 suggest that the *refugia* concept is well accepted by small-scale fishing communities and local officials. To date fishing communities in Cambodia, Indonesia, the Philippines, Thailand, and Vietnam have expressed their strong support for the establishment and management of fisheries *refugia* in areas of critical fisheries habitats. Achievements at pilot fisheries *refugia* sites in the Philippines, Thailand, and Viet Nam to date indicate that this assumption will be met.

A further assumption is that the national governments will take action to implement management plans for critical habitat areas of specific fisheries *refugia*. It is likely that this assumption will be met since all governments adopted habitat specific National Action Plans in support of the regional Strategic Action Program and the further development of the system of fisheries *refugia* is part of the agreed SAP.

G. Describe, if possible, the expected cost-effectiveness of the project:

The project intends to build on existing investments and the policy and scientific basis for the regional system of fisheries *refugia* established through UNEP/GEF South China Sea Project. The development of the fisheries *refugia* concept as a tool for integrating fish stock and habitat management was undertaken by the UNEP/GEF Regional Working Group on Fisheries in close collaboration with SEAFDEC, FAO, IUCN, and WorldFish Center during the period 2003-2008.

The concept was elaborated and refined, and priority *refugia* sites identified, based on: the outcomes of regional and national level expert and fishing community consultations; national reports on fisheries, mangroves, coral reefs, seagrass, and wetlands from the seven participating countries of the South China Sea project; 135 habitat site characterizations prepared during the SCS Project; the SCS meta-database and GIS; and information contributed directly by fisheries and habitat focal points. This has been supported by three regional training courses and 12 national training seminars on the scientific and management aspects of operating the regional *refugia* system.

Cost effectiveness was a key criterion for development of the *refugia* initiative. The concept aims to improve the use of area-based approaches to fish stock and habitat management, whilst overcoming the problems associated with the emphasis on no-take Marine Protected Areas in the region. The latter include low fishing community acceptance, and high costs in terms of displacement of fishermen and enforcement. The fisheries *refugia* initiative addresses the present problems by drawing on fisheries management concepts that are easily understood at the fishing community level and emphasise the sustainable use of fisheries resources and their habitats rather than the prohibition of fishing.

There is consensus amongst the fisheries and habitat specialists of the SCS Project that the *refugia* concept represents an innovative approach for building fishing community support for area-based approaches to fisheries and habitat management, through which fish stock and habitat conservation objectives can be achieved simultaneously. The focus of the project on establishing operational management at 23 priority fisheries *refugia* sites will enable the efficient timing of site level activities required to ensure the transfer of lessons-learned between and amongst sites, and evaluation of the effectiveness of project interventions in achieving the medium and longer term resource and institutional objectives of the *refugia* system.

H. Justify the comparative advantage of GEF agency:

The project represents implementation of one component of the Strategic Action Program for the South China Sea that was developed through the UNEP/GEF project entitled “*Reversing environmental degradation trends in the South China Sea and Gulf of Thailand*” and will build on the network of institutions, organizations and individuals responsible for the development of the *refugia* concept during execution of that project. SEAFDEC as the regional executing agency has collaborated with UNEP in the development and dissemination of the concept of the fisheries *refugia* and is the only regional fisheries body encompassing the South China Sea and Gulf of Thailand.

UNEP has been recognized by regional and International fisheries organizations as the appropriate organization to implement initiatives in Southeast Asia that focus on the integration of fisheries and environment considerations due to it being the only United Nations program whose core business is the environment. UNEP is also placed well to facilitate the multi-stakeholder, intergovernmental consultations required to ensure the close cross-sectorial consultation between fisheries and environment departments in the designation and management of fisheries *refugia*. This is particularly important in relation to the designation by Ministries of Environment of Marine Protected Areas to ensure that such areas are congruent with habitat areas of critical significance to fish stocks. This will involve the establishment of institutional mechanisms to effect the integration of habitat and marine biodiversity conservation considerations into fisheries management. UNEP has demonstrated its ability to achieve this and is evidenced by the Intergovernmental regional guidelines on fisheries *refugia* adopted by ASEAN and SEAFDEC.

PART III: APPROVAL/ENDORSEMENT BY GEF OPERATIONAL FOCAL POINT(S) AND GEF AGENCY (IES)

A. Record of endorsement of GEF operational focal point (s) on behalf of the government(s): (Please attach the country endorsement letter(s) or regional endorsement letter(s) with this template).

NAME	POSITION	MINISTRY	DATE (MM/DD/YY)
Nguyen VAN TAI,	Deputy Director General Department of Environment ,	Ministry of Natural Resources and Environment, Vietnam	
Agus PURNOMO,	Special Assistant Minister for International Environmental Issues and Partnership	Ministry of Environment, Indonesia	
Analiza TEH,	Assistant Secretary Department of Environment and Natural Resources Foreign Assisted and Special Projects Office	Department of Environment and Natural Resources Philippines	
Saksit TRIDECH,	Permanent Secretary Office of the Permanent Secretary	Ministry of the Natural Resources and Environment Thailand	
HEAL, Lonh	Technical Director General	Ministry of Environment Cambodia	

B. GEF agency (ies) certification

This request has been prepared in accordance with GEF policies and procedures and meets the GEF criteria for project identification and preparation.

Agency Coordinator, Agency name	Signature	Date (Month, Year, Day)	Project Contact Person	Telephone	Email Address
Maryam Niamir- Fuller Director, UNEP Division of GEF Coordination					

“IMPROVED FISHERIES MANAGEMENT THROUGH AN ECOSYSTEMS APPROACH TO FISHERIES BY DEVELOPMENT AND MANAGEMENT OF *REFUGIA* AND MARINE PROTECTED AREAS IN THE EASTERN GULF OF THAILAND”

Concept Note

Title of the action:	Improved Fisheries Management Through an Ecosystems Approach to Fisheries by Development and Management of <i>Refugia</i> and Marine Protected Areas in the Eastern Gulf of Thailand
Lot N°	Lot 8: Fisheries
Location(s) of the action: - <i>specify country(ies), region(s) that will benefit from the action</i>	(Eastern) Gulf of Thailand – Cambodia, Thailand and Vietnam
Total duration of the action (months):	48 months
Amount (in EUR) requested from the European Commission	1,200,000 Euro
Objectives of the action	<p>The development objective (overall objectives) is sustainable fisheries and healthy ecosystems in eastern Gulf of Thailand (Cambodia and bordering provinces in Vietnam and Thailand) and poverty eradicated along the coasts of the eastern Gulf of Thailand</p> <p>The objectives are to have:</p> <ul style="list-style-type: none"> • Capacity built up for the establishment of a well managed system of MPAs and fisheries resources conservation areas (<i>refugia</i>) for the management of commercially important fish stocks, endangered species habitats in the eastern Gulf of Thailand • Plans for the management of illegal and environmentally destructive fisheries coordinated among the Gulf of Thailand countries to reduce pressure on the ecosystems combined with programmes to identify alternative income to alleviate poverty • Experiences and knowledge shared about the implementation of ecosystems based fisheries among institutions and communities in Cambodia, Vietnam and Thailand as well as at the ASEAN regional level • A process supported to establish bi- and/or trilateral agreements on the management of fisheries and habitats (ecosystems) among Cambodia, Vietnam and Thailand
Target group(s) ²¹	<ul style="list-style-type: none"> • Fishing communities and fisher-folk (Cambodia, Thailand and Vietnam) • NGO staff • Staff from local and central government agencies (fisheries, environment) • Staff from international and regional organisations
Final beneficiaries ²²	Coastal fishing communities and fisher-folk

²¹ “Target groups” are the groups/entities who will be directly positively affected by the action at the action purpose level.

²² “Final beneficiaries” are those who will benefit from the action in the long term at the level of the society or sector at large.

<p>Estimated results</p>	<ul style="list-style-type: none"> • Enhanced cooperation mechanism and information/experience exchange promoted within countries and between countries in the sub-region. • Better understanding and enhanced capacity of the ecosystem approach to fisheries and demonstrated added value of this concept in the fisheries management and the role of MPAs in the process. • A series of capacity building events, on-site training and awareness raising activities, including alternative livelihood have been provided to all stakeholders • Capacity, strengthened to monitor and record active fishing capacity in small scale/coastal fisheries, including incidences of illegal (IUU) fisheries by large-scale vessels in coastal waters. • Drafting of plans for ecosystems based management systems in Cambodia, Vietnam and Thailand initiated • A sub-regional framework, based on nationally implemented management areas (MPAs, <i>refugias</i>), identified in the Gulf of Thailand for trans-boundary resource management • Consultative workshops organised to share the knowledge and experiences of the implementation of ecosystem approach to fisheries in the region.
<p>Main activities</p>	<ul style="list-style-type: none"> • Promotion of and capacity building for Ecosystems based management, including MPAs and designation of <i>refugia</i> • Identifying alternative livelihoods for coastal communities to reduce fishing pressure and poverty alleviation • Addressing fishing capacity by records of vessels and gear to reduce illegal and destructive fishing • On-site training and training of trainers in border areas • Promotion of bi- and trilateral agreements on fisheries and habitat management • Studies and research as needed to support the processes indicated in the proposal

PROJECT CONCEPT NOTE

Project Title: Strategies for trawl fisheries by-catch management (REBYC-II CTI)
Project Funding Agency: FAO/GEF/GIZ
Lead Department: Training Department
Duration: 2011 - 2015

1. BACKGROUND/INTRODUCTION

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 populations and exploitation pressures, growing threats from pollution and major ecosystem change are a particular concern in the region. Also – as more widely in the global context – the untargeted capture of fish and non-fish species, commonly called bycatch and discards, is an increasing concern. By-catch includes fish, turtles, marine mammals, and corals and other seabed fauna and flora. This part of the catch tends to be poorly monitored and not managed but could have an important impact on fishery resources, habitats and ecosystems. In some fisheries and regions, there is an increasing trend towards retention of the by-catch consisting of juveniles and small-sized fish for use as food for human consumption or for utilization as aqua feed. This is therefore a complex issue, requiring resource and biodiversity aspects to be tackled alongside human needs and involving a mix of policy, technical and community support measures.

A global project “Reduction of Environmental Impact from Tropical Shrimp Trawling through the Introduction of By-catch Reduction Technologies and Change of Management” (2002-2008) implemented by the SEAFDEC/TD in collaboration with FAO/UNEP/GEF) was completed and successfully gave benefits to SEAFDEC Member Countries. Therefore, the collaboration with FAO/GEF/GIZ, SEAFDEC/TD will be continued to implement a project on “Strategies for trawl fisheries by-catch management (REBYC-II CTI)” from 2011 to 2015. It aims to secure sustainable fisheries resources and healthy marine ecosystems in the Coral Triangle and Southeast Asian waters by reducing by-catch, discards and fishing impact on biodiversity and the environment. To attain them, **effective** public and private sector partnership will be required to improve trawl and by-catch management and practices that support fishery dependent incomes and sustainable livelihoods.

2. MAIN OBJECTIVES

Effective public and private sector partnership for improving trawl and by-catch management and practices that support fishery dependent incomes and sustainable livelihoods.

3. PROJECT DESCRIPTION

The project is structured on four interrelated components:

- 3.1 The Policy, legal and institutional frameworks component will be to work towards the formulation of national or area specific trawl fisheries by-catch management plans and building institutional capacity for their implementation. The need for adequate legislation and regulations to support the implementation of improved management measures will also be addressed. At the regional level, a by-catch policy/strategy will be developed and project countries will be encouraged to adopt the International Guidelines on By-catch Management and Reduction of Discards.
- 3.2 The Resource management and fishing operations component will lead to the adoption of more selective fishing gear and practices, zoning of fishing areas and development of spatial-temporal closure management measures, and better data on the number of vessels and recommendations for fishing effort and capacity management. The management measures will be supported by the

identification of incentive packages that promote more responsible fishing. The results from this component will be information to contribute to map out the regional by-catch policy/strategy and the national and/or area specific trawl fisheries by-catch management plans.

- 3.3 The information management and communication component will include by-catch data collection (at landing sites and onboard vessels), mapping of fishing grounds, establishment of socio-economic monitoring procedures and means for disseminating by-catch data and information. Standardized methods for by-catch data collection will be promoted across project countries.
- 3.4 The awareness and knowledge component will address the improvement of awareness and knowledge on trawl fisheries by-catch management issues to make stakeholders to understand well what measures are available for more responsible and sustainable fisheries. Private sector/fishers, policy makers, fisheries managers, officials, extension officers and NGOs will be offered training and workshops to enhance their knowledge on best management practices and responsible fisheries.

4. EXPECTED OUTPUTS

- Regional by-catch policy/strategy – in line with the forthcoming International Guidelines on By-catch Management and Reduction of Discards – it 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 50% of all trawlers in the project countries.
- Measures for management to reduce by-catch 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.
- Standardized data on at least 3 key by-catch and habitat indicators are available in all project countries to help trawl fisheries and by-catch management planning and implementation at national and regional levels.
- Enhanced understanding on responsible fishing of private sector/fishers, fisheries managers and decision-makers supports participatory management arrangements in all project countries.
- Institutional arrangements and processes for public and private sector partnerships fit into place to support trawl fisheries by-catch management in all project countries.
- The role of by-catch in trawl profitability is understood and measures to ensure long-term economic sustainability of trawl fisheries are identified and incorporated into trawl fisheries by-catch management plans in all project countries.
- Incentives for trawl operators to reduce by-catch are defined to implement the best communication practices within relevant regional frameworks in all projects.

5. PROGRESS AND STATUS

SEAFDEC/TD has started to communicate with CIM/GIZ on the dispatch of a regional project coordinator and prepare a contract with him to come to work at the Training Department. Project participating countries also will appoint / nominate their national coordinators. The Inception meeting to start the implementation of the project is scheduled for 1-4 May 2012.

SOUTHEAST ASIAN STATE OF FISHERIES AND AQUACULTURE (Concept and Outline)

BACKGROUND AND PROGRESS

SEAFDEC throughout the past decades has undertaken activities to compile various forms of fishery-related data and information. These include fishery statistics based on the national statistics provided by the Southeast Asian Member Countries for regional compilation, and other data and information collated through various SEAFDEC programs/projects, *e.g.* fisheries resources surveys in the Southeast Asian waters, information collection of highly migratory species, deep sea fishery resources exploration, tagging of sea turtles and research study on their habitats, tagging of economically-important pelagic species, development and usage of practical indicators for sustainable development and management of capture fisheries, supporting vessel registration and licensing, etc. However, the outputs from different initiatives are gathered in isolated manner and haven't been integrated/digested to come up with proper information that could be disseminated to target users and used to support development and management for sustainable fisheries of the region.

It is widely acknowledged that information on status and trends of fisheries is crucial for policy planning to ensure sustainable development and management of fisheries of the region. The "Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020" adopted during the ASEAN-SEAFDEC Conference in 2011 also emphasized the necessity to "strengthen knowledge/science-based development and management of fisheries"; while the "Plan of Action" stressed the need to "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". During the 32nd Meeting of SEAFDEC Program Committee held in 2009, the Committee also requested that considering that there are a number of regional resources surveys have been conducted by SEAFDEC, certain linkages of the outcomes from these resources surveys should be developed in a thematic way, the result of which should be made accessible to the Member Countries in order to maximize the benefits from such surveys.

SEAFDEC, under close cooperation between the Secretariat and all Departments, therefore undertake pilot activities in developing a publication entitled "Southeast Asian States of Fisheries and Aquaculture" or SEASOFIA aiming to provide a platform for compilation of synthesized data and information generated from various activities of SEAFDEC, and incorporating other available data and information, in order to provide better understanding on the status and trends of fisheries and aquaculture of the region. Also included in the publication are selected fisheries-related issues/challenges that are identified as important for the region in order to raise awareness and enhance the capacity of countries in the region in response to the issues.

The draft SEASOFIA is being prepared by the Secretariat in collaboration with all Departments, and the contents is to be presented to the 34th Meeting of the PCM for consideration and comment. The publication would be further finalized, published and disseminated to various target groups including fisheries-related agencies/institutions in the Member Countries, relevant regional/international organizations and public.

PROPOSED CONTENTS

I. Status and Trends of Capture Fisheries and Aquaculture

1. Global Production and Utilization of Fish
2. Fishery Production of Southeast Asia
3. Marine Capture Fisheries Production of Southeast Asia
 - 3.1 Tuna and Tuna-like Species
 - 3.2 Sharks and Rays
4. Production from Inland Capture Fisheries of Southeast Asia
5. Aquaculture Production of Southeast Asia
 - 5.1 Mariculture
 - 5.2 Brackishwater Culture
 - 5.3 Freshwater Aquaculture
6. Fish Trade
 - 6.1 Global Trading of Fish and Fishery Products
 - 6.2 Southeast Asian Export-Import of Fish and Fishery Products
7. Summary

II. Issues and Challenges in Sustainable Fisheries Development of the Southeast Asian Region

1. Marine Fishery Resources
 - 1.1 Small Pelagic Fishery Resources
 - 1.2 Deep Sea Fishery Resources
 - 1.3 Species Under International Concern
 - 1.3.1 Sharks and Rays
 - 1.3.2 Tunas
 - 1.3.3 Sea Turtles
 - 1.3.4 Sea Cucumbers
 - 1.3.5 Seahorses
2. Inland Fishery Resources
 - 2.1 Status, Issues and Concerns
 - 2.2 Challenges and Future Direction
3. Utilization of Fishery Resources
 - 3.1 Status, Issues and Concerns
 - 3.2 Challenges and Future Direction
4. Fisheries Management
 - 4.1 Management of Fishing Capacity and Combating IUU Fishing
 - 4.1.1 Vessel Registration, Licensing, and FAO Global Record
 - 4.1.2 Catch Documentation Including Logbook Systems
 - 4.1.3 Port Monitoring and Port Inspection
 - 4.1.4 Monitoring, Control and Surveillance Systems and Network
 - 4.1.5 Legal and Institutional Matters
 - 4.2 By-catch Reduction and Management
 - 4.3 Co-management
 - 4.4 Rehabilitation of Fishing Habitats
5. Safety at Sea and Standards for Fisheries in Southeast Asia
6. Aquaculture
 - 6.1 Integration of Aquaculture in Rural Development
 - 6.1.1 Aquaculture and Rural Development in Southeast Asia
 - 6.1.2 Issues and Opportunities in Integrating Aquaculture in Rural Development
 - 6.1.3 Perspectives in Integrating Aquaculture in Rural Development
 - 6.2 Production Good Quality Seeds
 - 6.2.1 Status of Seed Production
 - 6.2.2 Issues and Concerns
 - 6.2.3 Challenges and Future Direction
 - 6.3 Disease Diagnosis, Control, Monitoring and Surveillance of Aquatic Animals
 - 6.3.1 Status, Issues and Concerns
 - 6.3.2 Challenges and Future Direction

- 6.4 Development of Sustainable Aquaculture Feeds
 - 6.4.1 Use of Fish Meals and Fish Products for Aquaculture Feeds
 - 6.4.2 Issues and Concerns
 - 6.4.3 Challenges and Future Direction
- 6.5 Minimizing Impacts of Aquaculture on the Environment
 - 6.5.1 Status, Issues and Concerns
 - 6.5.2 Challenges and Future Direction
- 6.6 Capacity Building on Aquaculture Development
 - 6.6.1 Status, Issues and Concerns
 - 6.6.2 Challenges and Future Direction
- 7. Adaptation and Mitigation of the Impacts of Climate Change
 - 7.1 Coastal Habitat Vulnerability
 - 7.2 Impacts of Climate Change on Capture Fisheries
 - 7.3 Impacts of Climate Change on Aquaculture Development
 - 7.4 Adaptation Strategies
 - 7.5 Reduction of Carbon Footprints from Fisheries

III. Outlook of Fisheries for the Southeast Asian Region

- 1. Current Fisheries Scenario in Southeast Asia
- 2. Possible Scenario in the Future

IV. Acknowledgment

V. References

REQUIRED ACTIONS BY THE PCM

The PCM is requested to consider and provide view/comments on the contents as well as on other relevant aspects for improvement/finalization of the publication.

The PCM is also requested to provide directives on future production of the SEASOFIA, as well as other initiatives to be undertaken by SEAFDEC in order to improve better understanding on status and trends of fisheries and aquaculture and serve as a basis for knowledge/science-based policy planning and to ensure sustainable development and management of fisheries of the region, and avoid the duplication with other relevant/similar initiatives undertaken by other organizations/institutions.

EXPERT CONSULTATION ON EFFECTIVE SURVEILLANCE & LAW ENFORCEMENT TO COMBAT IUU FISHING

**MINISTRY OF
MARINE AFFAIRS AND FISHERIES**



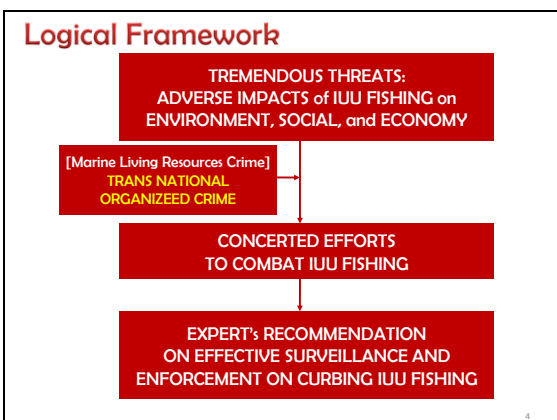
**Expert Consultation on
Effective Surveillance & Law Enforcement
to Combat IUU fishing**

Background

- IUU fishing presents a tremendous threat to the sustainability of fisheries which undermine efforts for food security
- IUU fishing tend to be associated with other type of crimes
- Surveillance and Law Enforcement to combat IUU fishing have not been addressed adequately
- Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 [B-Fisheries Management – Marine Fisheries 21-23]
- Minister’s statement upon the ASEAN-SEAFDEC Conference on Sustainable Fisheries for Food Security Towards 2020, held in Bangkok from 13-17 June 2011

Minister of Marine Affairs and Fisheries the Republic of Indonesia is intended to convene an Expert Consultation Meeting on Effective Surveillance & Law Enforcement to Combat IUU fishing

Date	: 5 – 8 December 2011
Venue	: Hotel Borobudur, Jakarta
Theme	: Effective Surveillance and Law Enforcement to Combat IUU Fishing for Sustainable Fisheries and Food Security Towards 2020
Opened by	: Minister of Marine Affairs and Fisheries



OBJECTIVES

- Equalizing perception, vision, and understanding among countries in the region about IUU fishing and Monitoring, Control and Surveillance [MCS]
- Review and identify the steps have been taken by the countries in the region in combating IUU fishing and building MCS capacity.
- Identify follow-up activities and the negative impact of illegal fishing, cross country (people smuggling, drug trafficking etc.)
- Establish a shared commitment of the countries in the region in combating IUU fishing by strengthening port state and flag state measure.
- Formulate concrete action steps to implement responsible fisheries, including combating IUU fishing in region.

SCENARIO

- The Expert Consultation Meeting will be officially opened by the Minister of Marine Affairs and Fisheries
- Keynote Address by the Minister of Marine Affairs and Fisheries
- Presentation by Resource Person
- Sharing information on existing and emerging issues regarding IUU fishing
- Exchange views on efforts have been taken by each country to combat IUU fishing
- Discussion
- Drafting Expert’s Recommendation on JOINT EFFORTS ON CURBING IUU FISHING

SCENARIO

- The Expert Consultation Meeting will be officially opened by the Minister of Marine Affairs and Fisheries
- Keynote Address by the Minister of Marine Affairs and Fisheries
- Presentation by Resource Person
- Sharing information on existing and emerging issues regarding IUU fishing
- Exchange views on efforts have been taken by each country to combat IUU fishing
- Discussion
- Drafting Expert's Recommendation on JOINT EFFORTS ON CURBING IUU FISHING

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Expected Outcomes

- A better understanding of the changing environment, including international and regional regulations, in curbing IUU fishing
- Expert's Recommendation on Effective Surveillance and Law Enforcement to Combat IUU Fishing would be used in the policy making
- Experts' Recommendation to Effectively Combat IUU Fishing will be reported to the Regional Organizations and Regional Bodies through relevant channel
- Improve compliance to region and global laws and regulation related to fisheries management

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RPOA participating countries and Regional Bodies to:

- Advice to whom the invitation should be addressed
- Identify and inform experts relevant to the topic of discussion, if possible
- Advice relevant Minister to assign and mobilize experts to participate and contribute their expertise

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Progress to Date

- Announcement at the RPOA CC Meeting 3 November 2011 at Cambodia
- Invitation direct to Experts have been sent November 2011, by fax and e-mail. Confirmation to attend *)
- Invitation via Ministers on progress
- Venue confirmed
- EO supported by IMACS: Note Taking, Rapporteur

*) see next slide

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Experts

No.	International Experts	Status
1	Professor Tatsuro Matsuoka - Kagoshima Univ.	On Progress
2	Professor Ron West - University of Wollongong	OK
3	Ms. Michele Kuruc - Fishing Operations and Technology Service – FAO and IMCS Network Interim Chair	OK
4	Mr. Todd Dubois – NOAA - IMCS Network Coordinator Interim Vice Chair	On Progress
5	Dr. Magnus Torell - SEAFDEC	OK
6	Mr. Bundit Chokesanguan - SEAFDEC	OK
7	Mr. Kenji Matsumoto - SEAFDEC	OK
8	RFMOs	On Progress
9	Stølsvik Gunnar A - UNODC	On Progress
10	Professor Atsushi Ishimatsu, Nagasaki Univ.	On Progress

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Experts

No.	International Experts	Status
11	Mr. Simon Veitch – DAFF - Australia	OK
12		On Progress
13		On Progress
14		On Progress
15		On Progress
16		On Progress
17		On Progress
18		On Progress
19		On Progress
20		On Progress

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No.	National Experts	Status
1	Dr. Suseno Sukoyono -SAM KP	OK
2	Professor Etty R. Agoes - UNPAD	OK
3	Professor Hasyim Jalal - Penasehat MenKP	OK
4	Melda Kamil Ariadno, SH, LL.M - UI	OK
5	Hikmahanto Juwana, SH. - UI	On Progress
6	Ir. Purwanto, PhD - Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumber Daya Ikan, KKP	On Progress
7	Dr. Bebeb Djunjuran - Direktur Perjanjian Ekonomi, Sosial dan Budaya, Kemenlu RI	On Progress
8	Dr. Purwito Martosubroto	On Progress
9	Dr. Indroyono Soesilo – SESMENKOKESRA	On Progress
10	Profesor OC Kaligis, SH – Free Lance	On Progress

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No.	National Experts	Status
11	Profesor Rokhmin Dahuri - IPB	On Progress
12	Ir. Tyas Budiman, MM - Direktur Pelayanan Usaha Penangkapan Ikan, Ditjen PT	OK
13	Ir. Agus Apun Budiman, M.Aq - Direktur Sumber Daya Ikan, Ditjen PT	OK
14	Dr. Achmad Purnomo – Secretary of the Agency for Reseach and Development of Marine Affairs and Fisheries	OK
15		On Progress
16		On Progress
17		On Progress
18		On Progress
19		On Progress
20		On Progress

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Tentative Agenda

- Opening Remarks
- Welcoming Remarks and Keynote Address
- Presentation by Experts
- Presentation by RFMOs
- Presentation by SEAFDEC
- Case Study → [each country ? or Magnus Torell
present result from previous expert meeting ?
- Report from previous Expert Consultation held in
Australia [2000] and Thailand
- Discussion
- Drafting Expert Recommendation
- Closing

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Arrangement

- Covered:
 - Accommodation
 - Meals during the Meeting
 - Meeting Package
 - Local Transportation
 - Field Trip
- Not Covered:
 - Air Ticket
 - Personal Expenses

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Contact Person

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STATEMENT

*By Dr. Simon Funge-Smith,
FAO Regional Office for Asia and the Pacific*

Mr. Secretary General,
Distinguished Delegates to the SEAFDEC Programme Committee:

Thank you for this opportunity to make some observations to the 34th PCM. First of all, I would like to thank our hosts for the providing their warm hospitality and the innovative training opportunities yesterday evening.

FAO cooperative activities with SEAFDEC during 2011 have been various, with the most prominent example being the successful approval of a project proposal for GEF funding of the regional trawl management project, "Reduction of By-Catch Phase II". FAO very much looks forward to working closely with SEAFDEC in the execution of this regional project, which will contribute to the SEAFDEC Regional Programme in several key areas.

I would like to thank SEAFDEC for cooperating in a number of regional consultative workshops with the Asia-Pacific Fishery Commission (APFIC), most notably in the area of strengthening assessments in fisheries and the impacts of climate change on fisheries and aquaculture. As Secretary of APFIC, I hope that SEAFDEC will join the APFIC Regional forum Meeting and 32nd Session to be convened in Na Trang, Vietnam in September 2012.

SEAFDEC has also been collaborating with the Bay of Bengal Large Marine Ecosystem project both through involvement of the Secretariat and the SEAFDEC Member Countries of Indonesia, Thailand, Myanmar and Malaysia. Both FAO and BOBLME are looking forward to stronger BOBLME-SEAFDEC collaboration in 2012, particularly in some key areas relating to resource management, the development of a regional Ecosystem Approach to Fishery training course and a regional workshop on the use of MPAs as a tool for fishery management.

I would like to congratulate the very broad range of SEAFDEC activities which the Programme Committee considers is an indicate of the very wide technical competence of SEAFDEC.

However, this may appear to an external observer, that this huge number of activities is largely input driven and does not reflect a coherent regional programme, particularly with respect to limited reporting on programme outcomes, as opposed to reports on completed activities.

That is, that the activities are driving the programme, rather than the setting of priorities and outcomes followed by the identification of activities allocation of budget.

Alongside this, there is a strong national prioritization in the SEAFDEC centers, which challenges the development of a convincing regional programme.

This appears to be a lost opportunity, as the application of strategic rethinking of the SEAFDEC regional programme, would allow most of the ongoing programme to be brought into a more coherent framework, and would strengthen the regional nature of SEAFDEC's work.

The ASEAN-SEAFDEC 2011 Resolution and Plan of Action, does provide a framework, but for it to truly be a regional programme, there needs to be contribution from several centres as well as Member Countries into the programme elements.

The plan of action could read more as an activity plan for the individual centers but if it is taken as a truly regional guide then planning would start here at the Programme Committee to ensure that each area of the

Plan of Action was allocated as a responsibility to a center to coordinate its own programme, which would be funded from a mixture of national funding, MRC and Trust Funds, *as well as complementary contributions from Member Countries.*

In this regard the *planning process would need to be more inclusive* and would see perhaps a biennial planning meeting of technical representatives of each member countries *for each key programme area* together with relevant SEAFDEC staff.

A regional programmatic approach would provide the external observer (and possibly Member Countries themselves) with a greater appreciation as to how the activities of SEAFDEC actually contribute to a regional programme of capacity building, knowledge development, technical innovation and support to policy development.

This would act to increase involvement of Member Countries which do not have SEAFDEC centers, but which may have significant national programmes that are complementary to the regional plan.

Using the Plan of Action as a framework, here are a few constructive suggestions as to how this might be achieved, without dramatically upsetting existing programmes and arrangements. The regional Programme elements would follow the POA.

- “Information in support of management and policy”
- “Strengthening of marine capture fishery management”
- “Inland capture fishery management”
- “Aquaculture development”
- “Post harvest & trade”

Streamlining the programmes of SEAFDEC to a few key themes means that both SEAFDEC centers and the Member Countries fishery institutions can contribute into the programme. Planning would need to be done in a more regional manner, rather than the centre-based way it is currently conducted.

The reporting on the programmes would not become constrained to the MRC and the Trust Funds, but would also reflect the national efforts in this regard.

This is highly attractive to partners and donors who see value adding and this is an important aspect of seeking GEF funding for regional or national projects (linked to environment, biodiversity and climate change).

Importantly, it would reduce the impression that there is considerable overlap and duplication of activities between the SEAFDEC centers, and that parallel activities are being undertaken without coordinating so that they contribute to a regional level outcome.

A strategic programmatic approach also allows provides a clearer entry point for cooperation and ensures that SEAFDEC can deliver its regional programmatic programme commitments, and ensures the inclusion of national programmes. At the same time, this also opens up greater opportunities to broaden the financial support to the regional and country programmes.

Thank you

“STRENGTHENING OF ASEAN-SEAFDEC STRATEGIC PARTNERSHIP”
ASEAN Secretariat



Strengthening ASEAN-SEAFDEC Strategic Partnership

34th SEAFDEC Program Committee Meeting
 14-16 November 2011
 Manila, Philippines

One Vision, One Identity, One Community

ASEAN-SEAFDEC Strategic Partnership

- ◆ ASEAN – a rules-based inter-governmental organisation
- ◆ Realisation of ASEAN Community in 2015
- ◆ ASEAN-SEAFDEC Cooperation
 - * FCG established in 1999
 - * ASEAN-SEAFDEC Strategic Partnership (ASSP) formalised in 2007 (LOU)
- ◆ ASSP Program
 - * Core component of ASEAN program on fisheries
 - * Appreciation by ASEAN Member States and Sectoral Bodies ”

One Vision, One Identity, One Community 2

SEAFDEC in ASEAN Process

- ◆ Implementation of programs/ projects under FCG/ASSP
- ◆ Implementation of ASEAN Integrated Food Security (AIFS) Framework
 - * Raising importance of fisheries contribution to food security
 - * Supporting the development of project concept notes and implementation on
 - ▲ Identifying and Addressing Emerging Issues Related to Food Security
 - Address impacts of climate change on food security

One Vision, One Identity, One Community 3

SEAFDEC in ASEAN Process

- ◆ Implementation of ASEAN Multi-sectoral Framework on Climate Change: Agriculture and Forestry towards Food Security (AFCC), focusing on fisheries
- ◆ Joint successfully conducted “Fish for the People 2020” Conference with adopted Resolution and Plan of Action
- ◆ Broadening ASEAN cooperation in fisheries with Dialogue Partners (i.e. ASEAN Plus Three)

One Vision, One Identity, One Community 4

Future Perspectives of ASSP

- ◆ Contribution of fisheries to ASEAN Community building by 2015
 - * Food safety/ SPS
 - * Fisheries quality management system – HACCP-based systems, good laboratory practices, application for SMEs
 - * Good aquaculture practices (as a regional product standard), including appropriate use of veterinary drugs
 - * Strategic alliances and joint approaches among AMSs and with the private sectors
 - * Engaging CSOs (fishers’ organisations) in the integration of fisheries sector

One Vision, One Identity, One Community 5

Future Perspectives of ASSP

- ◆ Contribution of fisheries to ASEAN Community building by 2015 (cont’d)
 - * Combating IUU fishing (considering the economic and security implication)
 - * Enhancing food security and safety
 - * Promoting sustainable use of coastal and marine environment
 - * Promoting sustainable management of natural resources and biodiversity
 - * Responding to climate change and addressing its impacts

One Vision, One Identity, One Community 6

Future Perspectives of ASSP

- ◆ From “collaborative projects” to “strategic collaborative program”
 - * Big picture (holistic approach in Project Cycle Management) and inter-linkages among projects towards the goals and common interests
 - * Built upon comparative advantages
 - * M&E and results-based reporting (outputs, outcomes and policy making process), tools for
 - ▲ Project effectiveness
 - ▲ Management efficiency;
 - ▲ Accountability with the concerned stakeholders.

Future Perspectives of ASSP

- ◆ From “collaborative projects” to “strategic collaborative program” (cont'd)
 - * Strong M&E system with results-based reporting will enable greater:
 - ▲ Awareness of contribution and the various factors that come into play;
 - ▲ Appreciation from stakeholders (e.g. Ministries, donors, community) of the program costs and benefits; and
 - ▲ Potential for more strategic program support from donor agencies
 - ◆ Continued engagement in initiatives on food security (AIFS) and climate change (AFCC)

Future Perspectives of ASSP

- ◆ Achievement of “Fish for the People 2020” Conference - Process
 - * Joint regional development towards vision and perspectives of fisheries towards 2020
 - * A platform for strengthening regional cooperation on fisheries in the ASEAN region (ASSP and beyond)
 - * Raise profiles of the fisheries sectors and ASSP to high level authorities
 - * Strengthen ASSP programme towards project effectiveness (coordinated efforts, synergies and greater impacts), management efficiency and accountability with the concerned stakeholders

Future Perspectives of ASSP

- ◆ “Fish for the People 2020” Conference – Outputs and outcomes
 - * Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020
 - ▲ New ASEAN Strategic Plan of Action (SPA) in Fisheries
 - ▲ Use as policy and principle by the ASEAN Countries in achieving sustainable fisheries for food security in the coming decade
 - * ASEAN Programme Concept Notes on Sustainable Fisheries for Food Security (2011-2015) - in line with RES & POA
 - * Awareness Building of the ASEAN-SEAFDEC Member Countries and the Conference participants on issues related to sustainable fisheries for food security
 - * Reinforced ASEAN solidarity and closer cooperation in the field of fisheries in accordance with the implementation of ASEAN Charter in realisation of the ASEAN Community by 2015

Future Perspectives of ASSP

- ◆ The supporting programme
 - * platform to implement the Resolution and Plan of Action
 - * platform of cooperation and partnership among ASEAN Member States, Dialogue Partners and Development Partners to ensure their synergy and complementarity
 - * will be developed in two phases to cover the decade of implementation:
 - ▲ Phase 1: Supporting the contribution of the fisheries sector to food security through the realisation of ASEAN Community Building (2011-2015); and
 - ▲ Phase 2: Enhancing the contribution of the fisheries sector post 2015

Future Perspectives of ASSP

- ◆ **Programme Phase 1 (2011-2015):** Supporting the Contribution of Fisheries Sector to Food Security through the Realisation of ASEAN Community Building (2011-2015)
 - * Fisheries is an important sector within ASEAN, and contributes across the three pillars of the ASEAN Communities (Political Security Community, Economic Community, and Socio Cultural Community), as well as to national development and regional cooperation
 - * Fisheries also have the potential to contribute significantly to ASEAN Community Building now and in the future
 - * Fisheries development must enhance the contribution of the sector to the ASEAN Community Building, ensure the sustainable development of the sector, and promote better livelihoods of people involved in fisheries.

Future Perspectives of ASSP

◆ Programme Phase 1 (2011-2015):

- * A number of challenges that need to be considered, as guided by the Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020
- ◆ The overall objectives of the programme are:
 - * To provide supporting initiatives for the ASEAN Member States to pursue the relevant ASEAN Community Blueprints;
 - * To provide a platform of technical cooperation and partnership that could enhance the capacity of AMS in developing sustainable fisheries for food security; and
 - * To support dialogue and cooperation on fisheries related issues both within and outside of the ASEAN context.

Future Perspectives of ASSP

- ◆ To achieve and ensure the contribution of fisheries to food security, better livelihoods and sustainable development, as well as the realisation of an integrated ASEAN Community by 2015, the priority issues and areas under Phase 1:
 - * Safety management systems that ensure food safety and food quality standards of fish and fishery products through fish quality assurance;
 - * Food security and climate change impact on fisheries and aquaculture;
 - * Illegal fishing in marine and inland fisheries;
 - * Contribution of inland fisheries to food security and sustainable livelihoods;
 - * Effective management of fisheries through the implementation of an ecosystem approach to fisheries, especially better management of fishing capacity and use of responsible fishing technologies and practices;

Future Perspectives of ASSP

◆ Priority issues and areas under Phase 1 (cont'd)

- ◆ Aquaculture Development – with emphasis on
 - * Contribution to food security and sustainable livelihoods
 - * Mitigation of potential impacts on the environment and biodiversity including the spread of aquatic animal diseases; and
 - * Development of better feeds;
- ◆ Promotion of joint ASEAN approaches and positions in international trade in fish and fishery products of the region by harmonising standards, criteria and guidelines;
- ◆ Optimum utilisation of catch from water to market by reducing post-harvest losses and waste;
- ◆ Fair and appropriate employment practices; and
- ◆ Minimising the contribution of the fisheries sector to green-house gas emissions, with emphasis on promoting energy efficiency and use of alternative energy sources.

Future Perspectives of ASSP

- ◆ Three cross-cutting themes will be emphasised throughout the implementation of the Programme - research and development (R & D), information management (collection, sharing and maximising its usage), and capacity building.

Future Perspectives of ASSP

◆ IMPLEMENTATION ARRANGEMENT

- ◆ Phase 1 (2011-2015) will be implemented by AMSs with support from the ASEAN Secretariat in consultation with relevant ASEAN stakeholders (e.g. Private Sector, Civil Society Organizations (CSO), and Academic Institutions) in cooperation and partnership with Dialogue Partners (e.g. Australia, ASEAN Plus Three, United States of America (USA), European Union (EU)); and Development Partners (e.g. SEAFDEC, FAO, MRC, NACA, IDB, ADB, and the World Bank)
- ◆ The ASEAN Secretariat will assist in facilitating technical cooperation, seeking funding support and cooperation for the implementation of Programme
- ◆ A full Programme proposal indicating substantial partners and cooperation arrangements will be developed for sourcing fund
- ◆ A review will be conducted after phase 1 in 2015 to evaluate achievements as a basis for developing Phase 2 of the Programme

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!

The adoption of the report of this Meeting brings us to the conclusion of the official business of this Meeting. Overall, the results of our deliberations lead us to conclude with satisfaction for a job well done. I would therefore wish to express our deep appreciation and gratitude for your active participation especially during the exchange of ideas and comments, and for your suggestions on the various points discussed, for indeed these make the Meeting achieved its objectives. I would also like to thank our staff from the Aquaculture Department and the Secretariat who worked hard to make this Meeting successful.

Your valuable inputs and recommendations on the corresponding projects and activities of SEAFDEC that have just been adopted at this Meeting, would be presented to the next meeting of the FCG/ASSP and to the forthcoming Council Meeting as the case may be, for final endorsement.

We are confident that the issues that need to be followed up in both program and non-program matters considered at this Meeting will contribute to the improvement of the activities of SEAFDEC. This means that we have lots of homework to do, which could be hard work for us but we will try to put more efforts with the close and friendly cooperation of all concerned, so that the ultimate goal can be achieved.

For some of you who will leave before the FCG/ASSP Meeting, I wish you a safe journey back home. To the rest, I will see you during the FCG/ASSP Meeting, which will start from tomorrow until Friday.

Finally, I wish you all the best and every success in the challenges that are placed ahead of us. With that Ladies and Gentlemen, I now declare the Thirty-fourth Meeting of the Program Committee closed. Thank you.