

**REPORT OF**  
**EXPERTS MEETING ON MEKONG COOPERATION ON FISHERIES, AQUATIC  
RESOURCES AND WETLANDS: 20-YEAR LESSONS LEARNT**

*(Full Report with PowerPoint Presentation)*

**12-14 November 2014**  
**Phnom Penh, Cambodia**

The Meeting was organized by  
**Southeast Asian Fisheries Development Center (SEAFDEC)**

in collaboration with  
**Mekong River Commission (MRC)**





## **PREPARATION AND DISTRIBUTION OF THIS DOCUMENT**

The Report of the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-Year Lessons Learnt, held in Phnom Penh, Cambodia, in 12-14 November 2014, was drafted by staff of the SEAFDEC Secretariat under the supervision of the SEAFDEC Secretary-General, Dr. Chumnarn Pongsri, and finalized in a joint effort by the resource persons of the Meeting.

The Full Report (with PowerPoint Presentations) was distributed as reference for participants of the Meeting and relevant organizations.

## **BIBLIOGRAPHIC CITATION**

SEAFDEC. 2015. Report of the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-Year Lessons Learnt (*Full Report with PowerPoint Presentations*), 12-14 November 2014, Phnom Penh, Cambodia. Southeast Asian Fisheries Development Center, Bangkok, Thailand. 155 pp.

## **NOTICE OF COPYRIGHT**

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

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

All Rights Reserved





## EXECUTIVE SUMMARY

The Mekong River is one of the richest and most diverse rivers in terms of aquatic resources and biodiversity, second only to Amazon River. However, to sustainably manage the utilization of the resources in the Mekong River is a major challenge as there are threats and opportunities as well. While providing livelihoods to people throughout the Mekong River Region and hosting the build-up of human societies, the Mekong River and its resources are also linked to the floodplains, wetlands and related habitats in the Lower Mekong Basin.

For peoples in the Southeast Asian region, their basic diet and food security is “*Rice and Fish, Fish and Rice*”. Early cultures, such as the one developed with center in present day Cambodia during the Angkor Period (ca 800-mid 1300s), had been built around a sophisticated wetland management system that balanced the benefits of the wet season with floods and of the dry season with less water. Annual seasonal change with pronounced wet/rainy season and long dry season is a feature unique to the Mekong River Region. However, disruptions in the flood regime, which are man-made or natural, have affected the productivity of the Mekong River Region including the availability of fish and other aquatic resources.

“Everybody” in rural areas of the Mekong River Basin is in one way or another, involved in activities related to catching fish and other aquatic animals although at different intensity depending on the location and time of the year, as well as in harvesting other wetland products, since a rice farming family could also be engaged in fishing depending on the season. A study in the mid 1990s in Lao PDR indicated that fish and frogs taken together was by far the country’s most important “non-timber forestry products”. Looking therefore at the consumption patterns of peoples in this Region, it could be gleaned that “all” people eat fish and other wetland products, as source of their much needed animal protein. Given the large numbers of people involved in catching fish and other aquatic products, catch or production estimates based on “catches” do not usually match the actual levels of fish being caught for consumption and processing. In an attempt to get a more accurate figure, the Mekong River Commission (MRC) in cooperation with other organizations had been making estimates based on the consumption pattern and level of consumption. Recent estimates by the MRC indicated that more than 3,000,000 metric tons of fish and aquatic products are harvested annually with aquaculture production increasingly adding to this total production. In order to get a picture of the total value and importance of fisheries in the Mekong River Region, it is also necessary to add the production of aquatic plants (*e.g.* Chinese water spinach also known as kang kong in many Southeast Asian countries) which to a large extent are harvested and marketed outside of any statistically system. In addition, estimates should be made of the most important wetland plant, which is rice.

Several attempts had therefore been made to estimate the “values” of the aquatic products provided by the Mekong River but all of them fell short of getting close to any accurate figure as there are just not enough information to be inputted into any valuation models. Shortage of information is especially evident when it comes to products of importance to poorer people such as smaller fish species, crabs, frogs, snails, aquatic plants, and other aquatic animals. Furthermore, information on the values added and supplementary incomes of rural people through sales of traditional (wetland) products (such as dried, fermented fish and other processed products) is very limited. Assessment of the importance and values should also include those aspects that make reference to the adaptive capacity to live with the large fluctuations of climate variability and seasonal variation (dry and wet season dynamics), a dominating feature of the Mekong River Region. In order to work towards long-term sustainability, it is therefore crucial to ensure the interconnectivity throughout the River system and to keep fish migration paths open. Moreover, it is also necessary to define and protect the conservation areas by securing deep pools and dry season refuges for fish and other aquatic animals.

A major constraint in the management of fisheries and wetlands as well as in building upon the benefits of annual floods is centered on the fact that all maps for “development” planning had been based on dry season picture of the River’s water coverage. With extensive filling-up of rice fields and other wetlands in the floodplains for urban development, housing estates, industrial estates and other purposes, the normal although productive floods in the Mekong Region had also become a problem.

Nonetheless, experiences on opportunities and challenges had been gained through a broad range of initiatives of regional, sub-regional or local nature, experiences that are both positive and negative, that in combination would provide a rich source of reference for the sustainability of the Mekong resources and supporting the importance of dynamic seasonal aquatic fluctuations in the River system. Important initiatives include those programs implemented by the Mekong River Commission (MRC Environment and Fisheries Programs), the Asian Institute of Technology (AIT) Aqua Outreach Program, WWF (Living with the floods, community fisheries in Lao PDR), ICLARM/WorldFish Center (Mekong Wetlands Approach, Valuation of Wetlands and Aquatic Resources, Fish Migration Dynamics) as well as those by the IUCN/GEF Mekong Biodiversity, FAO, ADB, among others.

Based on the experiences gained from these initiatives, indications and recommendations could be drawn in order to strengthen the sustainable utilization of the Mekong (living) aquatic resources for the benefit of peoples, especially the rural people who are more directly dependent on the fish and other aquatic resources in the Mekong River system. Nevertheless, the lack of “institutional memory” and limited references being made to earlier projects and programs misses the opportunity to advance efforts to sustain the use of aquatic resources and to improve the well-being of peoples dependent on fish and other aquatic products (including aquatic plants). Projects and activities are often developed that duplicate and repeat earlier actions – including those that have met with limited success (and failures). The continued and growing interest in the Mekong River Region, its resources and its people calls for a gathering of a group of resource persons involved in earlier initiatives related to resource utilization, the aquatic environment and in support of communities dependent on fisheries and aquatic resources of the Region.

With selected resource persons and other technical persons with interest in fisheries in the Mekong River Region participating, the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year Lessons Learnt was convened in Phnom Penh, Cambodia on 12-14 November 2014. Organized by SEAFDEC in cooperation with the Fisheries Administration of Cambodia and the MRC Fisheries Programme with funding support from the SEAFDEC-Sweden Project, the Experts Meeting was meant to recapture some of the lessons learnt and to provide indications for steps ahead on the Mekong River fisheries, aquatic resources and wetland management – with focus on strengthening the socio-economic conditions of people dependent on such resources. The past experiences and lessons learnt from previous activities in the Mekong River Region would also be relevant to the development of other similar areas in the Southeast Asian region, and comprise an important reference for the new SEAFDEC Department, the Inland Fishery Resources Development and Management Department (IFRDMD) based in Palembang, Indonesia.

In order to generate information from the participants on the key aspects relevant to fisheries, aquatic resources, wetlands/aquatic environment and social well-being among rural communities in the Mekong River Region, the Experts Meeting was structured around six “thematic clusters”, namely: (1) Regional and Bi-lateral Agreements on the Sustainable Development and Use of Natural Resources in the Mekong River; (2) Assessment of Mekong Productivity and Production; (3) Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin; (4) Social/Gender Aspects: Rights and Responsibilities; (5) Environmental Focus: Mitigating Lost Inter-connectivity, Wetland Quality Deterioration, Water Quality, Over-coming Effects of Infrastructures – Plans for Integrated Water Resources Management; and (6) Climate Variability and Climate Change.

After the discussions of the thematic clusters during the Experts Meeting, the sets of recommendations were adopted that could be used as reference in crafting the direction towards the sustainable development and management of the Mekong River Region. In addition, the Experts Meeting identified the areas where countries, concerned agencies and organizations could collaborate to ensure the sustainability of inland fisheries, and its contribution to livelihood, food security and economic development of the Lower Mekong Basin. Collaboration could also be extended as applicable, to other inland fishery habitats of the Southeast Asian region.

## CONTENTS

	Paragraph No.
I. INTRODUCTION	1-3
II. INAUGURAL SESSION	4-6
III. LESSONS LEARNT FROM MEKONG COOPERATION IN FISHERIES, AQUATIC RESOURCES AND WETLANDS	
3.1 Thematic Cluster 1: Regional and Bi-lateral Agreements on the Sustainable Development and Use of Natural Resources in the Mekong River	7-10
3.2 Thematic Cluster 2: Assessment of Mekong Productivity and Production	11-19
3.3 Thematic Cluster 3: Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin	20-26
3.4 Thematic Cluster 4: Social/Gender Aspects: Rights and Responsibilities	27-32
3.5 Thematic Cluster 5: Environmental Focus: Mitigation Lost Inter- connectivity, Wetland Quality Deterioration, Water Quality, Over-coming Effects of Infrastructure – Plans for Integrated Water Resources Management	33-38
3.6 Thematic Cluster 6: Climate Variability and Climate Change	39-42
IV. PANEL DISCUSSION AND RECOMMENDATIONS	43
V. POLICY AND RATIONALE FOR FUTURE COOPERATION IN MEKONG RIVER BASIN	44-50
VI. SUMMARY RECOMMENDATIONS AND WAYS FORWARD	51-52
6.1 General Recommendations	(G-1)-(G6),53
6.2 Cluster 1: Mekong Agreements	(1-1)-(1-6)
6.3 Cluster 2: Assessment of Mekong Productivity and (Fisheries) Production	(2-1)-(2-5)
6.4 Cluster 3 Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin	(3-1)-(3-7)
6.5 Cluster 4: Social and Gender Aspects	(4-1)-(4-4)
6.6 Cluster 5: Environmental Focus	(5-1)-(5-5)
6.7 Cluster 6: Climate Variability and Climate Change	(6-1)-(6-3)
VII. WAYS FORWARD AND IMMEDIATE ACTION	54-57
VIII. CLOSING OF THE MEETING	58



## ANNEXES

	Page
1. List of Participants	19
2. Brief Biographies of Resource Persons	29
3. Agenda and Timetable of the Experts Meeting	35
4. Opening Remarks by H.E. Prof. Nao Thuok	39
5. Welcome Remarks by Dr. Chumnarn Pongsri	41
6. Keynote Address by H.E. Prof. Nao Thuok	43
7. Mekong River Commission (MRC) 1995 Agreement by Dr. Magnus Torell	47
8. Lessons Learnt from Developing Regional Guidelines for Fisheries Management and Development by Mr. Peter Degen	51
9. Development of Regional and Sub-regional Agreements for the Sustainable Development of the Mekong River by Mr. Khuon Kumar	55
10. Lesson Learnt from Assessing Fish Catch in the Lower Mekong Basin by Mr. Peter Degen	57
11. Sustainable Aquaculture Development in the Lower Mekong Basin by Mr. Nguyen Viet Manh	61
12. The Importance of Rice Fields to the Productivity of Cambodia's Inland Capture Fisheries by Mr. Rick Gregory	65
13. Fishery Co-management and Conservation: Personal Reflections by Dr. Victor Cowling	71
14. Challenges in Inland Fisheries in the Mekong Delta by Ms. Nguyen Thi Dieu Thuy	75
15. Challenges in Valuating Fisheries in the Lower Mekong Basin by Mr. Peter Degen	77
16. Assessing the Economic and Welfare Values of Fish in the Lower Mekong Basin By Ms. Hap Navy	81
17. Fish Abundance and Diversity Monitoring in the Mekong of Lao PDR by Dr. Sinthavong Viravong	85
18. Population Assessment and its Application on the Development of Conservation Strategies of the Mekong Giant Catfish ( <i>Pangasiodon gigas</i> ) by Dr. Naruepon Sukmasavin	87
19. Lesson Learnt from MRC Co-management by Dr. Malasri Khumsri	91
20. Lesson Learnt on Community Fisheries Management in Cambodia (Over the past 15 years of Effective Mekong Fisheries Management) by Ms. Kaing Khim	95
21. Development of Fisheries Co-management in Lao PDR: Past Experiences and Future Perspectives by Mr. Sommano Phounsavath	99
22. Promoting Regional Gender Mainstreaming in Fisheries in the Lower Mekong Basin by Ms. Hap Navy	111



23.	Rights and Livelihoods of Small-scale Community Fisheries in Cambodia by Mr. Bunthoem Sim	113
24.	Challenges in Mitigating the Impacts of Water Development on Fisheries by Mr. Peter Degen	115
25.	Challenges in Raising the Profile of Mekong Fisheries in a Policy and Institutional Environment that Favors other Sectoral Interests by Dr. Chris Barlow	119
26.	Lessons Being Learnt Now: Water Infrastructure Development and Fish Passage in the Mekong by Dr. Lee Baumgartner	121
27.	Challenges of Keeping Floodplains and Wetlands in Rapidly Growing Cities by Dr. Jean Lacoursière	125
28.	Assessing Climate Change Vulnerability for Lower Mekong Basin Capture Fisheries and Aquaculture by Mr. Rick Gregory	131
29.	Potential Impacts of Climate Change on the Fishery Resources in the Lower Mekong Basin by Mr. Ngor Peng Bun	135
30.	Future Work on Inland Fisheries in the Mekong River Basin by Dr. David Lymer	139
31.	Network on Sustainable Hydropower Development in the Mekong Countries (NSHD-M) by D. Phouvin Phousavanh	141
32.	Future Cooperation with ACIAR to Support Mekong Fisheries by Dr. Chris Barlow	145
33.	Function and Responsibilities of SEAFDEC/IFRDMD by Mr. Budi Iskandar Prisantoso	147
34.	Adopted Summary of Recommendations: Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year Lessons Learnt	149
35.	Closing Remarks by Dr. Chumnarn Pongsri	155





**Report of the  
EXPERTS MEETING ON MEKONG COOPERATION ON FISHERIES,  
AQUATIC RESOURCES AND WETLANDS:  
20-year Lessons Learnt  
Phnom Penh, Cambodia  
12-14 November 2014**

---

## **I. INTRODUCTION**

1. The Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year Lessons Learnt was convened in Phnom Penh, Cambodia on 12-14 November 2014. Organized by the Southeast Asian Fisheries Development Center (SEAFDEC) in cooperation with the Fisheries Administration of Cambodia and the Mekong River Commission Fisheries Programme with support from the SEAFDEC-Sweden Project, the Experts Meeting was meant to call to mind the historical activities conducted in the Mekong River Basin during the more than 20 years of Mekong cooperation in fisheries, aquatic resources and wetlands as well as share the lessons learnt and experiences gained from such activities. Furthermore, it was envisioned that the recommendations during the Experts Meeting, especially those from the invited resources persons would be used as basis for the continued and improved planning and management for the sustainable utilization of Mekong River fisheries, aquatic resources and wetlands. More particularly, special focus was made on the improvement of livelihoods of people dependent on the aquatic resources in the Mekong and strengthening of the capacity of the Mekong riparian communities. The List of Participants in the Experts Meeting is shown as **Annex 1**, while the Brief Biographies of the Resource Persons appear in **Annex 2**.

2. In order to achieve the objectives of the Meeting, and specifically to facilitate the sharing of “Lessons Learnt from Mekong Cooperation in Fisheries, Aquatic Resources and Wetlands,” the discussion points were grouped into six (6) thematic clusters, namely: (1) Regional and Bi-lateral Agreements on the Sustainable Development and Use of Natural Resources in the Mekong River; (2) Assessment of Mekong Productivity and Production; (3) Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin; (4) Social/Gender Aspects: Rights and Responsibilities; (5) Environmental Focus: Mitigating Lost Inter-connectivity, Wetland Quality Deterioration, Water Quality, Over-coming Effects of Infrastructures – Plans for Integrated Water Resources Management; and (6) Climate Variability and Climate Change.

3. The adopted Agenda and Timetable are shown in **Annex 3**.

## **II. INAUGURAL SESSION**

4. During the Inaugural Ceremonies of the Experts Meeting, the Director-General of the Fisheries Administration of Cambodia, His Excellency *Prof. Dr. Nao Thuok* reiterated the importance of the Mekong River to the riparian countries, especially in providing resources-based livelihoods to about 55 million people living along the Mekong River system and dependent on its aquatic resources. He commended the conduct of the Experts Meeting as this could ensure the sustainability of the fisheries and resources in the River which has been greatly threatened by the impacts not only from natural occurrences but also by man-made activities. He recalled that more than 20 years had passed since the launching of the Mekong River Commission or MRC and that during those 20 years many studies had been conducted in the Mekong by various organizations and agencies in collaboration with MRC. He therefore expressed the hope that the vast experiences amassed during the conduct of such studies could be shared during the Meeting as these would be useful for crafting the sustainable utilization and management of the aquatic resources in the Mekong River. With those insights, he declared the Experts Meeting open. His Opening Remarks appears as **Annex 4**.

5. On behalf of the organizers of the Experts Meeting, the Secretary-General of SEAFDEC, *Dr. Chumnarn Pongsri* welcomed the participants to the Meeting and expressed the concern that the sustainability of the fisheries and resources of the Mekong had been constrained by inadequate knowledge of the over-all picture of the characteristics of the Mekong River as well as on water resources management. While extolling the efforts of MRC in promoting the optimum multiple use of the water resources of the Mekong for the benefit of the stakeholders and resources, he encouraged the Mekong riparian countries to strengthen their collaboration for the sustainable utilization of the resources. He also expressed the hope that the recommendations of the Experts Meeting as well as the consolidated experiences and lessons learned could be used as reference in mapping the direction towards the sustainable development and management of the fisheries and aquatic resources of the Mekong River Region. His Welcome Remarks appears as **Annex 5**.

6. In his Keynote Address, *H.E. Prof. Dr. Nao Thuok* commended the SEAFDEC-Sweden Project for pursuing activities in the Mekong River Basin Sub-region as this could pave the way for the sustainable utilization of the resources in the Mekong for socio-economic benefits of the riparian countries. He encouraged the Project to work closely with the MRC to avoid duplication of efforts as well as avoid repeating the same mistakes and waste of resources. Considering the rich bio-diversity in the Mekong which could be beneficial to capture fishers who depend on the aquatic resources in the Mekong for their livelihoods, he also suggested that actual valuation of fisheries, aquatic resources and wetlands of the Mekong River Basin should be determined during the Experts Meeting as the results could be used as reference in planning future activities in the Mekong. He also encouraged the resource persons and experts present at the Meeting to discuss thoroughly the environmental conditions of the Mekong River and to provide insights on how inland fisheries could adapt to climate change and variability as well as to suggest measures that would enable the relevant stakeholders to mitigate such impacts. He ended his Keynote Address with the hope that during the Experts Meeting, continued commitment and support from all concerned could be assured for the sustainability of the resources in the Mekong River Basin. His Keynote Address appears as **Annex 6**.

### **III. LESSONS LEARNT FROM MEKONG COOPERATION IN FISHERIES, AQUATIC RESOURCES AND WETLANDS**

#### **Thematic Cluster 1: Regional and Bi-lateral Agreements on the Sustainable Development and Use of Natural Resources in the Mekong River**

7. Moderated by the Secretary-General of SEAFDEC *Dr. Chumnarn Pongsri*, the Session had three presentations, namely: (1) Mekong River Commission (MRC) 1995 Agreement by *Dr. Magnus Torell*, Senior Advisor of SEAFDEC; (2) Lessons Learnt from Developing Regional Guidelines for Fisheries Management and Development by *Mr. Peter Degen*, representing the MRC Fisheries Programme; and (3) Development of Regional and Sub-regional Agreements for the Sustainable Development of the Mekong River by *Mr. Khuon Komar*, Policy & Institutional Specialist, Cambodia Development Triangle Area.

8. In his presentation, *Dr. Magnus Torell* provided a brief history of the events that led to the 1995 Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin, starting with the first cooperative arrangements in 1957 and the subsequent phases that led to the present MRC Agreement which was signed in 1995. In accordance with the 1995 MRC Agreement, the four MRC member countries have strengthened their cooperation through the: (1) adoption in 1999 and commitment to implement the Water Utilization Program (WUP); (2) approval in 2001 of the procedures for exchanging data and information; and (3) approval in 2003 of the procedures for monitoring the use of water. While providing a review of the provisions of the 1995 MRC Agreement, he also mentioned that, in spite of the important works carried out by the MRC Fisheries Programme, the fisheries sector in the Mekong region is still struggling to be recognized as a priority sector. However, the development of a basin-wide fisheries strategy could provide opportunities for Mekong riparian countries and organizations engaged in fisheries such as SEAFDEC, FAO/APFIC, WWF and others to work together to promote the long-term sustainability of fisheries, aquatic

resources and wetlands in the Mekong River Basin. The **Mekong River Commission (MRC) 1995 Agreement** presented by *Dr. Magnus Torell* is shown in **Annex 7**.

9. The next presentation of *Mr. Peter Degen* included an in-depth review of the development of the MRC Basin Development Strategy, known as the MRC Fisheries Programme and Mekong Basin-wide Fisheries Management and Development Strategy (BFMS). Here, he stressed the important role of the “Technical Advisory Body (TAB) for Fisheries Management in the Lower Mekong Basin” in providing support to the MRC Fisheries Programme. He concluded that the Mekong Basin-wide Fisheries Management and Development Strategy aims to address a broad range of issues including social, environmental, economic, and resources availability aspects. However, in order that the BFMS would be useful and well recognized, it should be drafted through a broad communication exercise and developed as an integral part of the wider Mekong Basin Development Strategy. He also outlined the plans to reorganize the MRC program structure, where under the new structure the Fisheries Programme would be integrated into the Core River Basin Management Functions (CRBMFs) and cease to exist as a separate program entity, while the present sector programs of the MRC would be decentralized to the national sector ministries. This new program structure with the identity of the fishery sector lost would create strong concerns on how to secure a continued basin-wide exposure of fisheries-related aspects in Mekong River Region, considering that the national sector ministries do not have a basin-wide overview and it is less likely that there will be a continued comprehensive assessment of status and trend of Mekong fisheries if no other entity or organization can fill the gap that could emerge. The **Lessons Learnt from Developing Regional Guidelines for Fisheries Management and Development** discussed by *Mr. Peter Degen* appears as **Annex 8**.

10. In the presentation of *Mr. Khuon Komar*, he reviewed the establishment and activities implemented under regional arrangements involving countries in the Southeast Asian Region since 1967. These include among others, the ASEAN, ADB-promoted Greater Mekong Sub-region (GMS), Mekong River Commission (MRC), and other existing sub-regional cooperative arrangements. He emphasized that during the negotiations for the development and implementation of important regional agreements and arrangements, policy-makers should address and incorporate the impacts of integrated factors and should balance the benefits and effects. He also stressed that it is necessary to build upon the efforts generated through government agencies and to consider the policies of donor agencies in order to gather regional support to address the current problems. He suggested that China and Japan which had been providing assistance in the Mekong could again be tapped to provide important inputs in reducing poverty, developing modern infrastructures and strengthening human resources in the Mekong River Region. The **Development of Regional and Sub-regional Agreements for the Sustainable Development of the Mekong River** presented by *Mr. Khuon Komar* appears as **Annex 9**.

## **Thematic Cluster 2: Assessment of Mekong Productivity and Production**

11. With the Senior Advisor from SEAFDEC *Dr. Magnus Torell* as the Moderator, the Session discussed the issues raised in five presentations, namely: (1) Lessons Learnt from Assessing Fish Catch in the Lower Mekong Basin by *Mr. Peter Degen*, representing the MRC/ Fisheries Programme; (2) Sustainable Aquaculture Development in the Lower Mekong Basin by *Mr. Nguyen Viet Manh*, Director of the Science, Technology and International Cooperation Division, Directorate of Fisheries of Viet Nam and SEAFDEC Alternate Council Director for Viet Nam; (3) The Importance of Rice Fields to the Productivity of Cambodia’s Inland Capture Fisheries by *Mr. Rick Gregory*, representing the AIT Aqua Outreach Program; (4) Fishery Co-Management and Conservation: Personal Reflections by *Dr. Victor Cowling*, Technical Advisor on Sustainable Hydropower and River Basin Management under the WWF Greater Mekong Programme; and (5) Challenges in Inland Fisheries in the Mekong Delta by *Ms. Nguyen Thi Dieu Thuy*, Fisheries Project Manager, WWF-Viet Nam.

12. In his presentation, *Mr. Peter Degen* cited some lessons learnt from assessing fish catch in the Lower Mekong Basin emphasizing on the importance of the high regional fish bio-diversity of the

Mekong with 850 to 1200 known aquatic species out of which 20% are endemic. He mentioned that the MRC Fisheries Programme had been able to provide information on the status and trends of Mekong fisheries over the last 20 years, and from such information there is a clear connection between the levels of fish catch and levels of water during the flood season. He also stressed the importance of maintaining habitat connectivity and keeping the fish migration paths open to sustain production and productivity. He explained that although fish and other aquatic resources is a common pool resource throughout the Mekong River Region which is critical to the nutrition and livelihood of poor people in the Sub-region, assessment of the production from the highly diversified fisheries remains a major challenge. He also cited that the ways and methods to catch and collect fish, crabs, snails, and other aquatic animals could include a large variety of small and large fishing gear (some of which are set while some are mobile); and that most people are engaged in fisheries at various times of the year – men and women, old and young, while farmers are not only farmers but are also engaged in fishing. Therefore, in order to be able to promote and sustain fisheries in the midst of the competition over land and resources, he emphasized that fisheries should have a “strong regional identity”, and that the profile of fisheries should be raised to reach the appropriate (high) policy level in all countries and in all relevant sector departments and rural development agencies. The **Lessons Learnt from Assessing Fish Catch in the Lower Mekong Basin** presented by *Mr. Peter Degen* is shown in **Annex 10**.

13. In the presentation delivered by *Mr. Nguyen Viet Manh*, a national review of the development of aquaculture and cultured fish in the Mekong Delta of Viet Nam was highlighted focusing on both successes and challenges encountered by Viet Nam. He mentioned that the biggest success being the production of *Pangasius* spp. has provided Viet Nam with high revenues in terms of export earnings, however, this success would not have been possible without the strong financial support and investments from the Government of Viet Nam. He added that the other Mekong River countries have great potentials to increase their aquaculture production but promoting similar activities should definitely not just a matter of copying any successful stories. Thus, he recommended that improving adaptive aquaculture models and diversifying the species to be cultured are highly crucial for the long-term development of inland fisheries in the Mekong River Basin. The **Sustainable Aquaculture Development in the Lower Mekong Basin** presented by *Mr. Nguyen Viet Manh* appears as **Annex 11**.

14. In the presentation of *Mr. Rick Gregory*, he shared some of his broad experiences from the AIT Aqua Outreach Program with regards to rice field and floodplain fisheries in Cambodia. He cited that these areas are very high in productivity but the interaction between dry and wet season dynamics are central to seasonal peaks in production, and that there is a strong variability in the seasonal shift from dry to wet season. In order to maintain the productivity, he suggested that fish should be available in refuges during the dry season to support the migration of fish and other aquatic species into the floodplains and rice fields at the onset of the wet/rainy season. He stressed that “connectivity” between dry season and different parts of the floodplains and rice fields is therefore a key to the preservation of the productivity of rice fields, floodplains and other wetlands. He added that recent developments had provided serious challenges to the natural seasonal cycles including impacts of dams, reservoirs, and road construction, as well as urban development and the filling up of rice fields and floodplains to pave the way for industrial and housing estates. These trends have resulted in the fragmentation of rice fields and floodplains, and eventually losing the connectivity between the dry season refuges and the broader floodplains and rice fields leading to decline in productivity.

15. *Mr. Rick Gregory* also emphasized that millions of rural people throughout Cambodia are dependent on the resources being harvested from rice fields and floodplains. As a matter of fact, almost everybody in rural Cambodia is engaged in the harvesting of fish and other aquatic resources all throughout the year, in one way or another, with a peak during the wet season, and for smaller farm units, it is common to observe the farmers making more money from fish and other aquatic resources than from rice production. Nonetheless, the large areas that cover the floodplains and rice fields, the broad variety of gear and fishing/harvesting methods used, and the number of people

engaged – including school children after school, make it very difficult to undertake a comprehensive assessment of the total production. As a result, the estimation of rice field/floodplain production levels has been heavily underestimated. In conclusion, he underlined the fact that rice field fisheries are contributing daily to the sources of protein and income for millions of people who live along the Mekong River. The **Importance of Rice Fields to the Productivity of Cambodia’s Inland Capture Fisheries** presented by *Mr. Rick Gregory* is shown in **Annex 12**.

16. In the presentation of *Dr. Victor Cowling*, he shared his personal reflections on fisheries co-management and conservation. In order not to lose the lessons learnt and to be able to build upon earlier experiences, he suggested that it is important to follow-up on the activities that had already been initiated. He mentioned that there are not only many good lessons but also bad as well, which could be learnt from the previous efforts and could be used to strengthen community-based conservation and fisheries management through co-management arrangements, especially in many sites in and around the Mekong River Basin. He added that significant efforts and investments have been carried out over the past twenty years in building up local capacity and awareness on conservation and co-management of the fisheries resources, such as those undertaken by MRC, AIT, WWF, IDRC, and others.

17. While highlighting on the social dimension and the importance of fisheries and aquatic resources to millions of poor people in the Mekong Region, *Dr. Victor Cowling* suggested that efforts in following-up earlier initiatives should allow for the strengthening of co-management schemes with strong conservation focus to ensure that natural wet and dry season cycles are maintained to secure the connectivity for the fish to migrate between different habitats. He explained that most frequently, infrastructure developments are causing problems by disrupting the connectivity and blocking fish migration paths while related environmental factors have led to increased uncertainty in aquatic resources availability to the local communities. In order to meet the social challenges following uncertainties and fluctuations in supply of fishery resources, many communities are increasingly forced to look for alternative employment opportunities and even leave their home villages to join the large group of migrant workforce seeking employment elsewhere, which is also happening in Lao PDR and in other countries of the region. The **Fishery Co-Management and Conservation: Personal Reflections** by *Dr. Victor Cowling* appears as **Annex 13**.

18. The final presentation given by *Ms. Nguyen Thi Dieu Thuy* focused on the challenges faced by people dependent on inland fisheries in the Mekong Delta of Viet Nam. She cited seasonality as a major factor and that the availability of fishery resources in the Mekong Delta are, as in other parts of the Mekong, subject to seasonal changes with a marked difference between the dry and wet seasons. Moreover, assessment of production in the Delta is fragmented and highly underestimated, since the Mekong Delta is one of the most densely populated areas in Viet Nam and large-scale infrastructure projects are common features, where the many structures are blocking the connectivity and migration path of the fishery resources in the Delta. The development of new structures in growing cities had altogether changed the aquatic bodies and habitats to other (non-fisheries) uses causing critical quality losses in the natural ecosystem with related degradation of important wetlands. While citing that people engaged in fishing, 67% of whom are on part-time basis, are in general very poor with low level of education, while the options open to support these groups of people are limited as Viet Nam is unable to “empower” the communities. To cope with such struggle, the communities have to find various means of livelihood diversification and income-generating opportunities, to the extent of getting significantly involved in illegal and destructive fishing activities in order to earn additional incomes. Thus, the diminishing resources and lack of opportunities in smaller communities have led to large increase in the mobility of workers/fishers that are seeking employment and income opportunities in other parts of Viet Nam as well as in other countries.

19. In conclusion, *Ms. Nguyen Thi Dieu Thuy* highlighted that seeking long-term solutions would be an uphill task since all the interest and investments in the Mekong Delta including the problems of “overlapping policies” among government agencies and departments, have made it difficult to promote the sustainability of fishery resources and social well-being among the fisherfolk.

Overlapping management functions also prevent the establishment of fisheries protected areas and conservation zones. She also emphasized that problems on overlapping policies are in fact common throughout the region – with fisheries policies (if any) being very weak and “lacking in strong regional identity”. The **Challenges in Inland Fisheries in the Mekong Delta** presented by *Ms. Nguyen Thi Dieu Thuy* appears as **Annex 14**.

### **Thematic Cluster 3: Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin**

20. Moderated by *H.E Srun Lim Song*, Deputy Director-General of the Fisheries Administration of Cambodia, the Session had four resource persons serving as panelists and presenting their experiences in the Mekong River Region, namely: (1) *Mr. Peter Degen*, representing the MRC Fisheries Programme on the Challenges of Valuating Fisheries in the Lower Mekong Basin; (2) *Ms. Hap Navy*, Deputy Director of Inland Fisheries Research and Development Institute of the Fisheries Administration of Cambodia on Assessing the Economic and Welfare Values of Fish in the Lower Mekong Basin; (3) *Dr. Sinthavong Viravong*, Deputy Director of the Living Aquatic Resources Research Center (LARReC) in Lao PDR on Fish Abundance and Diversity Monitoring in the Mekong of Lao PDR; and (4) *Dr. Naruepon Sukumasavin*, representing the MRC Planning Division on Population Assessment and its Application on the Development of Conservation Strategies of the Mekong Giant Catfish (*Pangasianodon gigas*).

21. In starting the discussion, *Mr. Peter Degen* briefly summarized the characteristics of fisheries in the Lower Mekong Basin, the valuation framework, and the methods and tools for data generation. He also provided a detailed review of the results of fisheries valuation with regards to fish yield, the value of fish, fish consumption and livelihoods. He cited that even though MRC has conducted a number of surveys to monitor the catch of fishers, abundance and diversity of fish as well as the drift of larvae and juveniles in the region, there is still room for improvement of these research activities. He then suggested that cooperation with other relevant agencies is a requisite in order that concerned stakeholders would gain better understanding of the value of fish and fishery resources as well as avoid duplication of works. The **Challenges of Valuating Fisheries in the Lower Mekong Basin** presented by *Mr. Peter Degen* is shown in **Annex 15**.

22. During the discussion, the Meeting recommended that concerned institutions/organizations should develop and apply appropriate/practical methodologies that can heighten the better understanding of the contribution of fisheries, aquatic resources and wetlands to local and national economies. In addition, in order to come up with information on fish yield that supports understanding of the status and trends of inland fisheries, socio-economic data should be compiled to determine the contribution of wetland resources to food security, livelihood and economic development.

23. To continue with the discussion, *Ms. Hap Navy* emphasized on the issues related to research needs for the development of a welfare and economic-based value approach in assessing the economic and welfare values of fish production in the Lower Mekong Basin. While specifically referring to an ongoing project on the assessment of values, she mentioned four basic components, namely: assessment of welfare values, market values, biological values as well as university-coordination component. She introduced the market value component to highlight the results of her study on the monetary value of inland fish resources in the commodity chain. **Assessing the Economic and Welfare Values of Fish in the Lower Mekong Basin** presented by *Ms. Hap Navy* appears as **Annex 16**.

24. The presentation of *Dr. Sinthavong Viravong* focused on the results of his study concerning the abundance and diversity of fishery resources in Lao PDR. With the results from the different monitoring sites, it could be seen that fishing in the Mekong River is totally dependent on the schooling and migratory behavior of fish while the seasonal hydrology of the Mekong is the key factor for the migration. Considering that the fishing gear types used along the River widely vary

with the numbers of species dissimilar year by year, he underlined the need for long-term monitoring of the abundance and diversity of fish as this could provide very helpful inputs for the future planning of fisheries in the Mekong Region. The **Fish Abundance and Diversity Monitoring in the Mekong of Lao PDR** presented by *Dr. Sinthavong Viravong* appears as **Annex 17**.

25. In the ensuing discussion, the Meeting suggested that seasonal variation, engagement of fishers, domestic consumption and other relevant aspects of inland capture fisheries should be fully considered in developing a methodology for collecting data on inland capture fisheries. Moreover, concerned organizations should put more focus on the development of methodologies that can be applied to extrapolate the data on fish yield and come up with more accurate statistics on inland capture fisheries. Fishery-related questions should also be included in the questionnaires for routine and non-routine data collection. Countries have therefore been encouraged to provide more accurate statistics on inland capture fisheries at detailed levels for instance at species level to relevant regional organizations such as MRC, SEAFDEC and FAO/APFIC.

26. In concluding the Session, *Dr. Naruepon Sukumasavin* focused on the giant catfish (*Pangasianodon gigas*), one of the world's largest freshwater fish that matures at about 20 years of age and weighs 250 kg, reaching at least 3 meters in length. A long-distance migrant and endemic species in the Mekong River Basin, the giant catfish has been considered as among the most endangered species in the Mekong and thus, is the focus for many conservation initiatives. However, he mentioned that there has been no coherent strategy for the conservation of the giant catfish. While citing the results of his research on population modeling to assess the status and recovery options for this species, he pointed out that the quantitative population assessment has proved highly informative even in an apparent data-poor situation and added that the outlook for the wild Mekong giant catfish would still be positive if the essential habitats would be conserved. The **Population Assessment and its Application on the Development of Conservation Strategies of the Mekong Giant Catfish (*Pangasianodon gigas*)** presented by *Dr. Naruepon Sukumasavin* is shown as **Annex 18**.

#### **Thematic Cluster 4: Social/Gender Aspects: Rights and Responsibilities**

27. The Senior Consultant for the Fisheries Administration of Cambodia *Dr Sam Nouv* served as the Moderator for this Session which involved five resource persons as panelists who also delivered their presentations, namely: (1) *Dr. Malasri Khumsri*, Fisheries Management and Governance Specialist from MRC Fisheries Programme on Lessons Learnt from MRC Fisheries Co-management; (2) *Ms. Kaing Khim*, Deputy Director General of the Fisheries Administration of Cambodia on Lessons Learnt on Community Fisheries Management in Cambodia over the past 15 years of Effective Mekong Fisheries Management; (3) *Mr. Sommano Phounsavath*, Director, Division of Fisheries of the Department of Livestock, Agriculture and Fisheries, Lao PDR on the Development of Fisheries Co-management in Lao PDR: Past Experiences and Future Perspectives; (4) *Ms. Hap Navy*, Deputy Director of Inland Fisheries Research and Development Institute of the Fisheries Administration of Cambodia on Promoting Regional Gender Mainstreaming in Fisheries in the Lower Mekong Basin; and (5) and *Mr. Bunthoeun Sim*, Director of Cambodia Program, GERES Southeast Asia, on Rights and Livelihoods of Small-scale Community Fisheries in Cambodia.

28. In the presentation of *Dr. Malasri Khumsri*, the reasons behind the need for co-management were identified and clarified as these are important elements in setting up co-management in the Lower Mekong Basin. This was followed by a review of co-management in Cambodia, Lao PDR, Thailand and Vietnam. In the presentation, the role of mentors in communities was emphasized as well as the promotion of capacity building, legitimate user rights and active collaborations between the locals and the government in the process of promoting co-management. Considering that a one-size-fit-all model for co-management does not exist, she recommended that arrangements for fisheries co-management must depend on factual situations, such as the so-called adaptive management. The **Lessons Learnt from MRC Fisheries Co-management** presented by *Dr. Malasri Khumsri* is shown in **Annex 19**.

29. In order to discuss the experiences in community-based fisheries management in Cambodia, *Ms. Kaing Khim* briefly summarized the issues in fisheries governance and the lessons learnt from the establishment of Community Fisheries (CFi) in Cambodia. She explained that CFi in the case of Cambodia is a kind of fisheries co-management anchored on participatory approach. After citing the results of the participatory assessment and main challenges, she summed up the key important points and recommendations relevant to the implementation of CFi in Cambodia. The **Lessons Learnt on Community Fisheries Management in Cambodia over the past 15 years of Effective Mekong Fisheries Management** presented by *Ms. Kaing Khim* appears as **Annex 20**.

30. The presentation delivered by *Mr. Sommano Phounsavath* included a wide-ranging review on the development of fisheries co-management in Lao PDR. He started with an introduction of the fisheries in Lao PDR including the status of the fisheries resources, the institutional and legal framework for fisheries together with case studies and lessons learnt from pilot sites in Nam Houm, Nam Ngum, Khong District in Champasak Province. He explained that based on the concept of fisheries co-management in Lao PDR, there is a need to maintain a balance between fishing, fish stocks and fish culture. In other words, fisheries co-management aims to find and maintain a balance between fish stocks, people and fish habitats. The **Development of Fisheries Co-management in Lao PDR: Past Experiences and Future Perspectives** presented by *Mr. Sommano Phounsavath* is shown in **Annex 21**.

31. In order to initiate discussion on gender issues, *Ms. Hap Navy* presented the activities and lessons learnt throughout the almost 13-year history of the Regional Network for Promoting Gender in Fisheries Development (NGF) from 1997 to the present. She pointed out some of the problems and constraints encountered during the long process of promoting gender awareness in the region. Nevertheless, she stressed that the existence and development of NGF is very important for dealing with gender issues in fisheries, especially in the Mekong riparian countries. **Promoting Regional Gender Mainstreaming in Fisheries in the Lower Mekong Basin** presented by *Ms. Hap Navy* appears as **Annex 22**.

32. In reviewing the rights and asserting the rights and livelihoods of fisheries communities in Cambodia, *Mr. Bunthoeun Sim* explained the ways forward for developing small-scale fisheries and affirmed that CFi and co-management comprise the priority approaches being promoted in fisheries development of Cambodia. He recommended that concerned organizations should not only focus on capacity building of human resources at commune level but also strengthen the communication and coordination between local authorities and the communities. The **Rights and Livelihoods of Small-scale Community Fisheries in Cambodia** presented by *Mr. Bunthoeun Sim* is shown in **Annex 23**.

**Thematic Cluster 5: Environmental Focus: Mitigating Lost Inter-connectivity, Wetland Quality Deterioration, Water Quality, Over-coming Effects of Infrastructure – Plans for Integrated Water Resources Management**

33. With *Mr. Rick Gregory* representing the AIT Aqua Outreach Program, the Session focused on the connectivity of aquatic systems, the degradation of wetlands, infrastructure, especially water development projects, and the integration of water resources management. Four resource persons made their presentations, namely: (1) *Mr. Peter Degen* representing the MRC Fisheries Programme on the Challenges in Mitigating the Impacts of Water Development on Fisheries; (2) *Dr. Chris Barlow*, Fisheries Program Manager, Australian Center for International Agricultural Research (ACAIR) on the Challenges in Raising the Profile of Mekong Fisheries in a Policy and Institutional Environment that Favors other Sectoral Interests; (3) *Dr. Lee Baumgartner* on a Lesson Being Learnt Right Now: Water Infrastructure Development and Fish Passage in the Mekong; and (4) *Dr. Jean O. Lacoursière*, Kristianstad University of Sweden on the Challenges of Keeping Floodplains and Wetlands in Rapidly Growing Cities.



34. For the discussion on the issue of connectivity, *Mr. Peter Degen* started by mentioning the technical aspects of water development projects, especially the 19 mainstream and 77 tributary dams planned in the Lower Mekong Basin, the mitigation measures and operational practices to minimize any negative impacts. He also explained the benefits of such developments to other sectors, especially the irrigated agriculture areas. The **Challenges in Mitigating the Impacts of Water Development on Fisheries** presented by *Mr. Peter Degen* appears as **Annex 24**.

35. In the ensuing discussion, it was emphasized that measures and technologies have been developed to mitigate the impacts of construction and operation of water development projects, it is necessary that affected stakeholders should be able to adapt suitable mitigation measures. Initiatives should therefore be undertaken to evaluate the impacts of construction and operation of water development projects on inland aquatic species and habitats. The effectiveness of the different designs of fish passage such as facilities that support the migration and survival of fish, benefits gained from fish passages and the impacts of fish passage in restoring fish stocks should also be investigated. Overall, it is necessary that the fisheries sector should come up with technical data/information, and transforming these into good quality information in order to attract the attention of policy-makers and encourage their support in decision making to achieve the trade-offs between development and ecosystems conservation. Also, appropriate strategies and approach for attracting and convincing policy-makers should be explored for the Mekong Region.

36. In the following presentation, *Dr. Chris Barlow* outlined the three tension points and 7 lessons learned over more than 15 years of efforts to raise the profile of Mekong fisheries in the region. However, such efforts should be continued and focused on influencing policy makers and senior planners to take fisheries concerns into account in any development plans. He therefore stressed the need to communicate the key information to senior government officials through the utilization of high quality media materials. The **Challenges in Raising the Profile of Mekong Fisheries in a Policy and Institutional Environment that Favors other Sectoral Interests** presented by *Dr. Chris Barlow* appears as **Annex 25**.

37. The presentation of *Dr. Lee Baumgartner* focused on the work carried out through an ACIAR-funded project on the installation of a fish ladder at Bak Beung in Lao PDR. This project was conducted in response to the huge number of about 8,000 barriers in streams in 3 sub-catchments that have been preventing the upstream and downstream migration of fish into the floodplains. This successful initiative looks at the considerable potentials for assisting a wide range of Mekong fish species in overcoming barriers of up to 4.0 m high. He stressed that the economics of fish ladders do not look prohibitive, and estimated that the Bak Beung ladder might pay for itself within 8 years. He added that the project which is still in progress involves the communities in the management of the ladders and also intends to reduce the mortality of fish moving downstream through undershot weirs. The **Lesson Being Learnt Right Now: Water Infrastructure Development and Fish Passage in the Mekong** presented by *Dr. Lee Baumgartner* is shown as **Annex 26**.

38. To cap the discussion on connectivity, *Dr. Jean Lacoursière* presented the issues on waste and storm water through the lens of a wetland close to Vientiane in Lao PDR. He explained that these issues might have changed dramatically over the past 10 years. Nevertheless, he stressed on the need for fisheries specialists to be engaged and involved in local urban development planning processes and in which case there is a need for fisheries specialists to find allies in other development sectors. The **Challenges of Keeping Floodplains and Wetlands in Rapidly Growing Cities** presented by *Dr. Jean Lacoursière* appears as **Annex 27**.

#### **Thematic Cluster 6: Climate Variability and Climate Change**

39. Serving as Moderator for this Session was *Dr. Oopatham Pawaputanon Na Mahasarakham*. The Session had two resource persons serving as panelists who also delivered their presentations, namely: (1) *Mr. Rick Gregory* representing the USAID Mekong Climate Change and Adaptation for

the Lower Mekong on Assessing Climate Change Vulnerability for Lower Mekong Basin Capture Fisheries and Aquaculture; and (2) *Mr. Ngor Peng Bun* representing the MRC Fisheries Programme on the Potential Impacts of Climate Change on the Fishery Resources in the Lower Mekong Basin.

40. The session started with the presentation of *Mr. Rick Gregory* on an overview of capture fisheries and aquaculture in the Mekong River Basin, climate change and its impacts on fisheries, as well as climate change scenarios and vulnerability assessment for Chiang Rai in Thailand. He highlighted on the fact that fishing and farming communities, throughout the long history of his taking up a residence in Southeast Asia, are extremely resilient to the vagaries of the weather and seasons. Therefore, the adaptive capacity of people in the Mekong would be harshly tested by exposure to climate change. He suggested that for long term strengthening of the adaptive capacity of the Mekong riparian communities, the people should be supported to enable them to acquire enhanced awareness of the changing conditions, techniques and innovations that suit the changing conditions. **Assessing Climate Change Vulnerability for Lower Mekong Basin Capture Fisheries and Aquaculture** presented by *Mr. Rick Gregory* appears as **Annex 28**.

41. During the discussion on the vulnerability of communities to climate change, *Mr. Nguyen Viet Manh* from Vietnam shared his observation on the conflict between marine aquaculture communities and rice farming communities. He pointed out that climate change and salt water intrusion could bring about unexpected impacts on communities, although at the same time, these could offer opportunities for other communities.

42. Finally, *Mr. Ngor Peng Bun* introduced the overview of fisheries and climate change in the Lower Mekong Basin by focusing on the potential impacts of climate change, the vulnerability of people in the Mekong in terms of livelihoods and food security, and the fisheries adaptation measures. The **Potential Impacts of Climate Change on the Fishery Resources in the Lower Mekong Basin** presented by *Mr. Ngor Peng Bun* is shown in **Annex 29**.

#### **IV. PANEL DISCUSSION AND RECOMMENDATIONS**

43. Chaired by *Dr. Chumnarn Pongsri*, Secretary-General of SEAFDEC, the Session reviewed the “recommendations and ways forward” developed through the discussions on the six thematic clusters. After discussing and harmonizing the general and specific recommendations, the final output was presented in the subsequent Session as shown in Section VI.

#### **V. POLICY AND RATIONALE FOR FUTURE COOPERATION IN MEKONG RIVER BASIN**

44. The discussion moderated by *Dr. Chumnarn Pongsri*, Secretary-General of SEAFDEC involved four resource persons from international and regional organizations who shared their views on the future cooperation in the Mekong River Basin, namely: (1) *Dr. David Lymer*, Fishery Resources Officer (Inland Fisheries), Fisheries and Aquaculture Department, FAO; (2) *Dr. Phouvin Phousavanh*, MRC-GIZ Cooperation Programme, National University of Lao PDR; (3) *Dr. Chris Barlow*, Fisheries Program Manager, ACAIR; and (4) *Mr. Budi Iskandar Prisantoso*, Chief of the Inland Fisheries Resources Development and Management Department of SEAFDEC (SEAFDEC/IFRDMD). The participant from Myanmar, *Mr. Aung Kyaw Thein* also provided inputs and comments during the discussion.

45. In the presentation of *Dr. David Lymer* about the future work on inland fisheries in the Mekong River Basin, he cited that production of the world’s inland capture fisheries accounted for 11.6 million metric tons and the Mekong River made up 20-30% of the global inland fish catch. He added that the actual catch trends and production data, especially in developing countries, could be certainly underestimated due to lack of reliable data and good sampling methods. He summarized the results of studies on consumption assessment and the contribution of inland fisheries as source of

nutrition for peoples in the Mekong. Moreover, since inland fishery resources are not well featured in schemes developed for the purpose of “water resources planning” while fisheries management solutions are rarely incorporated as main part of any planning processes, he suggested some directions and rationale for the continued and future work on inland fisheries in the Mekong River Basin. He also recalled key international instruments and mechanisms that could be referred to in addressing freshwater ecosystem management. The **Future Work on Inland Fisheries in the Mekong River Basin** presented by *Dr. David Lymer* is shown in **Annex 30**.

46. To continue the discussion, *Dr. Phouvin Phousavanh* introduced the Network on Sustainable Hydropower Development in the Mekong Countries (NSHD-M) which was established in 2012 and currently includes 25 universities and research institutions with 127 people from 5 countries. He mentioned that the main function of NSHD-M is focused on human resource development, advanced training, dialogue and regional networking for sharing information and good practices. He reported that many network members have independently conducted training courses for different stakeholders such as government agencies, civil society organizations and others in the Mekong region. He reported that twelve training courses have been conducted from 2013 to 2014 for a total of 350 trainees from China, Cambodia, Lao PDR, and Viet Nam. He expressed his hope that the NSHD-M would be extended to Myanmar in 2015. The **Network on Sustainable Hydropower Development in the Mekong Countries (NSHD-M)** presented by *Dr. Phouvin Phousavanh* appears as **Annex 31**.

47. The discussion continued with *Dr. Chris Barlow* introducing the activities supported by the Australian Centre for International Agricultural Research (ACIAR) that are conducted in many countries in the Southeast Asian region, *i.e.* Indonesia, East Timor, Philippines, Viet Nam, Cambodia, Lao PDR and Myanmar, where fisheries are important for the livelihoods and food security of their peoples. He added that ACIAR has funded approximately 25-38 fisheries-related research projects involving total funds that amounted to around 8 million USD per year. He emphasized that the identification of projects to be supported by ACIAR is based on the priorities of the country partners as reviewed by ACIAR on competitive basis. He therefore expressed the hope that ACIAR would be able to look for opportunities to cooperate with the new SEAFDEC/IFRDMD for the sustainable development of inland fisheries in the Mekong Region in particular and in the Southeast Asian Region in general. The **Future Cooperation with ACIAR to Support Mekong Fisheries** presented by *Dr. Chris Barlow* is shown in **Annex 32**.

48. On behalf of SEAFDEC, the Chief of SEAFDEC/IFRDMD *Mr. Budi Iskandar Prisantoso* made a brief introduction of the 5<sup>th</sup> Department of SEAFDEC, the Inland Fishery Resources Development and Management Department (IFRDMD), which is tasked to promote the sustainable development and management of inland fisheries in the Southeast Asian region. He also described the functions and organizational structure of the new SEAFDEC Department which is based in Palembang, Indonesia. The **Functions and Responsibilities of SEAFDEC/IFRDMD** presented by *Mr. Budi Iskandar Prisantoso* appears as **Annex 33**.

49. The participant from Myanmar *Mr. Aung Kyaw Thein* expressed heartfelt gratitude for the invitation from SEAFDEC that enabled delegates from Myanmar to attend the Experts Meeting and gave the opportunity for the participants to learn from the thought-provoking and fruitful thematic panel discussions. He also acknowledged the technical information provided by the resource persons and recommendations which are very useful for the development and management of inland fisheries in Myanmar. However, he indicated that there was no discussion on the critical political aspects related to the limited attention being given by policy makers to inland fisheries even though many challenges related to such disregard for fisheries management considerations, have been identified during the Experts Meeting. He therefore suggested that planners and programmers of the Lower Mekong Basin should think “out of the conventional technical box”, and be actively involved in the overall planning processes. He added that actual improvements in fisheries could be affected by any change in fisheries governance as these would also entail changes in both formal directions given by governments in terms of laws and policies relating to aquatic resources use and management.

Moreover, adaptation by informal institutions could also be affected by the changes in the practices and behaviors of aquatic resource users.

50. While agreeing with the aforementioned perspective, *Dr. Chumnarn Pongsri* expressed that although technical and scientific people have been doing very well inside the academic sector, it appears that most research activities have been discussed and promoted only among the academic people and never brought outside the academic debate. He therefore suggested that this is an opportune time for planners, managers, scientists and others interested in the Mekong, to think of generating appropriate ways to communicate their works and activities with other sectors. By reviewing the lessons learnt from different countries on Mekong fisheries, he re-emphasized that the political will to support fisheries management could be enhanced as this is vital for the sustainable development and management of the Mekong.

## **VI. SUMMARY RECOMMENDATIONS AND WAYS FORWARD**

51. After discussing the draft summary of concerns and recommendations raised during the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year Lessons Learnt during the “Panel Discussion” in Section IV, the participants finalized the recommendations. The adopted summary of recommendations raised during the Experts Meeting also appears in **Appendix 34**.

52. More specifically, taking into consideration the experiences from the past initiatives in the Lower Mekong Basin (LMB), the Experts Meeting also identified areas where countries, concerned agencies and organizations could collaborate to ensure the sustainability of inland capture fisheries, and its contribution to livelihood, food security and economic development of the LMB. The said collaboration could also be extended as applicable, to other inland fisheries habitats of the Southeast Asian region.

### ***General Recommendations***

- G-1 **Enhance regional cooperation on inland fisheries:** MRC, SEAFDEC and FAO/APFIC and relevant organizations should continue and strengthen their cooperation and dialogues, and provide inputs to relevant upcoming meetings in order to support sustainable development and management of inland capture fisheries in the LMB and Southeast Asia as a whole. In the process, support could be sought from available sources to ensure suitable participation in taking up the results, achievements and lessons learnt to policy makers and consider working with NGO’s (WWF, IUCN and others) and the private sector.
- G-2 **The importance of inland fisheries should be promoted** to people and organizations working with other sectors. In the process, seek their support for the sustainable management of inland fisheries and facilitate communication to explore options to cooperate with a broad range of organizations and agencies. However, there is a need to strike a balance by preparing valuable and quality information to be conveyed to organizations and agencies not directly engaged in fisheries.
- G-3 MRC, SEAFDEC, FAO/APFIC and others should be pro-active in promoting the achievements generated and the experiences gained on the importance of Mekong fisheries to the people of the Mekong Basin. Various media should be mobilized through SEAFDEC, FAO/APFIC, MRC and other channels and available information should be used to advocate the importance of aquatic resources to the livelihoods around the Mekong. Partners should seek to gain increased recognition of the importance of fisheries especially among decision-makers inside and outside of the region. People engaged in fisheries should attend other meetings convened by other sectors to share information and drum up support to the inland fisheries sector not only with government agencies but also with regards to private sector enterprises.

- G-4 SEAFDEC should work with the MRC in support of the development MRC's **Mekong Basin-Wide Fisheries Management Strategy**. In following-up the Strategy, SEAFDEC should take steps to accommodate the uptake of the concepts emerging from the Strategy into the SEAFDEC program frameworks on inland fisheries management and development.
- G-5 SEAFDEC should extract the methodologies and tools that have been used for various studies in the LMB, in order that these tools could also be applied in other inland aquatic areas of Southeast Asia with similar conditions. In the process, consider the specificity of the Mekong and Mekong habitat types.
- G-6 As SEAFDEC has established a coordination unit for Ecosystems Approach to Fisheries Management (EAFM), MRC and SEAFDEC should work together to promote the application of EAFM concept in inland fisheries management. As needed, special modules should be developed to reflect the specificities of inland fisheries.

53. More specifically, the Experts Meeting also summarized the recommendations in accordance with the six thematic clusters that had been used as guide during the discussions in order to generate information from the participants on the key aspects that are of relevance to fisheries, aquatic resources, wetlands/aquatic environment and social well-being among rural communities in the Mekong.

### *Thematic Cluster Recommendations*

#### **CLUSTER 1: Mekong Agreements**

- 1-1 Relevant agencies/organizations should consider (a) addressing trans-boundary management issues to support synchronized development and management of inland fishery resources among concerned countries; (b) organizing fora to share and exchange experiences, as well as among different agencies/organizations and development sectors to enhance planned activities, balance interest among relevant sectors, and avoid duplication of efforts; and (c) developing the platform for sharing of information among various partners.
- 1-2 Raise the profile of Mekong fisheries: Technical agencies/organizations should take active roles in generating, providing, and exchanging good quality and timely data and information in appropriate format, to support decision-making processes that may have impacts to inland fishery resources and habitats, and raise the public's awareness on the importance of inland capture fisheries.
- 1-3 MRC Fisheries Programme that focuses on management and sustainable development of fisheries in the LMB should work closely with concerned partners, *e.g.* SEAFDEC and FAO/APFIC, to ensure that issues on Mekong fisheries are appropriately addressed in the agenda of the ASEAN and relevant international fora. SEAFDEC should mobilize the initiatives and experiences of MRC on inland capture fisheries not only in the LMB but also in other Southeast Asian countries.
- 1-4 Partners to the MRC should support and enhance the role of MRC in advocating the sustainable management of inland fisheries in the Mekong and strengthen the cooperation with other agencies such as SEAFDEC, to be more active partners in taking the role in research and development in coordination with MRC and other concerned organizations.
- 1-5 In view of the perspective of the development of a new MRC Programme structure based on "core program" and with the likelihood of the Fisheries (and other sector) Programs disappearing as a separate entity, the roles and functions of SEAFDEC and other partners in assuming the roles of filling the vacuum and maintaining regional dialogues on the status and trends of fisheries, should be assessed to ensure a continued coverage of Mekong fisheries at appropriate (policy) levels.
- 1-6 Regional fisheries bodies such as SEAFDEC, APFIC and MRC/TAB should facilitate regional coordination and collaboration by playing the leading role in promoting high-level

coordination among concerned countries for fisheries research and development on inland capture fisheries. Partners should continue to build upon the TAB and strengthen the mechanism of the MRC to improve communication in multiple directions on the status and importance of Mekong fisheries.

## **CLUSTER 2: Assessment of Mekong Productivity and (Fisheries) Production**

- 2-1 Concerned countries and agencies should consider adopting as appropriate, methodologies that have already been developed by relevant organizations, *i.e.* MRC, for monitoring fish catch (*e.g.* fishery status and trends, fish migration, identification of spawning grounds); and analyzing compiled data in order to come up with better picture of the fishery production of various inland aquatic ecosystems.
- 2-2 Relevant agencies/institutions involved in data collection should enhance coordination and collaboration to ensure the compatibility of data, and consider developing and integrating databases (*e.g.* existing databases of academes, national and regional agencies) to support compilation and analysis of data from various sources.
- 2-3 Efforts should be made by concerned countries and agencies to raise the awareness of all stakeholders on the significant contribution of rice field fisheries to nutritional and food requirements of local people in the LMB, and to seek high-level support to ensure the sustainability of rice field fisheries, *e.g.* securing the natural refuge ponds, and supporting collection of better data and statistics on rice field fisheries.
- 2-4 Researchers and technical experts have been communicating very well inside the fisheries sector and related academic networks. However, in general research results have mostly been discussed and shared among those engaged in fisheries related sectors and disciplines only but not really shared outside the fishery-related groups. This is therefore the time to think of generating appropriate ways to communicate with other sectors. By reviewing the lessons learnt from different LMB countries and to promote awareness among the broader public, options could be built to raise the political will of policy makers to support fisheries management which is vital for the sustainable development in the Mekong region.
- 2-5 Concerned countries and agencies should ensure that the awareness of all stakeholders is raised on the fact that although aquaculture could provide fish supplies in response to increasing demand for fishery products in view of decreasing production from capture fisheries, aquaculture cannot replace inland capture fisheries as the latter provides contribution to livelihood and food security for people that have no assets and properties (*e.g.* land) and are dependent on harvesting the products of natural resources, while wild fish resources also fulfill important ecosystem services. Furthermore, there is a need to assess the amount of wild fish needed to support the feed requirements of aquaculture enterprises in order to get an adequate figure on the natural productivity of Mekong fisheries

## **CLUSTER 3: Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin**

- 3-1 To mitigate current underestimation of Mekong fisheries, concerned institutions/organizations should develop and apply appropriate/practical methodologies that support better understanding of the contribution of fisheries, aquatic resources and wetlands to national economies and societies. In addition to information on fish yield that provide understanding on the status and trends of inland fisheries, other socio-economic data should be compiled to assess the contribution of wetland resources to food security, livelihood and economic development.
- 3-2 Concerned institutions/organizations should carefully consider the specificity of inland capture fisheries in developing methodologies for data collection, *e.g.* seasonal variation, engagement of large number of fishers (including farmers, part-time and subsistence fishers), quantity that directly goes for domestic consumption, gear types and selectivity. In addition, the quantity and value of inland capture fishers that provide inputs to aquaculture should also be assessed.

- 3-3 Concerned institutions/organizations should develop methodologies that could be applied by countries to extrapolate data on fish yield and production, and come up with more reliable national statistics on inland capture fisheries; include fisheries questions for routine and non-routine data collection (*e.g.* census and baseline statistics assessment) to facilitate extrapolation of data for the national statistics figures.
- 3-4 Compilation of fisheries statistics should be improved to reflect the real situation of inland fisheries in the Mekong. Countries are encouraged to provide more accurate statistics on inland capture fisheries at detailed level (*e.g.* species group) to relevant regional organizations, *e.g.* MRC, SEAFDEC and FAO for regional compilation and analysis.
- 3-5 Relevant research agencies should continue to explore possible methodologies for tracking the movement of the Mekong giant catfish considered as a flagship species in the LMB, and to enhance future study on the species, as the currently available technologies, *e.g.* satellite tagging, are still not appropriate for monitoring this fish species that migrates for very long distance underwater.
- 3-6 In retrospect and to understand “why there is a low recognition of the value of Mekong fisheries,” efforts should be made while recapturing the experiences from 20 years (and more) of Mekong cooperation in fisheries and wetland management and to try to “look back” and assess the reasons behind the lack of attention being given to fisheries. The results could be used as basis to move forward with revised approaches in the promotion and awareness-raising strategy and in the process build upon the lessons learned with regard to the valuation of Mekong fisheries and wetland resources.
- 3-7 There should be a continuous process of evaluating achievements, outcomes and impacts of activities of relevance to Mekong fisheries in order to formulate a convincing information package that could enhance the understanding among policy makers and politicians on the values of Mekong fisheries, aquatic resources and wetlands and be able to get increased (financial) support from the governments in disseminating and implementing developed environmental friendly technologies and guidelines on sustainable aquatic resources management throughout the Mekong Region.

#### **CLUSTER 4: Social and Gender Aspects**

- 4-1 Concerned countries and agencies should be aware that co-management and limitations of the present open access to fisheries could be an appropriate approach for management of inland capture fisheries as it involves very large numbers of fishers and farmers in widely scattered areas. Since effective management by resource users requires supportive legal frameworks and technical supports (including for MCS activities) from responsible national/local authorities and development partners, research works should therefore be pursued in order to come up with information that could support formalization of science-based management measures.
- 4-2 Concerned countries and agencies should enhance the involvement of community leaders and representatives from various groups of stakeholders in related activities, *e.g.* formalizing local agreements, management and conservation activities, fisheries and aquatic resources data collection. As the key actors at village levels, these stakeholders could with their active support, contribute to the success of co-management. In addition, gender equity should be considered and involvement of women should be enhanced in developing activities related to fisheries and supplementary livelihoods.
- 4-3 Concerned countries and agencies should make sure that the capacity and knowledge of all stakeholders (women and men) are enhanced to enable them to increase their involvement in relevant management activities, and their skills should be improved to enable them to uptake various livelihood options. Appropriate fish marketing systems should be advocated and developed to improve returns to rural communities dependent on fishery resources and pave the way for alternative livelihood options. Collection of data on the local methods of harvesting fish and other aquatic products should also be enhanced.

- 4-4 Concerned countries and agencies should undertake initiatives to ensure self-sustainability in income generating activities and management functions by local communities with minimum external support, *e.g.* by generating management incentives (*e.g.* collection of membership/ fishing and licensing fees, income-generation by communities also in areas outside of the fishing sector).

#### **CLUSTER 5: Environmental Focus**

- 5-1 The fisheries and environmental sectors should come up with technical data/information, and transform these into good quality information in order to attract the attention of policy makers and support decision making to balance trade-offs between development projects and ecosystems conservation. In addition, appropriate strategies and approaches for attracting and convincing policy makers should be explored.
- 5-2 Concerned countries and agencies should undertake initiatives for evaluating the impacts of construction and operation of water development projects on inland aquatic species and habitats, and investigating the effectiveness of the different designs of fish passage, *i.e.* facilitate migration and survival of fish, benefits gained from fish passages, and the impacts of fish passage in restoring fish population. However, any misconceptions of infrastructure development in the Mekong River Basin should be avoided.
- 5-3 Concerned countries and agencies should ensure that information on the importance of inland aquatic ecosystems are made known to the public and mass media, to encourage the public in convincing decision makers to consider the concerns for informal economic benefits that rural communities (farmers, fishers and others) could gain from the ecosystems. Moreover, technical information from science-based studies should be translated into languages that could reach out and be understood by a broader target audience (public, policy makers, politicians) through the production of documentary video clips and other appropriate media that generate impacts and create awareness on the importance of inland capture fisheries and wetland/habitats conservation.
- 5-4 While measures and technologies have been developed to mitigate the impacts of construction and operation of water development projects on inland fisheries, concerned countries and agencies should consider adapting such mitigation measures, *e.g.* fish passage, to suit with the context of LMB, *e.g.* types of water barriers, fish species and their migratory requirements (upstream, downstream and lateral).
- 5-5 Concerned countries and agencies should consider developing the platform for facilitating discussion, coordination and development of joint projects between relevant sectors and communities to explore the measures that would mitigate the impacts of development projects including urbanization, and that fisheries should be considered in the planning of development projects; seeking support from decision makers to adopt technologies that are already available; and encouraging people from the fisheries sector to be involved in other sectors' discussion and fora to reflect the issues and concerns on the various aspects of fisheries. To facilitate participation in such dialogues, networks and collaborating mechanisms should be developed within the national institutional structures as well as with other Mekong countries.



## **CLUSTER 6: Climate Variability and Climate Change**

- 6-1 Concerned countries and agencies should compile and collate information from relevant agencies to obtain clearer pictures on the climate variability, locally and in the Mekong Basin as a whole, together with assessments of the longer-term the impacts of climate change, and in the process, to investigate and analyze the possible impacts on fisheries, *e.g.* fish biology, hydrology profiles and the ecosystems.
- 6-2 Relevant agencies and organizations should support the efforts to exchange information and experiences on adaptation measures towards climate variability and the possible impacts of climate change, taking into consideration local knowledge on climate change adaptations.
- 6-3 Models should be considered in order to come up with predictions on the impacts of climate change on capture fisheries and aquaculture in the LMB. Thus, relevant agencies and organizations should come up with measures to enhance the resilience of people engaged in fisheries-related activities in response to possible climate variability and the impacts of climate change.

## **VII. WAYS FORWARD AND IMMEDIATE ACTION**

54. The Meeting agreed that the resource persons/presenters would submit the full papers of their presentations to SEAFDEC Secretariat by the mid of December 2014 for inclusion in the Proceedings of the Meeting.

55. This draft Report of the Experts Meeting and the set of recommendations would be revised based on the feedback of the participants which should be sent to the SEAFDEC Secretariat not later than end of December 2014.

56. While taking note of the range of events that are organized by FAO/APFIC, MRC, SEAFDEC and others in 2015 with focus on inland fisheries in general and on the Mekong in particular, the Experts Meeting agreed that partners should make appropriate efforts to provide inputs to such upcoming events by actively involving in the discussions during such events. Partners should, within their respective capacities, consider supporting the participation of some representatives from the Mekong riparian countries and respective organizations in relevant events to be able to continue their involvement in similar dialogues in the future.

57. In order to avoid duplication of efforts and any possible competition, SEAFDEC was encouraged to work closely with the MRC in the conduct of studies in the Mekong as well as with other agencies. More particularly, SEAFDEC was also requested to support the development and implementation of the Mekong Basin Wide Fisheries Strategy.

## **VIII. CLOSING OF THE MEETING**

58. In his Closing Remarks, the Secretary-General of SEAFDEC *Dr. Chumnarn Pongsri* offered the special thanks to the resource persons and participants for their great contribution, and especially to the Fisheries Administration of Cambodia for the active involvement of its representatives during the three days of hard work. He also acknowledged the endeavor of SEAFDEC Secretariat team for the arrangements of the Meeting. After commending the efforts of the participants in the Meeting, especially in coming up with significant recommendations that could improve the project planning, implementation and management of activities towards a productive and sustained Mekong River Basin, he declared the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year lessons learnt closed. He also wished the participants good health and safe trips while returning to their homes. His Closing Remarks appear as **Annex 35**.



## LIST OF PARTICIPANTS

## CAMBODIA

<b>H.E. Prof. Dr. Nao Thuok</b> Director-General, Fisheries Administration	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 23 219 256 Fax: +855 23 219 256
<b>Ing Try</b> Deputy Director-General, Fisheries Administration	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 23 219 256, +855 21 995 665 Fax: +855 23 219 256 E-mail: tmmp.cam@online.com.kh ingtry@ymail.com
<b>H.E Srun Lim Song</b> Deputy Director-General, Fisheries Administration	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 23 219 256, + 855 17 485 206 E-mail: limsongs@gmail.com
<b>Kaing Khim (Ms.)</b> Deputy Director-General, Fisheries Administration	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 232 19256, + 855 171 88911 E-mail: kaingkhim@mline.com.kh
<b>Sam Nouv (Dr.)</b> Consultant, Fisheries Administration	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 12853747 E-mail: samnouy@gmail.com
<b>Hap Navy (Ms.)</b> Deputy Director, Inland Fisheries Research and Development Institute	Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration #186 Norodom Blvd., Sangkat Tonle Basac Khan Chamcar Mon, Phnom Penh P.O. Box 582, Phnom Penh, Cambodia Phone: +855 12 353683 E-mail: habnavy@yahoo.com

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

Ministry of Agriculture, Forestry  
and Fisheries, Fisheries Administration  
#186 Preah Norodom Blvd., Sangkat Tonle  
Basac, Khan Chamcar Mon, Phnom Penh  
P.O. Box. 582 Phnom Penh, Cambodia  
Phone: +855 16 850 003  
Fax: +855 23 215 470  
E-mail: emputhy@yahoo.com

#### LAO PDR

**Sommano Phounsauvanh**  
Director,  
Fisheries Division

Department of Livestock and Fisheries  
Ministry of Agriculture and Forestry  
P.O Box 6644, Vientiane 01000, Lao PDR  
Phone: +856 20 5613778  
Fax: +856 21 217 869  
E-mail: sommanop@gmail.com

**Sisamouth Phengsakoun (Ms.)**  
Chief, Fishery Inspection Section  
Division of Fisheries

Department of Livestock and Fisheries  
Ministry of Agriculture and Forestry  
P.O Box 6644, Vientiane 01000, Lao PDR  
Phone: +856 21 215242-3  
Fax: +856 21 217 869  
E-mail: sphengsakoun@yahoo.com

**Prachit Noraseng**  
Deputy Director,  
Provincial Agriculture and Forestry Office,  
Champasak

Province, Agriculture and Forestry Office  
Thaluang Village, Pakse District  
Champasak Province, Lao PDR  
Phone: +856 21 31212259  
E-mail: norasenprachit@yahoo.com

#### JAPAN

**Satoshi Honda (Dr.)**  
Coordinator,  
Collaborative Research

National Research Institute of Far Seas Fisheries  
Queen's Tower B 15 F  
Minatomirai 2-3-3, Nishi-ku, Yokohama  
Kanagawa 220-6115, Japan  
Phone: +81 45 2272693  
Fax : +81 45 2272704  
E-mail: hondas@bridge.ocn.ne.jp

#### THAILAND

**Oopatham Pawaputanon  
Na Mahasarakarm (Dr.)**  
Advisor to DOF, Thailand  
(Fisheries and resources  
management specialist)

Department of Fisheries  
Kaset Klang, Chatuchak  
Bangkok 1900, Thailand  
Mobile: +66 2 940 6521  
E-mail: oopatham@yahoo.com

#### VIET NAM

**Nguyen Viet Manh**  
The Science of Technology and  
International Cooperation Department

Fisheries Administration  
10 Nguyen Cong Hoan Street  
Ba Dinh District, Hanoi, Viet Nam  
Phone: +84 912153865  
Fax : +84 4 37245120  
E-mail: manhnv.htqt@mard.gov.vn

## ORGANIZATIONS

### Asian Development Bank Project

**Khuon Komar**  
Consultant

CDTA-7610 Office  
#47 Norodom Blvd., Mowram  
Phnom Penh, Cambodia  
Phone: +855 16 419155  
E-mail: khuonkomar606@hotmail.com

### Asian Institute of Technology

**Rick Gregory**  
Consultant

AIT Thailand  
P.O. Box 3, Prasing Post Office  
Muang District, Chiang Mai 50250  
Phone: ++66 8 49503740  
E-mail: rickgregory1@gmail.com

### Australian Centre for International Agricultural Research (ACIAR)

**Chris Barlow (Dr.)**  
Research Program Manager,  
Fisheries

Australian Centre for International Agricultural  
Research (ACIAR)  
38 Thynne S., Bruce, ACT 267  
Australia  
Phone: +61 2 62170508, +61 4 03065486  
Fax: +61 2 62170501  
E-mail: chris.barlow@aciar.gov.au

### Embassy of Sweden

**Göran Haag**  
Programme Manager,  
Environment, Energy and Urban Development

Development Cooperation Section  
Embassy of Sweden, 11<sup>th</sup> Floor, Units 1103-1104  
One Pacific Place, 140 Sukhumvit Road  
Bangkok 10110, Thailand  
Phone: ++66 8 99684506  
E-mail: goran.s.haag@gov.se

### Food and Agriculture Organization of the United Nations (FAO)

**David Lymer (Dr.)**  
Fishery Resources Officer

Fisheries and Aquaculture Department  
Food and Agriculture Organization of the United  
Nations  
Viale delle Terme di Caracalla  
00153 Rome, Italy  
Phone: +39 06 5705 6476  
E-mail: david.lymer@fao.org

### GERES Southeast Asia

**Sim Bunthoeun**  
Director,  
Cambodia Program

GERES Southeast Asia  
P.O. Box 2528, Phnom Penh, Cambodia  
Phone: +855 23 986 891, +855 12 5562  
Fax: +855 23 221 314  
E-mail: b.sim@geres.eu  
bunthoeunsim@gmail.com

### **Hohai University, China**

**Ruishan Chen (Dr.)**  
Researcher

School of Public administration  
Hohai University  
Nanjing, 210098, China  
E-mail: chenrsh04@gmail.com

### **Kristianstad University, Sweden**

**Jean O. Lacoursiere (Dr.)**  
Professor,  
Sustainable Water Management

School for Education and Environment  
Kristianstad University  
291 88 Kristianstad, Sweden  
Phone: +46 702140332  
E-mail: jean.lacoursiere@hkr.se

### **La Trobe University, Australia**

**Lee Baumgartner (Dr.)**  
Science Director

The Murray-Darling Freshwater Research Centre  
La Trobe University, P.O. Box 991 Wodonga  
Victoria 3689, Australia  
Phone: +61 2 60249662, 61 427 070056  
Fax : +61 6059 7531  
E-mail: l.baumgartner@latrobe.edu.au

### **Living Aquatic Resources Research Center, Lao PDR**

**Sinthavong Viravong (Dr.)**  
Deputy Director

LARReC, Lao PDR  
National Agriculture and Forestry Institute  
(NAFRI)  
Ministry of Agriculture and Forestry  
Nongviengkham Xaythany District  
Vientiane, Lao PDR  
Phone: +856 20 54597308  
E-mail: viravongs56@gmail.com

### **Mekong River Commission (MRC)**

**Naruepon Sukumasavin (Dr.)**  
Director,  
Planning Division

Mekong River Commission  
Office of the Secretariat in Vientiane (OSV)  
#184 Fa Ngoum Road, Unit 18  
Ban Sithane Neua, Sikhottabong District  
P.O. Box 6101, Vientiane 01000, Lao PDR  
Phone: +856 21 263263 ext.2111, +856 20  
55599138  
Fax : +856 21 263264  
E-mail: naruepos@gmail.com  
naruepon@mrcmekong.org

**Peter Degen (Dr.)**  
International Technical Advisor

MRC-Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia  
Phone: +855 12 221177  
E-mail: ptdegen@mrcmekong.org  
degen\_peter@yahoo.com

**Ngor Peng Bun**  
Capture Fisheries Specialist

MRC-Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia

Phone: +855 23 425535  
Fax: +855 23 425363  
E-mail: pengbun@mrcmekong.org

**Malasri Khumsri (Ms.)**  
Fisheries Management and  
Governance Specialist

MRC-Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia  
Phone: +855 23 425353 ext. 3053  
Fax: +855 23 425363  
E-mail: malasri@mrcmekong.org

**Peter Starr**  
Editor,  
Catch and Culture

MRC-Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia  
Phone: +855 12 894384  
E-mail: peterstarr@mac.com

**Chhut Chheana (Ms.)**  
Designer,  
Catch and Culture

MRC-Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia  
Phone: +855 80 850850  
E-mail: chheana.lotus@gmail.com

#### **Mekong-Lanna Network**

**Sahathaya Wises (Ms.)**  
Officer

Mekong-Lanna Network  
62 Moo 8, Chiang-Kong District  
Chiang Rai Province, Thailand  
Phone: +66 8 79077967  
E-mail: kungwises@hotmail.co.th

#### **National University of Lao PDR**

**Garry Thorncraft**  
Coordinator

Faculty of Agriculture  
National University of Laos (NUOL)  
P.O. Box 10864, Vientiane 01000, Lao PDR  
Phone: +856 20 55646376  
E-mail: garrythorncraft@yahoo.com.au

**Phouvin Phousavanh (Dr.)**

Faculty of Agriculture  
National University of Laos (NUOL)  
P.O. Box 10864, Vientiane 01000, Lao PDR  
Phone: +856 20 2220 5275  
Fax : +856 21 870131  
E-mail: phousavanh\_win@yahoo.com

#### **Naresuan University of Thailand**

**Dondej Tungtakanpoung (Dr.)**  
Assistant Professor,  
Energy for Environment  
Research Unit

Faculty of Engineering  
Naresuan University  
Phitsanulok, 65000 Thailand  
Phone: +66 55 964126, +66 81 1141088  
Fax: +66 55 964129  
E-mail: dondejt@yahoo.com

### **Network Activities Group (NAG)**

**Yin Nyein**  
Project Coordinator,  
Improving Fisheries  
Governance Project

Network Activities Group (NAG)  
No.70, Room 403  
Yaw mingyi Condo, Yaw mingyi Street  
Yaw mingyi ward Dagon township  
Yangon Myanmar  
Tel: +95 1 570590, +95 98621436  
Fax : +95 1 8500455  
E-mail: eurakaan007@gmail.com

### **PyoePin Programme**

**Aung Aung Naing**  
Coalition facilitator

PyoePin Programme  
78 Kanna Road, Kyauktada Township  
P.O. Box 638, Yangon, Myanmar  
Tel: +95 1 254658, +95 9 448041603  
Fax : +95 1 245345  
E-mail: eurakaan007@gmail.com  
aungaung.naing@pyoepin.org

**Aung Kyaw Thein**  
Strategic Advisor  
(Fishery Governance)

PyoePin Programme  
78 Kanna Road, Kyauktada Township  
P.O. Box 638, Yangon, Myanmar  
Tel: +95 1 254658, +95 9 450042002  
Fax : +95 1 245345  
E-mail: kyawkyaw007@gmail.com

### **Thai National Mekong Committee Secretariat (TNMC)**

**Kareema Wongsin (Ms.)**  
Fisheries Programme

Thai National Mekong Committee Secretariat  
(TNMC)  
Department of Water Resources  
180/3 Rama 6 Road, Soi 34, Phayathai  
Bangkok 10400, Thailand  
Phone: +66 2 2986605  
E-mail: kareema09@yahoo.com

### **WorldFish**

**Alan Brooks (Dr.)**  
Director

WorldFish-Greater Mekong Regional Office  
# 35, Street 71, Sangkat Boeung Keng Kang 1  
Khan Chamkar Morn  
P.O. Box 1135, Phnom Penh, Cambodia  
Phone: +855 77 555872  
E-mail: a.brooks@cgiar.org

### **WWF-Greater Mekong Programme**

**Victor Cowling**  
Technical Advisor,  
Sustainable hydropower and river basin  
management

WWF-Greater Mekong Programme  
P.O. Box 7871  
Vientiane, Lao PDR  
Phone: +855 21 216080, +856 20 77543760  
Fax : +855 21 251883  
E-mail: victor.cowling@wwfgreatermekong.org



## WWF-Viet Nam

**Nguyen Thi Dieu Thuy (Ms.)**  
Fisheries Project Manager

WWF-Viet Nam  
D-13, Thanglong Int.  
Village CauGiay District, Hanoi, Viet Nam  
Phone: +84 915330320, +84 437193049 ext. 142  
Fax : +84 43 7193048  
E-mail: thuy.nguyendieu@wwf.panda.org

## SEAFDEC

### Secretariat

**Chumnarn Pongsri (Dr.)**  
Secretary-General

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: sg@seafdec.org

**Hajime Kawamura**  
Deputy Secretary-General

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: dsg@seafdec.org

**Magnus Torell (Dr.)**  
Senior Advisor

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: magnus@seafdec.org

**Somboon Siriraksophon (Dr.)**  
Policy and Program Coordinator

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: somboon@seafdec.org

**Nualanong Tongdee (Ms.)**  
Information Program Coordinator, *a.i.*

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: nual@seafdec.org

**Virgilia T. Sulit (Ms.)**  
Fisheries Technical Officer

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: sulit@seafdec.org

**Pattaratjit Kaewnuratchadasorn (Ms.)**  
Program Manager

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand

Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: pattaratjit@seafdec.org

**Sawitree Chamsai (Ms.)**  
Policy and Program Officer

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: sawitree@seafdec.org

**Saivason Klinsukhon (Ms.)**  
Information Officer I

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: saivason@seafdec.org

### **Inland Fishery Resources Development and Management Department (IFRDMD)**

**Budi Iskandar Prisantoso**  
Chief

SEAFDEC / IFRDMD  
Research Institute for Inland Fisheries  
Jln. Beringin no. 8 Mariana, Palembang, 30763  
South Sumatra, Indonesia  
Phone: +62 711 7537194, 62 813 84386818  
Fax: +62 711 7537205  
E-mail: budi.prisantoso@gmail.com

**Dina Muthmainnah (Ms.)**  
Researcher

SEAFDEC / IFRDMD  
Research Institute for Inland Fisheries  
Jln. Beringin no. 8 Mariana, Palembang, 30763  
South Sumatra, Indonesia  
Phone: +62 711 7537194, 62 813 84386818  
Fax: +62 711 7537205  
E-mail: dina.gofar@yahoo.co.id

**Siswanta Kaban (Ms.)**  
Researcher

SEAFDEC / IFRDMD  
Research Institute for Inland Fisheries  
Jln. Beringin no. 8 Mariana, Palembang, 30763  
South Sumatra, Indonesia  
Phone: +62 711 7537194, 62 813 84386818  
Fax: +62 711 7537205  
E-mail: wanta\_kaban@yahoo.co.id

### **SEAFDEC Regional Fishery Policy Network (RFPN)**

**Chin Leakhena (Ms.)**  
RFPN for Cambodia

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: chin@seafdec.org

**Chainuek Phakhounthong**  
RFPN for Lao PDR

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326, Fax: +66 2 940 6336  
E-mail: chaineuk@seafdec.org

**Myo Min Hlaing (Dr.)**  
RFPN for Myanmar

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: myo@seafdec.org

**Nichaphat Dissayaphon (Ms.)**  
RFPN for Thailand

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: nichaphat@seafdec.org

**Hoàng Nguyễn**  
RFPN for Viet Nam

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: hoang@seafdec.org

**Secretariat of the Meeting**

**Matinee Boonyintu (Ms.)**

SEAFDEC Secretariat  
P.O. Box 1046, Kasetsart Post Office  
Bangkok 10903, Thailand  
Phone: +66 2 940 6326  
Fax: +66 2 940 6336  
E-mail: matinee@seafdec.org



## BRIEF BIOGRAPHY OF RESOURCE PERSONS

### **Mr. Sim Bunthoeun**

Director, Cambodia Program  
 GERES South East Asia  
 E-mail: b.sim@geres.eu/ bunthoeunsim@gmail.com  
 Mobile phone: (+855) 12 42 55 62

*Mr. Sim Bunthoeun* is Director for Cambodia Program of GERES South East Asia and has extensive work experience surrounding natural resource issues mainly focusing on save energy biomass and fisheries livelihoods. He also has experience in capacity building for government, NGOs and communities. As a Medical Doctor Assistant by qualification, he used to work for UNBRO, UNTAC, Japanese Development Organization, Oxfam America, the Learning Institute and some consultancy offices. While working with these organizations, he wrote some publications such as (1) CBNRM Book Volume 1: Chapter of Fisheries Reform in Cambodia, 2005; (2) Understanding the Factors that Support or Inhibit Livelihood Diversification in Coastal Cambodia, September 2005; (3) Key Factors that Influence Success of Community Fisheries Management, December 2006; (4) Asserting Rights, Defining Responsibilities: Small Scale Fishing Communities and Fisheries Management, 2007; (5) Study on Roles, Needs, and Aspirations of Women in Community Fisheries Management, February 2008; and (6) CBNRM Book Volume 2: Chapter on Livelihood, 2009. To date, he has over 25 years experience working professionally in six different organizations. He has strong knowledge in the field of Medical Health and Community Development, and practical experience on NRM/livelihoods, facilitation, leadership and management. His research interest is on Rights and Livelihoods in Small-scale Community Fisheries in Cambodia.

### **Dr. Jean O. Lacoursière**

Professor in Sustainable Water Management  
 Man and Biosphere Health Thematic Research Platform, Kristianstad University, Sweden  
 E-mail: jean.lacoursiere@hkr.se

*Dr. Jean Lacoursière* has 30 years of multidisciplinary research and consulting assignments in both academia and corporate environments. His main expertise is on *Integrated Aquatic Ecosystem Management*, both in assessment of threats and development of mitigation/prevention measures. He has worked in the Mekong Region since 1990 and is the last “Chief of the Environment Unit” of the Mekong River Commission (1999-2000). He now coordinates an international research partnership which is focused on *integrating sustainable urban drainage, resource-based sanitation, biogas and food security in a concept validation of climate compatible development and Eco-City vision*. Called CITYBLUES++, it brings together universities, research institutions, municipalities, businesses, and NGOs

### **Mr. Khuon Komar**

Policy and Institutional Specialist  
 Freelance Consultant  
 E-mail: khuonkomar606@hotmail.com

*Mr. Khuon Komar* received a Master of Arts degree in Foreign Affairs and Trade from Monash University, Melbourne, Australia. In 1973-1975, he was a Khmer Air Force Pilot (T41D & C47), and in 1980-2006, he worked with the Ministry of Foreign Affairs and International Cooperation and was a diplomat posted in Moscow from January 1990 to September 1994. His last position was as Deputy Director General of the Cambodia-ASEAN General Department in charge of Administration, Political and Security Cooperation in the Asia-Pacific. From December 2001 to September 2007, he was a Senior Program Officer at MRC Headquarters in charge of rules formulation for water utilization, and from 2008 to the present, he is a freelance consultant for various projects of WB, MRC, and ADB.

**Dr. Magnus Torell**

Senior Advisor to SEAFDEC

*Dr. Magnus Torell* is from Goteborg, Sweden, who started his academics in law and after finishing the law degree went over to Geography and Economic Geography with a special focus on fisheries. He remained in fisheries, marine and riverine policy ever since. After joining SEAPOL in the mid 80s, he worked with Swedish Sida for 8 years where among other things he was handling the Swedish Support to the Mekong River Commission. From Sida, he went on to ICLARM and WorldFish Center where his major tasks was to run a Program on Fisheries and Wetlands in the Mekong: the Mekong Wetland Approach. Now, for almost a decade he has joined SEAFDEC as a Senior Advisor.

**Dr. Malasri Khumsri**

Fisheries Management and Governance Specialist

Fisheries Programme of Mekong River Commission (MRC)

E-mail: [malasri@mrcmekong.org](mailto:malasri@mrcmekong.org)

*Dr. Malasri Khumsri* has been appointed as Fisheries Management and Governance Specialist for the MRC Fisheries Programme. She joined the Inland Fisheries Research and Development Bureau of the Royal Thai Department of Fisheries in 1997-2011. She completed her PhD in Aquaculture and Aquatic Resource Management (AARM) from the Asian Institute of Technology (AIT) in Thailand in 2008.

**Mr. Peng Bun Ngor**

Capture Fisheries Specialist, MRC Fisheries Programme

*Mr. Peng Bun Ngor* worked with the Fisheries Administration of Cambodia from 1998 until 2011, where he was involved in various fisheries projects notably the MRC Project for the Management of Capture Fisheries (1988-2002), MRC Assessment of the Mekong Capture Fisheries (2003-2005) and Natural Resource Management and Livelihoods Programme and Regional Fisheries Livelihoods Programmes, among others. He earned his Bachelor's degree in Fisheries Science from the Royal University of Agriculture in Phnom Penh Cambodia, and two Master's degrees, one in Information Management from the Asian Institute of Technology in Thailand and the second in Environmental Management and Development from the Australian National University in Canberra, Australia.

**Ms. Nguyen Thi Dieu Thuy**

Fisheries Project Manager

WWF-Viet Nam

E-mail: [thuy.nguyendieu@wwf.panda.org](mailto:thuy.nguyendieu@wwf.panda.org)

*Ms. Nguyen Thi Dieu Thuy* has been working in the fisheries sector of Viet Nam since 1995. In 2006, she started working with WWF where her works focused on sustainable fisheries. She has been leading the efforts of WWF-Viet Nam on better fishing practices, conservation of sea turtles in fishing, promotion of MSC, eco-label certification and Fisheries Improvement Projects (FIP), developing fisheries protected/conservation areas. Her experience also includes fisheries statistics, fish stock assessment, sustainable fisheries in MPAs, and developing community-based fisheries management.

**Mr. Nguyen Viet Manh**

Director, Science, Technology and International Cooperation Division

Directorate of Fisheries, Viet Nam, and

SEAFDEC Alternate Council Director for Viet Nam

*Mr. Nguyen Viet Manh* graduated with two Bachelor's degrees, one from the La-Habana University in Cuba and the other from the Fisheries College in Viet Nam, in 1979 and 1982, respectively. After finishing his studies, he worked as official in the International Cooperation Department, Ministry of Fisheries of Viet Nam. From 2007 to 2010, he served as a Deputy Director General of the International Cooperation Department, Ministry of Agriculture and Rural Development (MARD), Viet Nam. After which, he serves as the Director of Science, Technology and International Cooperation Department of MARD. In addition, he is a member of the Technical Advisory Board or TAB of MRC since its beginning up to now, and is also the SEAFDEC Alternate Council Director for Viet Nam.

**Mr. Sommano Phousavath**

Director, Division of Fisheries, Department of Livestock and Fisheries, Lao PDR

*Mr. Sommano Phousavath* started working with the Division of Aquaculture Extension of the Department of Livestock and Veterinary (now DLF) in 1993 after completing M.Sc. in Animal Husbandry from the Moscow Veterinary Academy of the former USSR. In 1997, he went for a study at the Asian Institute of Technology (AIT) in Thailand and graduated in 1998 with M.Sc. degree in Aquaculture and Aquatic Resources Management. He then worked as a researcher at the newly established Living Aquatic Resources Research Center (LARReC) from 1999 to 2012. His field of work focused on inland capture fisheries and fisheries co-management. He was the National Project Coordinator for the MRC Fisheries Programme's component on reservoir fisheries from 2000 to 2010. In 2013, he moved to the Division of Fisheries, Department of Livestock and Fisheries (DLF). In 2014, he became the Director of the Division of Fisheries, DLF. Since 2013, he was assigned as the National Technical Manager for the MRC Fisheries Programme (2011-2015) at DLF. Beside this he is also a member of the Scientific Council of the Ministry of Agriculture and Forestry (MAF).

**Dr. Sinthavong Viravong**

Deputy Director, Living Aquatic Resources Research Center (LARReC), NAFRI, MAF

*Dr. Sinthavong Viravong* completed two Master's degrees; the first was M.Sc. in Aquaculture from Bulgaria in 1989, and second was M.Sc. in Fishery Science from Thailand in 1995. He continued his studies and obtained Ph.D. on Biology of Fishes from the United Kingdom in 2005. In 1991-1993 he was involved with the IDRC Project on the Mekong Indigenous Fish Species in Southern Lao PDR, focusing to the fish migration in Housom Yai Channel one of many Khone Falls Channels at the Khone Falls stretch line. In 1997-2002, he worked with the MRC Project on the Fish Migration along the Mekong River in the Lower Mekong Basin, and from 2005 to the present; he serves as the National Technical Manager for the MRC Fisheries Programme in Lao PDR.

**Dr. Victor Cowling**

Technical Advisor, Sustainable Hydropower and River Basin Management  
WWF Greater Mekong Programme  
E-mail: [victor.cowling@wwfgreatermekong.org](mailto:victor.cowling@wwfgreatermekong.org)

*Dr. Victor Cowling* arrived in Lao PDR in early 1998, and spent most of the next 12 years working on fishery and wetland management issues. This included projects for the MRC and the World Bank. Then in 2010, he joined WWF and to date is still with WWF. His job involves addressing the biggest issue on the determination of some governments to press ahead with hydropower development on the mainstream of the Mekong. More general challenges include the vast expansion of agri-business which has been taking away rural people's traditional lands and thus placing greater pressure on food supply, leading to increased and unsustainable exploitation of natural resources, especially fish.

**Mr. Peter Degen**

International Technical Advisor, MRC Fisheries Programme  
# 576 National Rd., # 2, Chak Angre Krom  
P.O. Box 623, Phnom Penh, Cambodia  
Phone: +855 12 221177  
E-mail: [ptdegen@mrcmekong.org](mailto:ptdegen@mrcmekong.org); [degen\\_peter@yahoo.com](mailto:degen_peter@yahoo.com)

**Dr. Naruepon Sukumasavin**

Director, Planning Division  
Mekong River Commission  
Office of the Secretariat in Vientiane (OSV)  
#184 Fa Ngoum Road, Unit 18  
Ban Sithane Neua, Sikhottabong District  
P.O. Box 6101, Vientiane 01000, Lao PDR  
Phone: +856 21 263263 ext.2111, +856 20 55599138  
Fax : +856 21 263264  
E-mail: [naruepos@gmail.com](mailto:naruepos@gmail.com)  
[naruepon@mrcmekong.org](mailto:naruepon@mrcmekong.org)

**Mr. Rick Gregory**

Consultant

Asian Institute of Technology, Thailand

P.O. Box 3, Prasing Post Office

Muang District, Chiang Mai 50250

Phone: ++66 8 49503740

E-mail: rickgregory1@gmail.com

**Ms. Kaing Khim**

Deputy Director-General, Fisheries Administration

Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration

#186 Norodom Blvd., Sangkat Tonle Basac

Khan Chamcar Mon, Phnom Penh

P.O. Box 582, Phnom Penh, Cambodia

Phone: +85523 219 256, + 855 17188911

E-mail: kaingkhim@mline.com.kh

**Dr. Chris Barlow**

Research Program Manager, Fisheries

Australian Centre for International Agricultural Research (ACIAR)

38 Thynne S., Bruce, ACT 267

Australia

Phone: +61 2 62170508, +61 4 03065486

Fax: +61 2 62170501

E-mail: chris.barlow@aciar.gov.au

**Dr. Lee Baumgartner**

Science Director

The Murray-Darling Freshwater Research Centre

La Trobe University, P.O. Box 991 Wodonga

Victoria 3689, Australia

Phone: +61 2 60249662, 61 427 070056

Fax: +61 6059 7531

E-mail: l.baumgartner@latrobe.edu.au

**Ms. Hap Navy**

Deputy Director, Inland Fisheries Research and Development Institute

Ministry of Agriculture, Forestry and Fisheries, Fisheries Administration

#186 Norodom Blvd., Sangkat Tonle Basac

Khan Chamcar Mon, Phnom Penh

P.O. Box 582, Phnom Penh, Cambodia

Phone: +855 12 353683

E-mail: habnavy@yahoo.com

**Dr. David Lymer**

Fishery Resources Officer

Fisheries and Aquaculture Department

Food and Agriculture Organization of the United Nations

Viale delle Terme di Caracalla

00153 Rome, Italy

Phone: +39 06 5705 6476

E-mail: david.lymer@fao.org

**Dr. Phouvin Phousavanh**

Professor

Faculty of Agriculture

National University of Laos (NUOL)

P.O. Box 10864, Vientiane 01000, Lao PDR



Phone: +856 20 2220 5275  
Fax: +856 21 870131  
E-mail: phousavanh\_win@yahoo.com

**Mr. Budi Iskandar Prisantoso**

Chief  
SEAFDEC/IFRDMD  
Research Institute for Inland Fisheries  
Jln. Beringin no. 8 Mariana, Palembang, 30763  
South Sumatra, Indonesia  
Phone: +62 711 7537194, 62 813 84386818  
Fax: +62 711 7537205  
E-mail: budi.prisantoso@gmail.com

Jln. Gub. HA. Bastari No. 08  
Rt. 29 Rw. 27 Kel. Silaberanti Kee  
Seberang Ulu I-Jakabaring, Palembang 30252  
South Sumatra, Indonesia  
Tel: +62 7115649600  
Fax: +62 7115649601  
<http://www.seafdec.org.ifrdmd>

**Aung Kyaw Thein (Mr.)**

Strategic Advisor, Fishery Governance  
PyoePin Programme  
78 Kanna Road, Kyauktada Township  
P.O. Box 638, Yangon, Myanmar  
Tel: +95 1 254658, +95 9 450042002  
Fax : +95 1 245345  
E-mail: kyawkyaw007@gmail.com



## AGENDA AND TIME TABLE

### 12 November 2014 (Wednesday)

08.30-09.00	Registration
09:00-10.00	<p><b>Agenda 1: Inaugural Session</b></p> <ul style="list-style-type: none"> <li>- Opening Remarks by <i>H.E. Prof. Dr. Nao Thuok</i>, Director-General of Fisheries Administration of Cambodia and SEAFDEC Council Director for Cambodia</li> <li>- Welcome Remarks by <i>Dr. Chumnarn Pongsri</i>, Secretary-General of SEAFDEC</li> <li>- Keynote Address by <i>H.E. Prof. Dr. Nao Thuok</i>, Director-General of Fisheries Administration of Cambodia and SEAFDEC Council Director for Cambodia</li> </ul>
10.00-10.05	<b>Agenda 2: Arrangement of the Meeting</b>
10.05-10.30	<i>Coffee and Group Photo Session</i>
10.30-11.00	<p><b>Agenda 3: Lessons Learnt from Mekong Cooperation in Fisheries, Aquatic Resources and Wetlands (Successes and Failures)</b></p> <p><b>Thematic Cluster 1: Mekong Agreements</b> Regional (Mekong) and bi-lateral agreements on the sustainable developments and use of natural resources in the Mekong River Region</p> <p>1.1 Mekong River Commission (MRC) 1995 Agreement</p>
11.00-11.30	1.2 Lessons Learnt from Developing Regional Guidelines for Fisheries Management and Development
11.30-12.00	1.3 Development of Regional and Sub-regional Agreements for the Sustainable Development of the Mekong River
12.00-13.00	<i>Lunch</i>
13.00-13.30	<p><b>Thematic Cluster 2: Assessment of Mekong Productivity and (fisheries) Production</b> Assessments of the productivity (seasonal productivity/migration) and production of fisheries and other aquatic resources in the Mekong River Basin (amount of fish and aquatic products being harvested)</p> <p>2.1 Lessons Learnt from Assessing Fish Catch in the Lower Mekong Basin</p>
13.30-14.00	2.2 Sustainable Aquaculture Development in Low Mekong Basin
14.00-14.30	2.3 The Importance of Rice fields to the Productivity of Cambodia's Inland Capture Fisheries
14.30-15.00	2.4 Fishery Co-Management and Conservation: Personal Reflections
15.00-15.30	2.5 Challenges in Inland Fisheries in the Mekong Delta
15.00-15.30	2.6 Panel Discussion
15.30-15.45	<i>Coffee break</i>

15.45-16.15	<b>Thematic Cluster 3: Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin</b> 3.1 Challenges of Valuating Fisheries in the Lower Mekong Basin
16.15-16.45	3.2 Assessing Economic and Welfare Values of Fish in the Lower Mekong Basin
16.45-17.15	3.3 Fish Abundance and Diversity Monitoring in the Mekong of Lao PDR
17.15-17.45	3.4 Population Assessment and its Application on the Development of Conservation Strategies of the Mekong Giant Catfish ( <i>Pangasianodon gigas</i> )
17.45-18.00	3.5 Panel Discussion
18.30-20.00	Dinner hosted by SEAFDEC

### 13 November 2014 (Thursday)

08.30-09.00	<b>Thematic Cluster 4: Social/gender Aspects – Rights and Responsibilities</b> Strengthen the rights, roles and functions of communities to manage, harvest (and conserve) fisheries and other aquatic resources (“poor in all but fish”) – including the need to diversify livelihood opportunities 4.1 Lesson Learnt from MRC Fisheries Co-management
09.00-09.30	4.2 Lessons Learnt on Community Fisheries Management in Cambodia over the past 15 years for Effective Mekong Fisheries Management
09.30-10.00	4.3 Development of Fisheries Co-Management in Lao PDR: Past Experiences and Future Perspectives
10.00-10.30	<i>Coffee</i>
10.30-11.00	4.4 Promoting Regional Gender Mainstreaming in Fisheries in the Lower Mekong Basin
11.00-11.30	4.5 Rights and Livelihoods of Small-Scale Community Fisheries in Cambodia
11.30-12.00	4.6 Panel Discussion
12.00-13.00	<i>Lunch</i>
13.30-14.00	<b>Thematic cluster 5: Environmental Focus – Mitigating Lost Inter-connectivity, Wetland Quality Deterioration, Water Quality, Over-coming Effects of Infrastructure – Plans for Integrated Water Resources Management</b> 5.1 Challenges in Mitigating Impacts of Water Development on Fisheries
14.00-14.30	5.2 Challenges in Raising the Profile of Mekong Fisheries in a Policy and Institutional Environment that Favors Other Sectoral Interests
14.30-15.00	5.3 Challenges of Keeping Floodplains and Wetlands in Rapidly Growing Cities
15.00-15.30	<i>Coffee</i>
15.30-16.00	A Lesson Being Learnt Right Now: Water Infrastructure Development and Fish Passage in the Mekong
16.00-16.30	Plenary Discussion <b>Thematic cluster 6: Climate Variability and Climate Change:</b> “The average year don’t exist” - the importance of seasonal floods, impacts of fish migration and spawning, dry season fish refuge

- |             |   |
|-------------|---|
| 16.30-17.00 | 6.1 Assessing Climate Change Vulnerability for Lower Mekong Basin Capture Fisheries and Aquaculture |
| 17.00-17.30 | 6.2 Potential Impacts of Climate Change on the Fishery Resources in the Lower Mekong Basin          |
| 17.30-18.00 | 6.3 Panel Discussion  |

**14 November 2014 (Friday)**

- |             |  |
|-------------|--|
| 08.30-09.00 | <b>Agenda 4: Policy and Rationale for Future Cooperation in Mekong River Basin (on environment, fisheries, social well-being, etc.)</b><br>Future Work on Inland Fisheries in the Mekong River Basin |
| 09.00-09.30 | Network for Sustainable Hydropower Development in the Mekong Countries (NSHD-M)  |
| 09.30-10.00 | Future Cooperation with ACIAR to Support Mekong Fisheries  |
| 10.00-10.30 | Functions and Responsibilities of the SEAFDEC Inland Fisheries Research Development and Management Department (IFRDMD)   |
| 10.30-10.45 | Coffee   |
| 10.45-11.30 | <b>Agenda 5: Presentation on outputs from each thematic cluster by Facilitators and Plenary discussion</b>   |
| 11.30-12.15 | <b>Agenda 6:</b> Summing up and Ways forward   |
| 12.15-12.30 | <b>Agenda 7:</b> Closing of the Meeting  |
| 12.30-13.30 | Lunch  |



## OPENING REMARKS

*By H.E. Prof. Dr. Nao Thuok  
Director-General, Fisheries Administration of Cambodia*

The SEAFDEC Secretary-General *Dr. Chumnarn Pongsri* and Deputy Secretary-General *Mr. Hajime Kawamura*; Your Excellencies; Distinguished Guests; Renowned Resource Persons; My Colleagues from the Fisheries Administration of Cambodia; Ladies and Gentlemen, Good Morning!

At the onset, I would wish to welcome all of you to Phnom Penh, Cambodia's capital city which was earlier referred to as the Pearl of Asia, and now the economic center and political hub of the country. Please allow me also to express my deepest gratitude to the organizers for giving me the opportunity to formally inaugurate and open this Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-year lessons learnt.

As you may already know, the Mekong River is a very important resource for many riparian countries, as it is the main source of natural resources-based rural livelihoods of about fifty five million people living along the river system. The organization of this Experts Meeting is therefore very timely as the sustainability of utilizing the fisheries and wetland resources has been greatly threatened by the harmful impacts from natural occurrences and man-made activities.

We are also aware that during the past 20 years or more, many studies had been conducted by many organizations and agencies on the fisheries, aquatic and wetland resources in the Mekong. Their experiences could therefore provide valuable lessons that the riparian countries could base their efforts in optimizing the multiple-use and mutual benefits of the resources. We are therefore very grateful to the organizers of this Meeting, more particularly to SEAFDEC, for spearheading the compilation of the experiences in the Mekong that we could use as reference in addressing the sustainability of the fisheries and wetland resources in the Mekong River Basin. Such compendium of experiences could also provide us with valuable lessons that we could look up to while crafting the future programs towards optimizing the multiple-use and mutual benefits of the region's inland aquatic resources.

Ladies and Gentlemen, it has been almost 20 years when the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin was signed in April 1995 by the Kingdom of Cambodia, the Lao People's Democratic Republic, the Kingdom of Thailand, and the Socialist Republic of Vietnam, that also marked the launching of the Mekong River Commission or MRC. In the short history of its existence, MRC has greatly contributed to the efforts of these riparian countries in conserving and protecting the river's resources. It is therefore my sincere wish that the experiences and lessons learnt on Mekong fisheries and its aquatic and wetland resources that we could pick up from this Meeting could contribute to our future endeavors, not only as far as the riparian countries are concerned but also the other countries in the region, in charting the right direction towards the sustainable utilization of the inland aquatic resources of the Southeast Asian region, but most especially in the Mekong River Basin.

Without further ado, Ladies and Gentlemen, let me now declare this Experts Meeting open. Thank you and have a good day!





**WELCOME REMARKS**

*By Dr. Chumnarn Pongsri  
Secretary-General, Southeast Asian Fisheries Development Center*

His Excellency the Director-General of Fisheries Administration of Cambodia, Prof. Nao Thuok; Resource persons, distinguished participants, ladies and gentlemen, good morning! Let me begin by saying how pleased I am to speak to you this morning, to welcome you most cordially to the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20 years of lessons learnt.

As you may already know, with its length of 4200 km, the Mekong River is known as the longest river in the Southeast Asian region. Its journey originates from the Himalayas, crossing the borders of six countries, namely: China, Lao PDR, Myanmar, Thailand, Cambodia, and Vietnam before reaching and discharging into the South China Sea. The river and its backwaters, tributaries, lakes, and swamps support the abundance of aquatic species. As reported, this river system is the second highest aquatic biodiversity in the world and the richest basin in Southeast Asia. Therefore, the Mekong river system and its resources play an extremely important role as the main source of natural resources-based rural livelihoods of about fifty five million people living in the Lower Mekong Basin, about one third of the total population of Cambodia, Lao PDR, Thailand, and Vietnam combined.

However, the sustainability of utilizing fisheries and wetland resources has been constrained by the lack of adequate knowledge in the panorama of Mekong basin characteristics and water resources management. Moreover, after related laws had been developed and came into force, their effective enforcement and good governance have not been properly put in place.

The livelihoods of people living in the Lower Mekong Basin encompass a broad range of activities, from catching fish and other aquatic animals to harvesting wetland products, and are dependent on seasonal dramatic processes of flooding and recession that are strongly affected by the variability of climate. Furthermore, according to the International Panel on Climate Change, fisheries and alternative livelihoods in the Lower Mekong Basin are vulnerably threatened by climate change including changing precipitation, ice melting and rising sea level. I am sure you would agree with me that climate change is a global concern; hence, the strong cooperation among countries in the Lower Mekong Basin is very necessary.

Ladies and Gentlemen, almost 20 years have already passed since April 1995 when the Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin was signed by the Kingdom of Cambodia, the Lao People's Democratic Republic, the Kingdom of Thailand, and the Socialist Republic of Vietnam. In the short history of its existence, the Mekong River Commission has greatly contributed to the effort of these four countries to optimize multiple-use and mutual benefits of the resources, and alleviate the harmful impacts caused by natural occurrences and man-made activities.

Distinguished guests, on behalf of this Experts Meeting, it is my most sincere wish that the discussions and recommendations at this Meeting would positively contribute to the consolidation of experiences and lessons learnt on Mekong fisheries, aquatic resources and wetlands including the aspects on social well-being. I also wish that all of you will have a pleasant stay in Phnom Penh during this Meeting.

Thank you and have a good day!



## KEYNOTE ADDRESS

*By His Excellency Prof. Dr. Nao Thuok  
Director-General, Fisheries Administration of Cambodia*

The Secretary General of SEAFDEC, *Dr. Chumnarn Pongsri*, Your Excellencies, Distinguished Guests, Renowned Resource Persons, Ladies and Gentlemen, a pleasant and good morning to all of you. First of all, please allow me to express my sincerest gratitude to the organizers for inviting me to deliver a keynote address at this prestigious “**Experts Meeting on Cooperation on Fisheries, Aquatic Resources and Wetlands: 20-Year Lessons Learnt**”. It is indeed a great privilege for me to share with you in brief at this Meeting, the knowledge and experiences that Cambodia has amassed from our cooperation with various organizations and agencies on the Mekong River and the Mekong River Basin. As we all know, the Mekong River of South-eastern Asia is one of the richest and most diverse rivers in terms of aquatic resources and biodiversity, second to the Amazon River of South America. As a transboundary river in Southeast Asian, the Mekong River with an estimated length of 4,350 km runs from the Tibetan Plateau through China’s Yunnan Province, Myanmar, Lao PDR, Thailand, Cambodia and Vietnam, drains an area of about 795,000 km<sup>2</sup> and discharges about 457 km<sup>3</sup> of water annually. In 1995, Lao PDR, Thailand, Cambodia, and Vietnam established the Mekong River Commission or MRC to work on the management and promote the coordinated use of Mekong River’s resources. In 1996, China and Myanmar became “dialogue partners” of MRC and the six countries now work together through a cooperative framework for the benefit of the River and the stakeholders of the resources.

Please allow me also to thank SEAFDEC for pursuing the implementation of the SEAFDEC-Sweden Project with a great vision of improving the resources of the four sub-regions in Southeast Asia such as the South China Sea and Gulf of Thailand, Andaman Sea, Sulu-Sulawesi Sea, and the Mekong River Basin. We have been informed that the Project’s focus in the Mekong River Basin Sub-region gives priority to strengthening the cooperation among the major countries that make use of the Mekong River for economic benefits, such as promoting economic stability, advancing resource protection against illegal users, and increasing awareness among managers and users of the Mekong River. The project would emphasize on activities that have not been undertaken by the MRC and its collaborators, considering MRC’s presence in the Sub-region for about 20 years. Therefore, I would agree that the project could put more emphasis in strengthening cooperation and collaboration with MRC to avoid duplication of efforts as well as avoid repeating previous mistakes and waste of resources. Nevertheless, I am also of the opinion that the project is proceeding quite well because several meetings and consultations had been convened by the Project with the concerned countries such as Cambodia, Lao PDR, Thailand, and Vietnam. As a result, appropriate MOUs had been developed with transboundary countries for the promotion of joint fisheries management.

Secondly, I wish to also stress that this Experts Meeting is convened at an opportune time because the inland fisheries sector has now been gaining much attention by the international community. This forum therefore gives us the opportunity to learn lessons from the experiences of many countries, organizations and agencies on the fisheries resources scenario of the Mekong River as well as from the experts who had worked in the Mekong River, thus preventing such experiences from being forgotten or even going to waste. I strongly believe that based on such experiences, we could chart our future direction toward the sustainability of the resources in the Mekong River.

Thirdly, on behalf of Cambodia and the Fisheries Administration, I would wish to commend SEAFDEC and the SEAFDEC-Sweden Project for spearheading the establishment of collaborative arrangements among the concerned countries together with local and international organizations including the MRC to look at the ways and means of improving the management of fisheries for sustainability of the resources in the Mekong River Basin Sub-region. As a result, various relevant MOUs had been drafted or are now being implemented in this Sub-region. Nonetheless, it should also be recalled that various Mekong agreements had been crafted earlier and we should try to capture the lessons that could be learnt from those agreements during the discussions, may they be successes or failures as these could give us the focus of our future insights in managing the available resources and in planning additional programs that could be implemented in the Mekong River.

Aside from reviewing the Mekong agreements at this Meeting, I wish to agree with the organizers that there is also a need for us to assess the fisheries production in and productivity of the Mekong River Basin. All of us may be already aware that the Mekong River Basin could easily boast of its high level of biodiversity with the reported biota estimates that include 20,000 plant species, 430 mammals, 1200 birds, 800 reptiles and amphibians, and an estimated 850 freshwater fish species (excluding introduced species). Among the freshwater fishes in the Mekong River Basin, the most common are the cypriniforms with 377 species and 92 species of catfishes. It was also reported that in 2009, 145 new species were found in Basin, comprising 29 fish species previously unknown to science, 2 new bird species, 10 reptiles, 5 mammals, 96 plants and 6 new amphibians. The Mekong River Basin has also been reported to contain the greatest concentration of eco-regions in mainland Asia.

There is no other river known to be home of so many species of very large fishes, the biggest of which include three species of *Probarbus babs*, which can grow up to 1.5 meters and weigh 70 kilograms and the giant freshwater stingray or *Himantura polylepis* syn. *H. chaophraya* that can grow up to 4.3 meters. In addition, the giant pangasiid or *Pangasius sanitwongsei*, giant barb or *Catlocarpio siamensis*, and the endemic Mekong giant catfish also known as *Pangasianodon gigas* which are reported to grow up to about 3 meters in length and weigh 300 kilograms also inhabit the Mekong River. However, we have also received reports that almost all of these species are believed to be in serious decline mainly because of infrastructure development projects such as dam and flood control constructions, as well as overfishing. As a matter of fact, reports have also indicated that one species of freshwater dolphin, the Irrawaddy dolphin or *Orcaella brevirostris* which was once common in the whole of the Lower Mekong River Basin has now become very rare, with only 85 individuals remaining. There are other wetland species that have been reported to be living in and around the river such as the smooth-coated otter or *Lutra perspicillata* and fishing cat or *Prionailurus viverrinus*, and the endangered Siamese crocodile or *Crocodylus siamensis*, but these species are believed to occur now in small isolated pockets within the Mekong River.

It should also be noted that the Mekong River exhibits the most concentrated biodiversity per hectare of any river. The commercially valuable fish species in the Mekong are generally grouped into 'black fish' or those fishes that are slow moving and inhabit in low oxygen shallow waters, and the 'white fish' or those fishes that are fast moving inhabiting the well oxygenated deeper waters. People living along the Mekong River system generate many other sources of food and income from what are often termed 'other aquatic animals' (OAAs) such as freshwater crabs, shrimp, snakes, turtles, and frogs. These OAAs account for about 20 percent of the total catch from the Mekong River Basin. The fish habitats in the Mekong River Basin could be classified into three types. First, we have the main river that comprises the main tributaries, the rivers in the major flood zone, and the Tonle Sap which altogether could yield about 30 percent of the production from wild capture fisheries. Next are the rain-fed wetlands outside the river floodplain zone comprising mainly rice paddy in formerly forested areas and usually inundated to about 50 cm that could easily yield about 66 percent of fish catch landings. Then, there are large water bodies outside the flood zone, including canals and reservoirs yielding about 4 percent of catch landings.

Considering therefore, the great productivity of the Mekong River which is very amazing, there is a need for us to protect and manage this resource in view of its seasonal variation in terms of water level and the varying range of wetland habitats. The River's immense biodiversity could easily provide livelihoods to millions of people living along the Mekong River and within its Basin. Thus, the Mekong River Basin has one of the world's largest and most productive inland fisheries. An estimated 2 million metric tons of fish are landed annually, in addition to almost 500,000 metric tons of other aquatic animals. In addition, aquaculture contributes about 2 million metric tons of fish every year. The total economic value of the inland fisheries could be between 4 to 7 billion US Dollars per year with the value of wild capture fisheries estimated at 2 billion US Dollars. Reports have also indicated that about three million metric tons of inland fish and other aquatic animals are consumed in the lower Mekong Basin annually, with aquatic resources making up between 47 percent and 80 percent of animal protein in rural diets for people living in the Lower Mekong Basin. As the cheapest source of animal protein in the region, fish is so significant that any decline in fisheries production could impact on human nutrition, especially among the poor. Comparing the benefits from wild capture fishery production and from aquaculture, it can be gleaned that wild capture fisheries play the most important role in supporting livelihoods of the people. This is considering that wild capture fisheries are largely open access which poor rural people can easily access for food and income. In fact, it has been reported that an estimated 40 million rural people, which is more than two-thirds of the rural population in the Lower Mekong Basin, are engaged in wild capture fisheries,

contributing significantly to the livelihoods of many people who are mostly the poor and are highly dependent on the Mekong River and its resources that serve as a safety net in times of poor agricultural harvests or other difficulties. In Lao PDR for example, it is believed that 71 percent of rural households or about three million people rely on fisheries for their subsistence or additional source of cash income. In Cambodia, about two million people live in fishing communes around the Tonle Sap Lake who depend almost entirely on fishing for their livelihoods. This brings us to consider the need to enhance the valuation of fisheries, aquatic resources and wetlands of the Mekong River Basin, which we hope could be pinned down during this Meeting.

Moreover, I also strongly believe that gender equity is an important issue that should be discussed at this Meeting to ensure that there is a reasonable participation of both men and women in the implementation of programs and activities in the Mekong River Basin. In addition, we have to make sure that there is a fair distribution of benefits among all stakeholders from such development activities. We cannot deny that the role of women in fisheries in our region is very crucial, especially in earning additional incomes for their households. However, the involvement of women in fisheries although very significant has never been given much focus, even considering that women could easily comprise almost one-half of the labor force in small-scale fisheries. We are aware that in the fishing households, while husbands are fishing far from the shore, the wives are engaged in small-scale local fisheries activities inshore, such as collecting shells, mending fishing nets, as well as processing and marketing fish and fishery products. Thus, there is also an urgent need to assess the roles of all members of the fishing communities in utilizing and managing the resources to ensure equitable socio-economic benefits for all.

Going back to our three-day Meeting, we are happy that the organizers have invited this group of resource persons/experts who are renowned and involved in fisheries and wetland management of the Mekong River Basin, to share with us their knowledge and experiences. They are the most qualified people who could provide the necessary inputs especially on the environmental condition of the Mekong River as well as insights on how inland fisheries could adapt to the climate change and variability. We are all aware that the impacts of climate change are starting to mainstream in the development of inland fisheries, and that of the Mekong River Basin is no exception. We therefore express the hope that the experts present at this Meeting could suggest some measures that would enable the relevant stakeholders to mitigate such impacts. While we understand that the SEAFDEC-Sweden Project wishes to map the direction that could provide a platform for improving project planning and management for the sustainability of Mekong River fisheries, aquatic resources and wetland management, it is also our wish that with such direction, the socio-economic conditions of people dependent on these resources could be enhanced. We therefore agree that there is no other right time to undertake this crucial assessment meeting than now.

Finally, with the renowned experts present at this Meeting, we can be assured of the best results valuable outputs of this Meeting that could guide us towards the right direction. Let us therefore join hands together to show our commitment and continuing support for the sustainability of resources in the Mekong River Basin. With this, my sincerest thanks to all of you who are already part and will take part in this collaborative endeavour.

God Bless everyone.



## THE MEKONG RIVER COMMISSION (MRC) 1995 AGREEMENT

By *Dr. Magnus Torell*  
Senior Advisor to SEAFDEC

**SEAFDEC, MRC, ASEAN:  
EXPERT MEETING ON MEKONG  
COOPERATION ON FISHERIES,  
AQUATIC RESOURCES AND  
WETLANDS: 15 YEARS LESSONS  
LEARNT, PHNOM PENH, NOV 2014**

Information on the development, scope and implementation of the 1995 Mekong Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin

1

**The Mekong River Region**

The **Mekong River** is one of the richest and most diverse rivers in terms of aquatic resources and biodiversity, second only to the Amazon River (as indicated by H.E. Nao Thuok in his Key Note)

The **Mekong River Basin** has one of the world's largest and most productive inland fisheries (details in other presentations).

Capture fisheries and the harvesting of other wild wetland resources in the **Mekong** and its flood plains have a very specific and important role in supporting livelihoods of millions of rural people with limited access to land

The importance and uniqueness of the **Mekong** has for many decades attracted interest, locally and internationally, to support cooperation in the development and use of Mekong resources

2

**Steps leading up to 1995 Mekong Agreement**

- September 1957: Statute of the Committee for the Co-ordination of Investigations of the Lower Mekong Basin
- 1970: An Indicative Basin Plan prepared
- January 1975: Joint Declaration of the Principles for the Utilization of Waters of the Lower Mekong Basin
- 1978: Declaration of the Interim Mekong Committee
- 1987: Revised Indicative Basin Plan
- December 1992: Kuala Lumpur Joint Communique
- 1993 – 1994: Negotiations for a New Mekong Agreement
- April 1995: Mekong Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin

3

**Underlying expectations for a new Agreement from Prof. George Radosevich**

- **Framework for cooperation**
- **Non-interference** with reasonable national interests to develop water and related resources
- **Compliance based agreement** – no formula for water allocation, not regulatory – pursue trade-offs and exchanges
- **Promote constructive and mutually beneficial sustainable development** of MRB water and related resources, and protect and manage the environment and aquatic conditions
- **Take into account interests of all riparians**
- **Address and resolve issues and problems** through their own organization in an amicable, timely and good neighbourly manner

4

**Negotiating the 1995 Mekong Agreement**

The process of negotiating the new Mekong Agreement was initially conducted with "engineers" from the four countries

This was found not to be sufficient to meet cover all aspects that would be needed to cover to meet demands of environmental sustainability, etc

The profile of country representatives was broadened to include other sector interests, including lawyers and the Ministry of Foreign Affairs

Following the negotiation is important to note that the 1995 Mekong Agreement is not a "watercourse" agreements, but a "basin" agreement

5

**The Agreement on the Cooperation for the Sustainable development of the Mekong River Basin**

The 1995 Mekong Agreement was signed on 5 April 1995 in Chiang Rai, Thailand

The agreement was signed by:

- **Cambodia:** H.E. Ing Kieith, Deputy Prime Minister and Minister of Public Works and Transport
- **Lao PDR:** H.E. Somsavat Lengsavad, Minister of Foreign Affairs
- **Thailand:** H.E. Krasae Chanawongse, Minister of Foreign Affairs
- **Vietnam:** H.E. Nguyen Manh Cam, Minister of Foreign Affairs

6



## The Agreement on the Cooperation for the Sustainable development of the Mekong River Basin

Contents/Chapters of the 1995 Mekong Agreement:

- Chapter I: Preamble
- Chapter II: Definition of Terms
- Chapter III: Objectives and Principles of Cooperation
- Chapter IV: Institutional Framework
- Chapter V: Addressing Differences and Disputes
- Chapter VI: Final Provisions

Note: A Protocol to the Agreement was developed and agreed upon for the Establishment of the Mekong River Commission, as such  
Note 2: the Preamble and Definition of Terms is part of the Agreement

7

## The 1995 Mekong Agreement: core elements and what countries agreed upon 1

The 1995 Mekong Agreement is interesting and unique in different ways.

It does not express a "sharing" approach but it does include a "no harm" rule (Art. 6+7)

The importance to maintain "water balance" and minimum flows on the mainstream during dry and wet season are central to the 1995 Mekong Agreement

A specific provision relates to the need to ensure an acceptable natural reverse flow of the Tonle Sap River during wet season (Art 6)

8

## The 1995 Mekong Agreement: core elements and what countries agreed upon 2

The very "core" of the 1995 Mekong Agreement lies in Articles 5, 6 and 7

**Article 5: Reasonable and Equitable Utilization** – rules notification and prior consultation with highlight on wet season and dry season situations

**Article 6: Maintenance of Flows on the Mainstream** – including minimum flows in dry season, ensure wet season Tonle Sap reverse flow, and to prevent wet season peaks "higher than average"

**Article 7: Prevention and Cessation of Harmful Effects** – avoid, minimize and mitigate harmful effects that might occur to the environment, especially the water quantity and quality, the aquatic ecosystem conditions and ecological balance of the river system

9

## The 1995 Mekong Agreement: core elements and what countries agreed upon 3

It should be noted that riparian countries are supposed to, in preparation for (major) developments provide "notification" and/or prior consultation" with other Mekong countries. These requirements has been subject to much discussion as to when, and how to apply these rules, such as in the case of mainstream infrastructure. Clarifications are still needed to avoid diverse interpretations

"Basin Wide" does not mean that the whole basin has to be covered. It could be "local" but with a basin wide or trans-boundary significance

No requirements relates to small projects - but there is a concern that the "cumulative" effect of many (100+) small projects could be more significant than one larger project

10

## The 1995 Mekong Agreement: core elements and what countries agreed upon 4

The 1995 Mekong Agreement is an agreement to promote "sustainable development" and in doing so the task is broader than just managing the "water" as such. Article 1 is clear in this as it states:

"To cooperate in all fields of sustainable development, utilization, management and conservation of the water and related resources of the Mekong River Basin, including, but not limited to irrigation, hydro-power, navigation, flood-control, fisheries, timber floating, recreation and tourism"

In response the MRC work program include Core Programs (Environment, Water Utilization and Basin Development) and Sector Programs (Fisheries, Navigation, Hydro-power, Agriculture, Forestry, etc) – a process is initiated (2014) to revise the program structure!!!

11

## The 1995 Mekong Agreement: Addressing differences and disputes

Article 34: Resolution by the Mekong River Commission; and Article 35: Resolutions by Governments spells out the steps to be taken if "difference or dispute arises between two or more parties to this Agreement".

The steps provided follow recommendations under international law:

- Consultation and Mitigation
- Negotiation and Conciliation
- Mediation, and
- Arbitration

In the perspective of aims to avoid disputes, the 1995 Mekong Agreement is in a way in itself an expression of the willingness of having no conflicts.

12

## The Mekong River Commission

The Mekong River Commission (MRC) was established through the establishments of a Protocol to the 1995 Mekong Agreements

The MRC was/is by definition an "international, country-driven river basin organization that provides the institutional framework to promote regional cooperation to facilitate the implementation of the 1995 Mekong Agreement.

13

## The 1995 Mekong Agreement: Information, information sharing, climate variability and climate change

Although agreements exist on information sharing (under WUP) – also with China - there are still uncertainties among countries on how information is used and there are sometimes a reluctance to release information that could be misused or miss-cited.

However, information sharing is key to an organization like the MRC

The projection of climate variability and seasonal patterns need to build upon information sharing of hydro-meteorological data

14



### The 1995 Mekong Agreement: Climate variability and climate change

As indicated in the Core Articles 5, 6 and 7 the 1995 Mekong Agreement provide a good basis to address climate variability, seasonal patterns and climate change – if the countries so wish.

Key words in this context is the focus on "dry season" and "wet season" concerns as well the need to ensure "maintenance of flows on the mainstream" with specific provisions for the dry and the wet season – including the requirement to "enable acceptable natural reverse flow of the Tonle Sap during the wet season.

Environment and climate variability/change will be discussed in more detail at a later agenda point.

15

### The 1995 Mekong Agreement: Challenges ahead

On 5 April 2015 the 1995 Mekong Agreement is 20 years. Prior to the 10th Anniversary the Swedish Embassy organized an expert meeting on the context and challenges ahead for the MRC and regional cooperation under the MRC Framework. Some of critical points raised during that meeting could be repeated today – prior to the 20th Anniversary, such as:

- Cooperation is a key word for processes ahead. Confidence and trust needs to be built among various "stakeholders" in Mekong development and environmental protection. There is still a lot of mistrust, but still enough trust to move forward.
- The MRC and the use of 1995 Mekong Agreement will be no "better" than the countries want it to be

16

### The 1995 Mekong Agreement: Challenges 2

In the coming decade(s) there is continued need for MRC (and Member Countries) to:

- Look towards more challenges
- Look beyond immediate needs

Challenges and needs will be a reflection of changes in the regional, in the countries, among people and the environment, such as:

- More people and increased resource scarcity (conflicts??)
- Quality concerns with growing cities and industries
- Role of civil society with political/economic change
- ASEAN Community 2015 and beyond
- Continued illegal fishing, logging, trade, etc
- Increased regional migration to seek employment opportunities

17

### The 1995 Mekong Agreement: Challenges 3 Fisheries, Aquatic Resources and Wetlands

In spite of the huge production of fisheries and aquatic/wetland resources the importance of fisheries to the region, local economies and poor people, the Mekong Fisheries is still struggling to be recognized as a major priority sector.

The development of Basin Wide Fisheries Strategy could be a good opportunity – for that to materialize all concerned partners (MRC FP, SEAFDEC, FAO/APFIC, WWF and others) need to work together to have it endorsed at higher levels – including ASEAN, ADB and World Bank

On the other hand the development of new MRC program structure could imply that individual sectors (such as fisheries) will be "sidelined". Cooperation is again critical and MRC FP/EP should work closely with SEAFDEC and FAO to ensure that fisheries remains high on the regional (ASEAN) agenda to the benefit of people throughout the Mekong region

18

### The 1995 Mekong Agreement

Hopefully this event will provide some guidance on how to build upon the 1995 Mekong Agreement to strengthen combined efforts to secure long-term sustainability of fisheries, aquatic resources and wetlands in the Mekong River Region.

Steps ahead include:

- FAO International Inland fisheries conference during the first quarter of 2015
- MRC Fisheries Symposium in May 2015 followed-on by a back to back event to look into the continued development of strategies relevant to fisheries, aquatic resources and wetlands

19



## LESSON LEARNT FROM DEVELOPING REGIONAL GUIDELINES FOR FISHERIES MANAGEMENT AND DEVELOPMENT

By Mr. Peter Degen  
International Technical Advisor, MRC Fisheries Programme



1



2



3



4

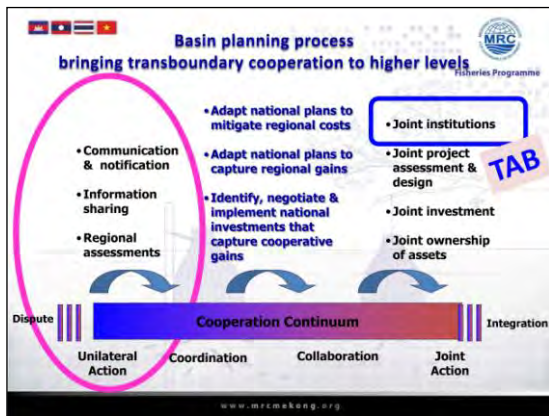


5

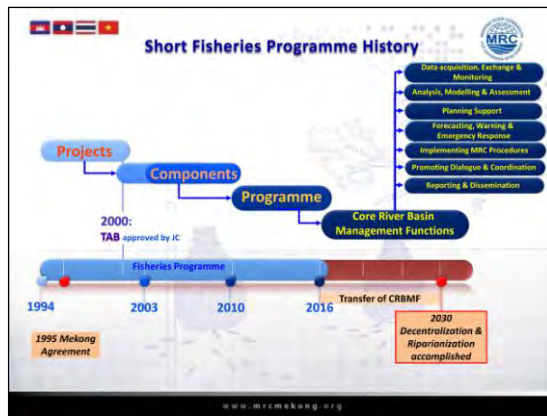


6





7



8

### MRC Fisheries Programme

Approach	Period	Implementation Platform
FP Project	1994-2003	1. Capture Fisheries Mgt. (C)
		2. Reservoir Fisheries Mgt. (L-T-V)
		3. Assessment of Mekong Fisheries (C-L-T-V)
		4. Rural Extension Aquaculture Dev. (C-V)
		5. Aquaculture of Indigenous Fish (C-L-T-V)
FP Reorganization	2003-2005	Regrouping of outcomes from different projects under preliminary component titles
FP Component	2005-2010	• Fisheries Ecology, Valuation & Mitigation
		• Aquaculture of Indigenous Fish
		• Fisheries Management
MRC F-PIP 11-15	2011-2015	4 Outcomes contributing to key milestones
MRC Strategy Plan	2016-2020	Restructured under Core River Basin Management Functions

**1 Plan for all MRC Activities**

www.mrcmekong.org

9

### MRC Fisheries Programme

No	MRC Core Function	Sub-Core Function
1	Secretariat, Admin & Management	
2	River Basin Management	1. Data acquisition, exchange & monitoring
		2. Analysis, modelling & assessment
		3. Planning support
		4. Forecasting, warning & emergency response
		5. Implementing MRC Procedures
		6. Promoting Dialogue & Coordination
		7. Reporting & Dissemination
3	Capacity & Tools Development	
4	Consulting & Advisory Services	

www.mrcmekong.org

10

### Why do we need a Basin wide Fisheries Management and Development Strategy (BFMS)?

Three answers:

1. Capture fisheries are essential for the economic, social and cultural existence and survival of the majority of the rural people and their communities in the LMB.

www.mrcmekong.org

11

### Why do we need a Basin wide Fisheries Management and Development Strategy?

2. Survival and sustainable utilization of the fisheries resources, their effective management and conservation will need to be approached holistically, addressing the larger LMB ecosystem and challenges emerging from competing water resource use and development projects.

www.mrcmekong.org

12

### Why do we need a Basin wide Fisheries Management and Development Strategy?

3. States should, within their respective competences and in accordance with international law, cooperate at sub regional, regional and global levels through fisheries management organizations, other international agreements or other arrangements.....

(FAO's Code of Conduct for Responsible fisheries)

www.mrcmekong.org

13

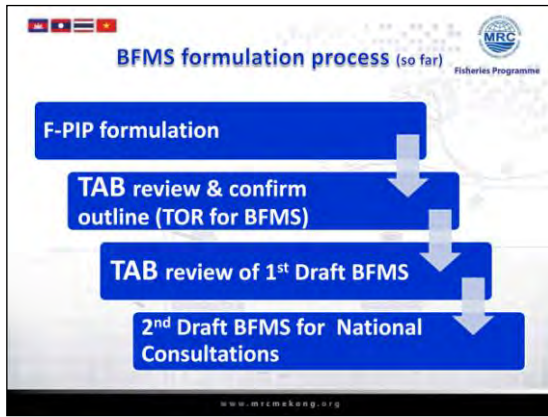
### Why do we need a Basin wide Fisheries Management and Development Strategy?

.....to promote conservation and management, ensure responsible fishing and ensure effective conservation and protection of living aquatic resources throughout their range of distribution, taking into account the need for compatible measures in areas within and beyond national jurisdiction.

www.mrcmekong.org

14





15

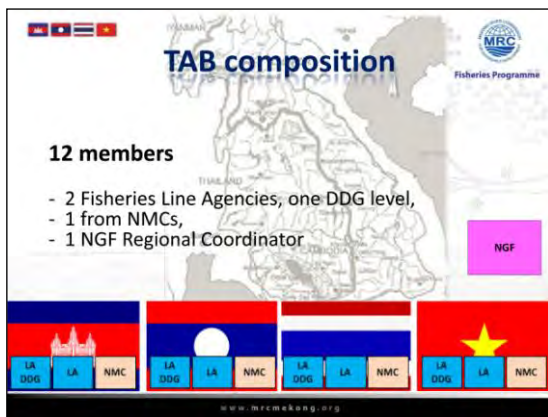
### The TAB

- The Technical Advisory Body for Fisheries Management in the LMB (TAB) needs to own the process of BFMS formulation & implementation.

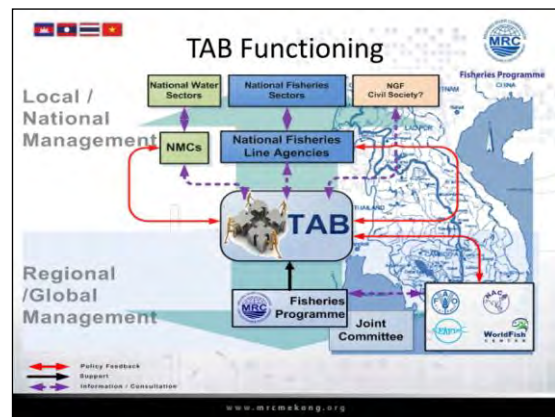
**TAB objectives:**  
*Fisheries stakeholders foster coordinated management and development and sustainable utilization of the economic and nutritional potential of aquatic resources in the Mekong River Basin, and facilitate the uptake of regional issues in national and local action plans and activities by concerned government agencies and user groups.*

www.mrcmekong.org

16



17



18

### Review of National Strategies and Policies

**Assessment Framework:**

- Contribution to economic (GDP) growth, including by value chain and post harvest improvements
- Contribution to sustainable livelihoods
- Contribution to food security
- Responsible fisheries
- Fisheries enhancement, including rice field fisheries
- Responsible aquaculture

www.mrcmekong.org

19

### Review of National Strategies and Policies

**Assessment Framework (cont.):**

- Environmental and ecosystem/
- habitat protection and restoration
- Co-management, including public sector institutional strengthening and capacity building
- Research, including monitoring, generation of data & information
- Basin-wide cooperation in fisheries management and development
- Regional/international cooperation

www.mrcmekong.org

20

### BFMS: Vision – Mission - Goal

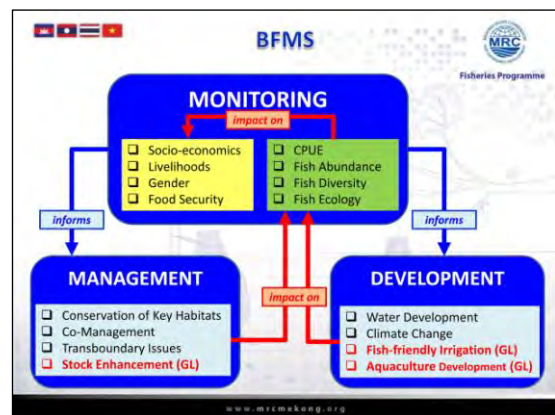
**Vision:** Member Countries collaborate to manage the fisheries of the Mekong Basin in an environmentally non-degrading, technically appropriate, economically viable, and socially acceptable manner.

**Mission:** To provide MCs, TAB and the MRC FP with a holistic strategic framework for fisheries management of the LMB.

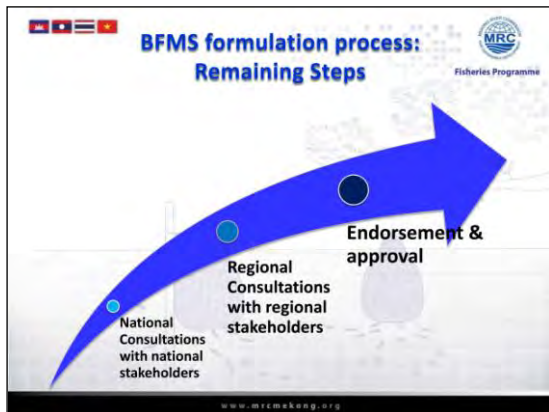
**Goal:** Responsible and sustainable use of living aquatic resources.

www.mrcmekong.org

21



22



23

**Lessons Learnt**

- The basin-wide Fisheries Management and Development Strategy has to address the broad range of regional fisheries sector issues  
⇒ *not only those that MRC is able to address.*
- BFMS needs to be integral part of the Basin Development Strategy  
⇒ *to inform overall management and development strategies of the Lower Mekong Basin.*
- BFMS is a broad communication exercise  
⇒ *to engage all relevant national fisheries stakeholders and regional support structures.*

www.mrcmekong.org

24

**Lessons Learnt**

- In the process of MRC reorganization the Fisheries Programme will “integrate” into Core River Basin Management Functions (CRBMF), and thus, “disappear” as *(a name of)* a sector programme.
- National Sector Ministries are not organized as CRBMF
  - ➔ Risk that regional “Sector Identity” of Fisheries gets “diluted”.
    - ⇒ *National fisheries line agencies to strengthen TAB as a functional institutional platform for basin-wide cooperation.*
    - ⇒ *Communication among national fisheries line agencies to be strengthened*
    - ⇒ *Communication with water sectors (hydropower, irrigation) to be fostered*

www.mrcmekong.org

25



## DEVELOPMENT OF REGIONAL AND SUB-REGIONAL AGREEMENTS FOR THE SUSTAINABLE DEVELOPMENT OF THE MEKONG RIVER

*By Mr. Khuon Komar  
Policy and Institutional Specialist*

**Expert Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands**

**Topic 2:** Development of Regional and sub-regional agreements for the sustainable development of the Mekong River

Phnom Penh, 12-14 November 2014

1

Development of Regional and sub-regional agreements for the sustainable development of the Mekong River

- Regional agreements:
  - ASEAN
- Sub-regional agreements
  - Greater Mekong Sub-region (GMS)
  - Mekong River Commission (MRC)
- Other Existing Sub-regional Cooperation
  - Lower Mekong Initiative
  - CLMV-Japan Cooperation
  - Mekong-Ganga Cooperation (MGC)
  - ACMECS

Conclusion

2



3

**ASEAN (1/2)**

- ASEAN established in 1967 by five older members (IMPST)
- Currently it has 10 members, one candidate & one observer
- TAC is a major instrument of "regional engagement" aiming at promoting regional peace and stability
- Art 2(c): "Non-interference into internal affairs of one another"
- Art 2(d): "settlement of differences or disputes by peaceful means"

4

**ASEAN (2/2)**

- ASEAN Summit: Holds on a yearly basis
- AMM, AEM, Sectoral ministers' meeting, ASC, SOM, .....
- ASEAN & Dialogue Partners; ASEAN + 3
- AMBDC:
  - Established in 1996 to promote economic integration among member countries
  - Focused on development of infrastructure and human capital, enabling the sharing of resources base btw ASEAN Member Countries & Mekong riparian States, and with China

5

**Greater Mekong Sub-region (1/3)**

- Members: Cambodia, China, Lao PDR, Myanmar, Thailand and Vietnam share the Mekong River. Five are ASEAN members (CLMTV), of these five States 4 are MRC members.
- The 9 priority areas of GMS cooperation are transport, telecommunications, energy, tourism, HRD, environment, agriculture, trade, and investment.
- In last 10 yrs, many projects have been completed or are being undertaken, i.e., development of North-South, East-West, & Southern Economic Corridors (road networks linking many of six GMS mbrs, electricity trade, cross-border movement of goods & people. As the GMS members are market-based open economies, potential benefits from this cooperation are large.

Despite significant economic growth, poverty is still widespread.

6

### Greater Mekong Sub-region (2/3)

- **GMS Triangle Activities:**
  - Tripartite action (Gov + workers' + employers' organizations)
  - Aims to protect and promote migrant workers rights in & from the GMS region
  - Operational in CLMTV focusing on
    - Strengthening policy & legislation
    - Building capacity of stakeholders
    - Providing services to migrant workers
  - It is in discussions with govt., employment and industry on development of operational guidelines

7



8

### Greater Mekong Sub-region (3/3)

- **5 GMS Development Areas:**
  - Development Triangle Area (CLV)
  - Emerald Triangle Development Cooperation
  - Golden Triangle (LMT)
  - Green Triangle (ChLM)
  - China-Laos-Vietnam Triangle (ChLV)
- {Golden Quadrangle Area (LMTCh)}
- **Economic Corridors:**
  - East-West Corridor
  - North-South Corridor
  - Southern Corridor, etc...

9

### Greater Mekong Sub-region



10

### MRC

- 5 April 1995: Agreement on the Cooperation for the Sustainable Development of the Mekong River Basin (CLTV)
- 1999 MRC Resolution: five set of Rules for Water Utilization
  - PDIES: approved in 2001
  - PNPCA: approved in 2003
  - PWUM approved in 2003
  - PMFM: approved in 2006
  - PWQ signed in 2011; its technical guideline is under discussion
- 2010: 1<sup>st</sup> Summit of the MRC heads of Government agreed to commit for the MRC to be financially sustained by member countries by 2030.

11

11

### Other Sub-regional Mechanisms (1/2)

- **MRC-US: Lower Mekong Initiative (LMI)**
  - Initiated in 2000, focusing on 4 areas: health, environment, education, & infrastructure dev.
  - A sister-river agreement was signed btw MRC & the Mississippi River Commission
- **CLMV-Japan is a dialogue forum apart from ASEAN-Japan coop**
  - Program for development of the Mekong region
  - production & distribution network across the region and facilitating intra-regional trade,
  - assisting in capacity-building for economic planning and fostering human resources for the management of electric power networks

12

12

### Other Sub-regional Mechanisms (2/2)

- **Mekong-Ganga Cooperation (MGC)**
  - Established 2000 by CLMTV & India,
  - emphasized on 4 areas of cooperation: Tourism, culture, education & transportation linkage for future trade & investment cooperation in the region
- **ACMECS (Ayayewadi-Chao Phraya-Mekong Eco. Coop Strategy)**
  - Established in 2003 by CLMT (V joined later)
  - Action for 2013-2015 (VTE) trade and investment facilitation, agriculture cooperation, industrial and energy cooperation, transport linkages, tourism cooperation, human resources development, public health and social welfare development and environmental cooperation

13

13

### Conclusion

- Various existing forums both multilateral & bilateral (at nat'l, sub-nat'l or even at local levels) for consultation, discussion, cooperation and solving various issues of their concern. They are supplement and complement one another.
- Policy makers need to cope with economic integration's impacts, bringing balance between benefits & effects, while benefits can be maximized & effects can be minimized.
- Government's efforts, donor's policy and regional support to solve problems together thru various mechanisms need to be focused on pro-poor development.
- In the region, China & Japan are important key players for the Mekong riparian countries in reducing poverty, in support for modern infrastructure, and in fostering devel. of HR

14

14

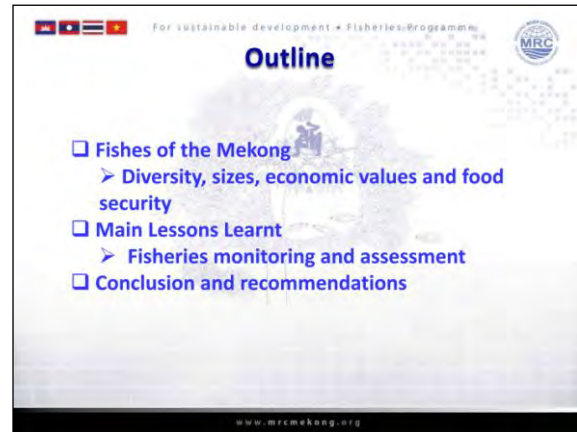


## THE LESSONS LEARNT FROM ASSESSING FISH CATCH IN THE LOWER MEKONG BASIN

*By Mr. Peter Degen  
International Technical Advisor, MRC Fisheries Programme*



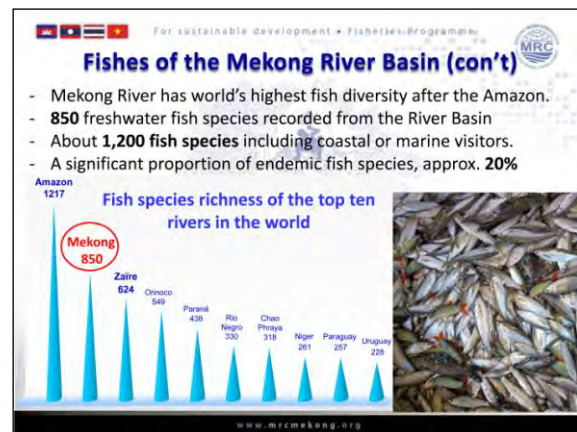
1



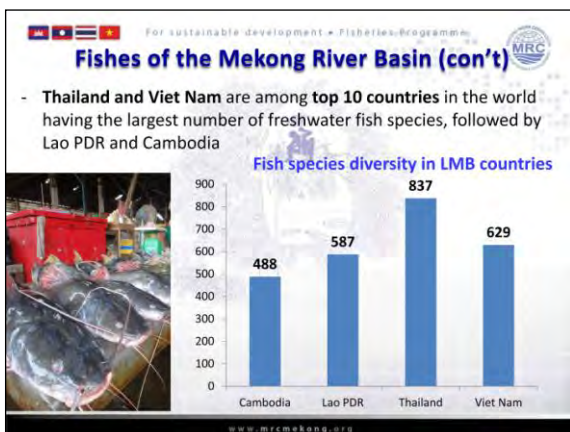
2



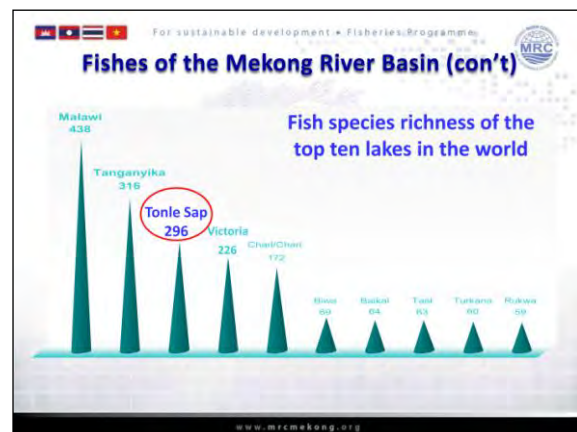
3



4



5



6

For sustainable development • Fisheries Programme

## Volume and Value of the Mekong Fisheries

www.mrcmekong.org

7

For sustainable development • Fisheries Programme

## Size of LMB fisheries

The Annual LMB fish production is approximately **≈ 4.0 million tonnes**

www.mrcmekong.org

8

For sustainable development • Fisheries Programme

## Catch and species richness by migration guilds

Fish production - weight

Fish diversity - number

www.mrcmekong.org

9

For sustainable development • Fisheries Programme

## Comparison with other regions

**LMB fish production** =

- 2% of World fisheries production
- 43% of Africa fisheries production
- 19% of America fisheries production
- 4% of Asia fisheries production
- 12% of SE Asia fisheries production
- 24% of Europe fisheries production

- LMB fish production represents about **20%** of the world inland fish production.
- This **inland capture fish production** is higher than anywhere else in the world.

www.mrcmekong.org

10

For sustainable development • Fisheries Programme

## Fisheries monitoring methods

- Fisheries monitoring methods
  - ✓ Well-established, fully acquainted and applied by national line fishery agencies
  - ✓ Cost-effective vs resource-intensive methods

www.mrcmekong.org

11

For sustainable development • Fisheries Programme

## Types of Fisheries Monitoring

www.mrcmekong.org

12

For sustainable development • Fisheries Programme

## Use Fisheries Monitoring Data

Current MRC - FP Fisheries Monitoring (national data generation & reporting)

- Fish Abundance & Diversity
- DoI Fishery
- Lee Trap Fishery
- Drift of Larvae & Juveniles

**MASTER CATALOGUE**

Discharge  
Rating Curves  
Water Level  
Water Quality  
Simulated flow  
Sediment  
Tidal Regime

Access to Master Catalogue

**PDIES**

- ✓ MRC Programmes feed the MRC Master Catalogue
- ✓ External Visitors can access data from Master Catalogue in line with the Procedures for Data and Information Exchange and Sharing

www.mrcmekong.org

13

For sustainable development • Fisheries Programme

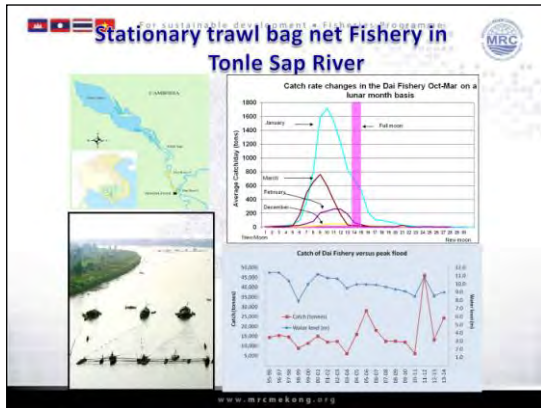
## Fisher catch monitoring

- 15 locations in Lao PDR
- 11 locations in Cambodia
- 05 locations in Thailand
- 07 locations in Viet Nam
- Total: 38 locations

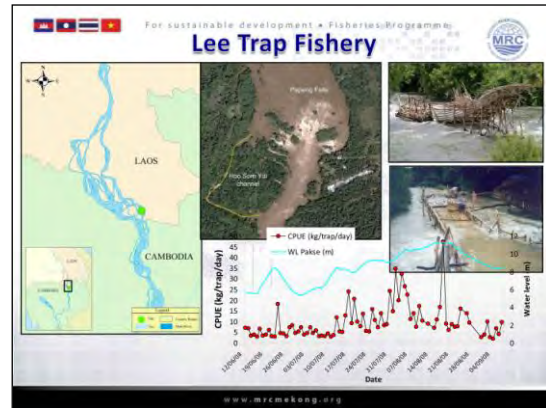
www.mrcmekong.org

14

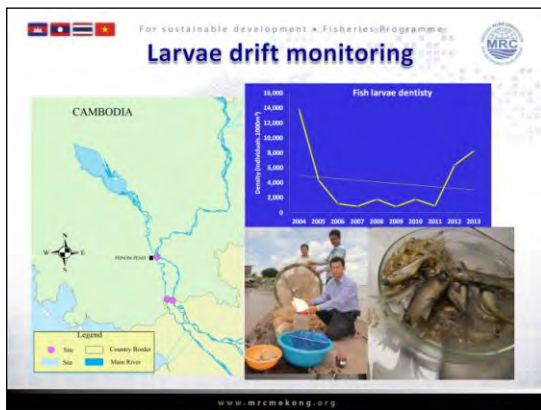




15



16



17

### Main Lessons Learnt & Recommendations

Phnom Penh  
12 September 2014

www.mrcmekong.org

18

### Lessons Learnt

- Mekong Fisheries are unique, highly productive, complex, frequently under-appreciated and "invisible" and threatened by water development
  - Common pool resource
  - Largely middle and small scale & subsistence activity
- To assess the yield, these fisheries need to be taken into account the fisheries yield estimate.
- Appropriate/science-based assessment methods make difference in fisheries statistics, and thus raise its profiles
- Time series data on key fisheries yield indicator is important to understand status and trend of stocks.
- Regional fisheries need to be taken into consideration in national development planning - fisheries sector needs strong regional "identity".

www.mrcmekong.org

19

### Recommendations

Further work may be need for Mekong fisheries management:

- Integration of basin-wide fisheries management strategy into Basin Development Strategy
- Clear definition of "environmental/fisheries hotspots" to safeguard connectivity of critical fish habitats; these need to be operationalised.
- Development of comprehensive and integrated fisheries database in support of regional fisheries science community (universities, research institutes, international science networks).
  - Sharing of tools, approaches - compatibility

www.mrcmekong.org

20

### Recommendations (con't)

- Participation of fishers/ communities in reporting fisheries statistics is important, contributing to formulation and implementation of fisheries management under IWRM
- Trans-boundary management needs to be based on and integrate existing local structures into up-scaling fisheries management mechanism.
- To raise fisheries profile, communication and dissemination should reach:
  - to the appropriate levels
  - across all water management and development sectors
  - in adequate formats.

www.mrcmekong.org

21



THE SUSTAINABLE AQUACULTURE DEVELOPMENT IN THE LOWER MEKONG BASIN

By Mr. Nguyen Viet Manh  
 Scientist, Fisheries Administration of Viet Nam

### Vietnam Mekong Aquaculture and Challenges in Sustainable Development

**Nguyen Viet Manh**  
 Director of Science, Technology and International Cooperation  
 Directorate of Fisheries (D-FISH), MARD, Vietnam

1

### A Brief Overview

**Vietnam profile**

- Total Area: 330,000 Km<sup>2</sup>
- Population: 90 million
- 3,200 Km coastlines
- Ponds and lakes: 120,000 ha
- Reservoirs: 340,000 ha
- Rice fields: 580,000 ha
- Tidal areas: 600,000 ha
- Lagoons: 300-400,000 ha

**Mekong delta**

2

### An Overview of National Fisheries

**Fisheries production and export value**

**Capture and Aquaculture**

**Export value**

**Fishing capacity in 2013**

- Total 120,376 fishing boats
- 20HP: 64,715
- 20-90HP: 45,160
- 90HP: 19,629

3

### An Overview of National Fisheries

**Fisheries master plan towards 2020**

- \* Development Goal:
  - Food security
  - Exportation for hard currencies
- \* Target objectives:
  - 7,000,000 MT of fisheries
  - 4,500,000 MT from aquaculture
  - 11 billion USD from exportation

**For capture fisheries**

- \* Balance between resources and fishing
- \* Encourage off shore fishing
- \* Quality improvement on post-capture fisheries
- \* IUU application

**For Aquaculture**

- \* Diversification
- \* Major species: Shrimp, Pangasius, clam/oyster, tilapia
- \* Marine aquaculture
- \* Intensive aquaculture, not area expanding
- \* Encourage GAP practice

4

### Aquaculture in Mekong Delta Vietnam

**An Overview**

**Good Practices Aquaculture**

- GAP in aquaculture: Global GAP, SQF 1000, BAP, ASC, VietGAP
- Encourage GAP practice: training, technical support, certification

**Total areas for aquaculture: ~4 bill. ha**

**+ for brackish water shrimp in 2013:**

- 586,474 ha, 554,585 tons (account for 91% and 85% in term of total national aquaculture area and production, respectively)
- ++ semi-extensive: 515,647 ha
- ++ semi-intensive & intensive: 70,827 ha
- ++ 554,585 tons: tiger shrimp 46%, white-leg shrimp 54%

**+ For Pangasius in 2013:** 6,035 ha, 1,285,500 tons

**+ Tilapia in 2012:** 4,020 tons, 8,561 ha

**+ Bivalve in 2012:** 54,757 tons, 16,919 ha

Total aquaculture production and area

5

### Aquaculture in Mekong Delta Vietnam

**Brackish-water shrimp**

Provinces	All species		Tiger shrimps		White-leg shrimp	
	Area (ha)	production (ton)	Area (ha)	production (ton)	Area (ha)	production (ton)
<b>Mekong delta</b>						
Long An	6,288	11,507	1,102	848	5,185	10,659
Tien Giang	5,436	17,139	2,740	3,202	2,696	13,937
Ben Tre	36,869	47,397	28,396	9,795	8,473	37,602
Tra Vinh	33,665	20,457	30,967	12,325	2,698	8,132
Soc Trang	69,337	74,054	52,378	22,947	16,959	51,107
Bac Lieu	124,202	85,626	119,305	62,825	4,897	22,801
Ca Mau	266,735	133,500	263,135	104,700	3,600	28,800
Kien Giang	88,000	41,978	86,842	28,250	1,158	13,728
<b>Whole country</b>	<b>687,647</b>	<b>554,585</b>	<b>619,985</b>	<b>256,972</b>	<b>67,662</b>	<b>297,613</b>

6



### Aquaculture in Mekong Delta Vietnam

#### Pangasius

Provinces	2012		2013	
	Area (ha)	production (ton)	Area (ha)	production (ton)
Tiền Giang	125	38,851	150	45,000
Bến Tre	719	155,000	680	140,000
Đồng Tháp	1,879	386,610	2,000	400,000
Vĩnh Long	423	132,206	450	130,000
Trà Vinh	135	28,855	150	30,000
An Giang	1,384	260,428	1,400	300,000
Cần Thơ	1,355	165,837	900	165,000
Hậu Giang	172	40,740	180	45,000
Sóc Trăng	138	33,623	100	25,000
Kiên Giang	17	2,050	25	5,500
<b>Total</b>	<b>6,346</b>	<b>1,244,200</b>	<b>6,035</b>	<b>1,285,500</b>

7

### Aquaculture in Mekong Delta Vietnam

#### Tilapia

Provinces	2012		2013	
	Area (ha)	production (ton)	Area (ha)	production (ton)
Tiền Giang	11			
Bến Tre				
Đồng Tháp				
Vĩnh Long				
Trà Vinh				
An Giang				
Cần Thơ	207	4,020		
Hậu Giang				
Sóc Trăng				
Bạc Liêu				
Cà Mau				
Kiên Giang				

8

### Aquaculture in Mekong Delta Vietnam

#### Bivalve

Provinces	2012		2013	
	Area (ha)	production (ton)	Area (ha)	production (ton)
Ninh Thuận	50	52		
Bà Rịa VT	423	3,184		
Tiền Giang	2,300	6,211		
Bến Tre	4,695	12,000		
Trà Vinh	1,241	779		
Sóc Trăng	830			
Bạc Liêu	504	2,520		
Cà Mau	400	500		
Kiên Giang	6,949	32,747		

9

### Aquaculture in Mekong Delta Vietnam

#### Challenging

- HIGH DISEASE PREVALENCE
- HIGH PRODUCTION COST
- MARKET REQUIREMENT
- CLIMATE CHANGE
- FINANCIAL RESOURCES & VALUE CHAIN LINKAGES



10

### Aquaculture in Mekong Delta Vietnam

#### Challenging (1): High Diseases

- WSSV, AHPNS IN SHRIMP
- 110,000 ha in shrimp in 2012
- Disease in Pangasius (60% survival), in Tilapia (*Streptococcus*)
- Lobster, Clam




11

### Aquaculture in Mekong Delta Vietnam

#### Challenging (2): High production cost

- PANGASIOUS PRODUCTION :
  - Fingerlings: 10%
  - Feeds: 75-80%
- SHRIMP PRODUCTION:
  - Feeds, chemicals, probiotics
  - Electricity
- Others:
  - Fish meal
  - Trash fish

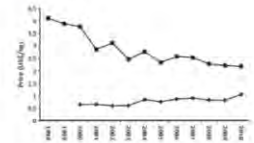


Figure 10 Trends in the average farm gate price and export price of fish (USD/ton) (Avg. average: ●; Avg. Pangasius: ▲; kg<sup>-1</sup>; ●: avg. export price USD/kg<sup>-1</sup>)

12

### Aquaculture in Mekong Delta Vietnam

#### Challenging (3): Market and its requirement

- MARKETS:
  - Much focus on US, EU, Japan. Others?
  - Role of domestic Market
  - Production vs. Demand
- MARKET REQUIREMENT:
  - More requirement
  - Number of certification


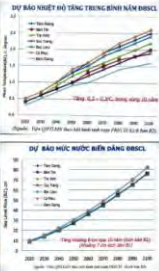


13

### Aquaculture in Mekong Delta Vietnam

#### Challenging (4): CLIMATE CHANGE

- One of the five most vulnerable countries by climate change (the World Bank, 2009)
- Sea level rise & seawater intrusion:
  - To change area of Freshwater & Brackishwater aquaculture
- Extreme weather: flood, drought, typhoon, temperature
  - Scarce freshwater
  - Safety of facilities (pond, cages...)
  - Survival and growth of farmed species

14

## Aquaculture in Mekong Delta Vietnam

### Solutions (1): seed quality

- IN AQUACULTURE:

- Selective breeding for Seed quality improvement: Shrimp, Pangasius, Tilapia
- Feed and Feeding management
- Disease prevention: Pangasius/marine fish vaccination



15

## Aquaculture in Mekong Delta Vietnam

### Solutions (2): cultured species and adaptive model

- IN AQUACULTURE:

- Divertification of cultured species
- Adaptive aquaculture systems:
  - Less use of water
  - Location of farms
  - Submergible cages



16






## THE IMPORTANCE OF RICE FIELDS TO THE PRODUCTIVITY OF CAMBODIA'S INLAND CAPTURE FISHERIES

*By Mr. Rick Gregory  
Consultant, AIT Thailand*

**The importance of rice fields to the productivity of Cambodia's inland capture fisheries**



Mr. Rick Gregory, Mr. Hans Guttman and HE Prof. NaoThuok


1

### 1. Introduction

- Describes AIT Aqua Outreach's work in collaboration with the Cambodian Department of Fisheries on rice field fisheries between 1993-2005.
- Initially a small-scale aquaculture project.
- Quick realisation that aquatic animals from rice fields were an important source of food and income for many rural household.

2

### Job Description Problem. Fisherman? Rice farmer? Duck raiser?



Actually this photo is from the Ayeyarwaddy Delta but the concept is the same.

3

### More than Just Rice: RICE FIELD FOODS



4

### Structure of Presentation

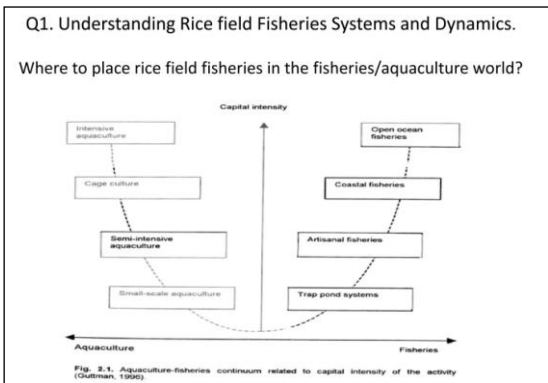
1. Introduction
2. Understanding Rice field Fisheries Systems and Dynamics
3. Assessing Rice field fisheries productivity in different areas.
4. Rice field fisheries contributions to nutrition and income.
5. Enhancing rice field fishery productivity
6. Impact on Cambodia's Inland Fisheries Policy
7. More recent work
8. Some Conclusions

5

### 4 Questions to try and answer.

1. How was the rice field fishery regenerating each wet season?
2. How could the aquatic foods productivity of rice fields be assessed?
3. How much were rice field foods contributing to household nutrition and incomes?
4. Could the productivity of rice field fisheries be enhanced

6

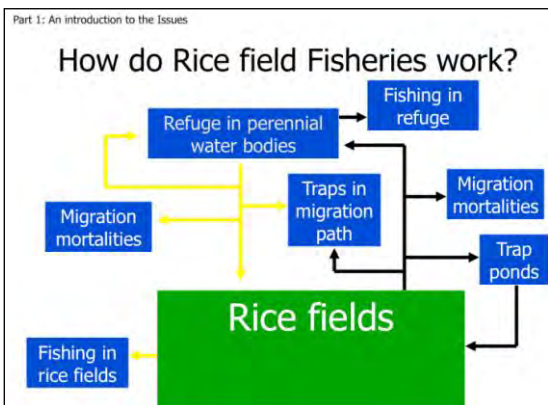


7

**Out migrations and Back Migrations**

- The system chart developed by Gutman H. (1996), shows movements and mortalities in the rice field fisheries system during
  - the out migration from the refuge area (yellow arrows) in the wet season,
  - and the back migration, (black arrows) to the refuge area in the cool season.
- Helped identify bottlenecks where management of rice field fisheries resources might have an impact.

8



9



10



11

The key Component.... Connectivity!

12

**Q2. Assessing Rice field fisheries productivity in different areas.**

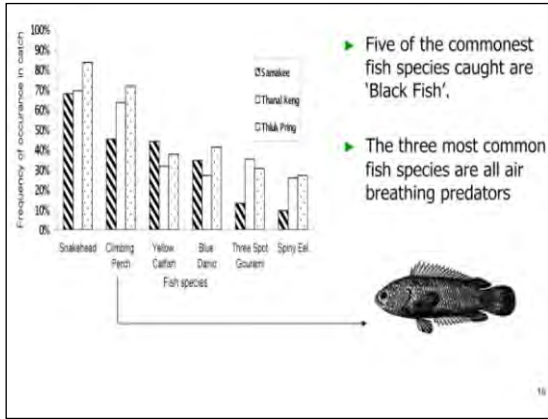
- Trap ponds can be used as a proxy for local rice field fisheries productivity
- Black fish catch data, collected, when trap ponds are pumped dry (usually Feb – April), can be plotted to show relative productivity levels in an area.

13

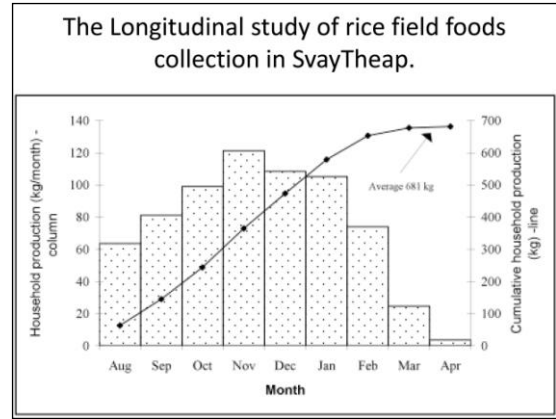


14





15



16



17

### Comparative Rice Fish Values

Part 3: A case study from Svay Theap, Cambodia

Village	Average Yield (kg)/ household	Value (U\$)/ household	Rice: Fish Value Ratio
Samakee	Rice 1,100 Fish 446	162 357	1:2.3
Thanak Keng	Rice 3,480 Fish 765	512 611	1:1.2
Thluk Pring	Rice 3,204 Fish 953	445 762	1:1.7

© 2011 Presentation May 2013

18

- ### Aquaculture implications
- Not much point in promoting small-scale aquaculture in the black areas.
  - Black areas tend to be areas
    - Snakehead predominate.
    - They are also areas where farmers plough with buffalo rather than cattle.
  - White and grey areas may have some potential for aquaculture, (especially in dry years).
    - More catfish than snakehead.

19

### Q4. Enhancing rice field fishery productivity

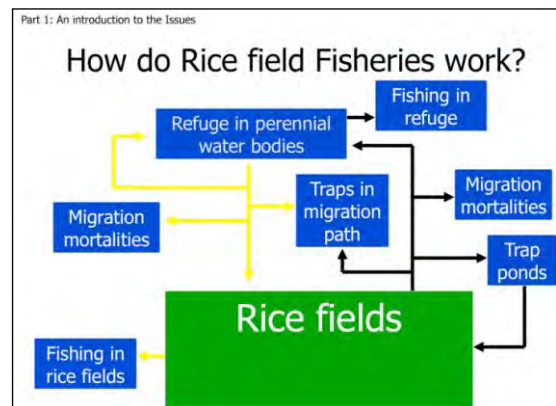
- The first community managed refuge for rice field fisheries.
- KokKandal, SvayChrum, SvayRieng

20

### Small people catching small fish.

- Women and kids play a big role in the collection of foods from rice fields
- Rice field fisheries production estimates range from 20 – 100 kg/ha/year.
- This would mean that Cambodia's fish production from rice fields is between 64,000 – 320,000 tonnes a year.

21



22

## Assessing the benefits

- Challenge. Quantifying the benefits of a single refuge pond, on a local rice field fishery.
  - large annual variations in rainfall/flooding.
- Qualitative benefits can be achieved through the restocking of refuges with a locally extinct species, and their subsequent reappearance in the rice field fishery, the following year.

23

## 5. Impact on Cambodia's Fisheries Policy

- Estimates of national rice field fisheries production are around 100,000 tonnes/year have been included as a separate statistics category since 1999.
- Varies greatly depending on the extent of the flood season.
- Since 2000, the Cambodian Fisheries Administration has promoted community managed fish refuges as a major national inland fisheries management strategy
  - Community Fish Refuges now number over 830.
  - FiA's goal is to establish at least one community fisheries refuge in each of the 1,630 communes nationally.

24

## Enhancing Refuges

- Refuge ponds can be made more attractive to fish through habitat enhancement.
- the installation of substrates, (tree branches, pipes,) and the planting of trees etc on embankments.



25

## Some more recent work

- In 2008, FiA and CARE work in Kompong Thom experimented with small cement rings in rice fields in Pursat province.
- Demonstrated that even tiny water bodies can have a localised impact on nearby fisheries.

26

Some refuges have become beautiful peaceful places



27



28

## Some Problems

- Excavated refuge ponds cannot just be left to look after themselves, as they slowly begin their journey back to becoming dry land, through siltation and the establishment of macrophytes, e.g. water hyacinth.
- In a very dry year, water levels may not reach a point where fish can leave the refuge..

29

## Other recent work

- MRC study in Battambang 2008.
- On going World fish is doing very useful work on characterising and assessing the productivity of community fisheries refuges around the Great Lake.
- Some donor projects have promoted refuges.....

30

### Some of which are huge!



31

### Some Conclusions

- Rice field fisheries are likely to remain an important source of fish and OAA in Cambodia, as well as in Laos PDR and NE Thailand.
- The Plain of Reeds in Vietnam- a very important black fish refuge area influencing both S Vietnam and SE Cambodia's wet season fisheries.
- Pressures on rice field fisheries, including the loss of connectivity between different parts of the rice field system and the use of pesticides during the dry season exist.

32

### Conclusions cont.

- But rice field fisheries are robust and are able to bounce back quickly, if given half a chance.
- Rice field fish, (particularly black fish) look to be climate change tolerant, less affected by mainstream dam obstructions, and a lot more tasty than cultured fish;
- Whether we study them or not, rice field fisheries will remain important for providing sources of protein and income for millions of people in the LMB and beyond, for the foreseeable future.

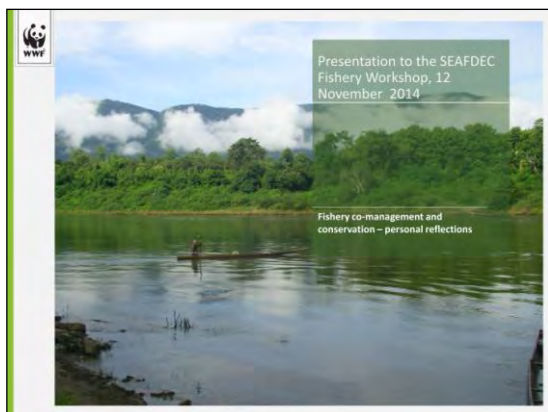
33



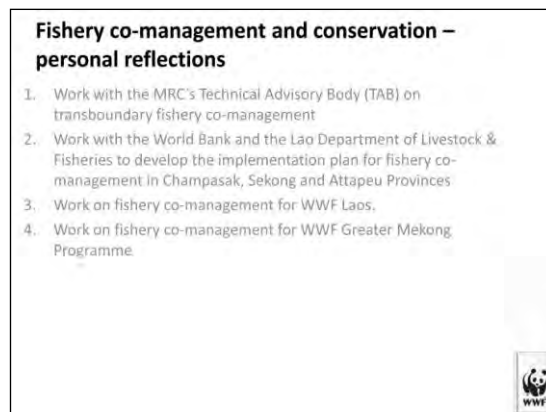


**THE FISHERY CO-MANAGEMENT AND CONSERVATION: PERSONAL REFLECTIONS**

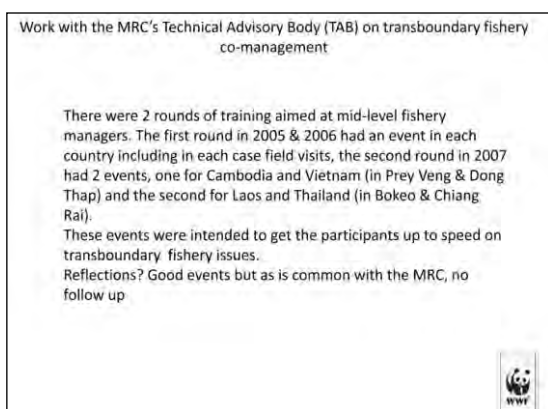
*By Dr. Victor Cowling  
 Technical Advisor, Sustainable Hydropower and River Basin Management,  
 WWF-Greater Mekong Programme*



1



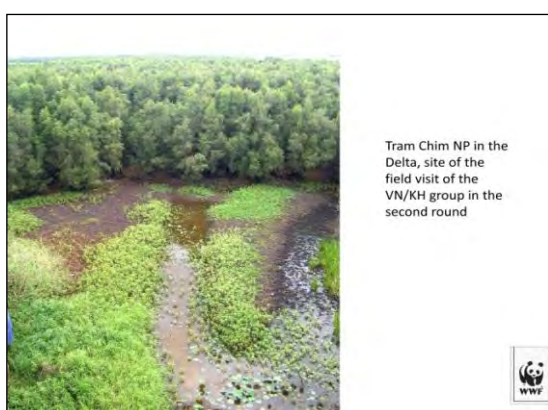
2



3



4



5



6

Work with the World Bank and the Lao Department of Livestock & Fisheries to develop the implementation plan for fishery co-management in Champasak, Sekong and Attapeu Provinces.

This took place over a 9 month period in 2010 and involved detailed consultation with 5 district agriculture and forestry offices, local communities and of course the national and provincial fishery offices. Villages were selected in 3 districts of Champasak and one district each in Sekong and Attapeu. It took a while but the plans were finally approved by the Board of the World Bank in Washington, D.C. For a total of \$4.5 million.

Reflections? A long process and the WB and I always felt there was likely to be a capacity limitation at the DLF. This has since proved to be the case.



7

### WWF - Community Fisheries for Lao PDR



- We follow the agreed 6 step process published in the DLF/WWF Fisheries Co-management Guidelines
- This process is fully endorsed in the Fishery Law



8

#### Step 1: Consensus building

Activities:

- Interview fishermen, women and children;
- Gather information on capture fisheries management;
- Habitat mapping to determine critical fisheries habitat;
- Collect data on fishing gear, fish species, migratory information.



9

#### Step 2: Drafting Regulations

Activities:

- Village meetings to discuss fisheries management and to draft regulations.



10

#### Step 3: Revision of draft regulations

Activities:

- Village meeting to explain how regulations will be developed and who should participate;
- Discussion of the draft regulations with people in the villages, expert fishers, neighboring villages;
- Record the feedback from the different groups of people and revise the draft regulations.



11

#### Step 4: Agreement on revised draft regulations by local level stakeholders

Activities:

- Village meeting to present the draft regulations in detail;
- Revise draft regulations based on feedback.



12

#### Step 5: District approval of aquatic resources management regulations

Activities:

- Regulations are signed by the Village authorities and presented to DAFO;
- DAFO signs and endorses the regulations and presents them to the District Governor;
- District Governor signs the regulations and issues an agreement to allow the village to implement the proposed regulations.



13

#### Step 6: Public announcement of the establishment of village regulations for aquatic resources management

Activities:

- Provide copies of the approved regulations to all local stakeholder representatives;
- File original copies of the regulations in agreed locations;
- Inform the general public of the management regulations via local news media;
- Conduct opening ceremony (optional) and erect village signboard.



14





15

But this only sets things up...

Now management has to be done. This is primarily the job of the local community, under the supervision of the Fishery Management Committee. The FCM can access support from the DAFO staff, and from WWF technical staff.

16

Step 7: Monitoring and evaluation

Activities:

- Conduct village meetings to identify problems and important issues in the village aquatic resources management plan.
- Discussion on the way forwards to sustainable management & use of village aquatic resources

Presentation to Natural Capital Workshop

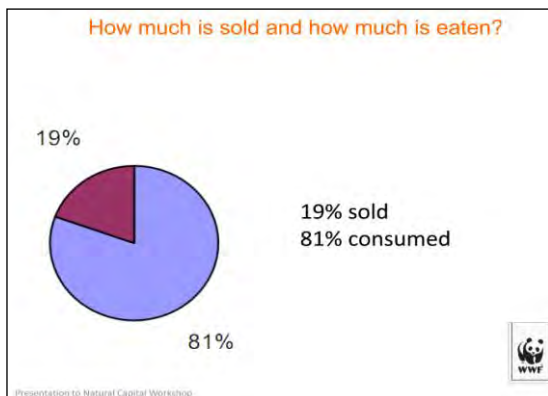
17

WWF experience with fisheries in the Sekong basin

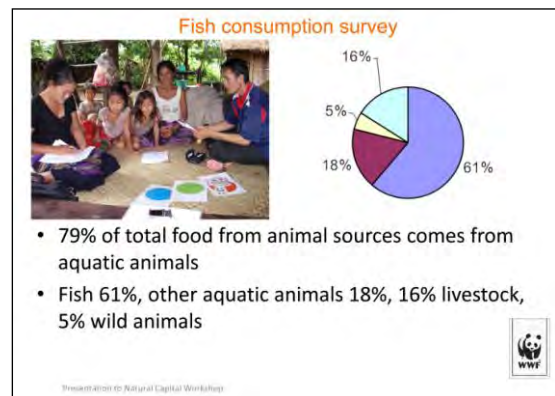
Aquatic resources are important to livelihoods!  
3 types of research to help decision makers about policy on the management of the basin

- fish market survey
- participatory fishery monitoring
- fish consumption survey

18



19



20

- Work on fishery co-management for WWF Greater Mekong Programme
1. Work on sustainable hydropower
    - a. WWF is not anti-dam
    - b. But you should not gamble, especially on the mainstream without proving the fish ladders etc. do the job as intended
    - c. This has not been the case with Xayaburi & Don Sahong
    - d. So we have campaigns on both calling for a halt, for a 10 year period while research is done to fill the gaps in knowledge
  2. The HSBC Water Programme
    - a. Works in 5 basins across the world
    - b. A regional component and 4 country programmes
  3. The BMZ fishery co-management project in Siphandone, Stung Treng and Kratie

21

Regional component includes work on eDNA  
This is a new method searching for environmental DNA in the Mekong. Primarily to seek the Mekong Giant Catfish, but can detect all species that are in the gene database. Initial results are in and one sample found MGC DNA up in Chiang Khong in northern Thailand. It also located the Irrawaddy dolphin in the Lao/Cambodia transboundary pool

22

The HSBC Water Programme

1. In Thailand, working at Beung Khong Long Ramsar site and the 2 rivers that connect it to the Mekong. Mainly FCZs and water use management
2. In Vietnam, working currently on ecotourism at Mui Ca Mau Ramsar site
3. In Laos and Cambodia, co-funding the BMZ project (see later slide)

Water Programme | HSBC



23

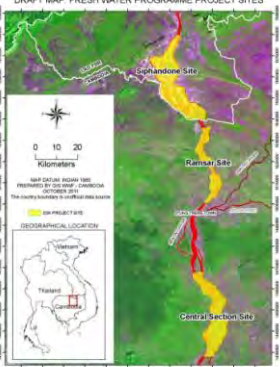
Water Programme | HSBC

Thailand, mouth of the river Songkhram





24

DRAFT MAP: FRESH WATER PROGRAMME PROJECT SITES



**BMZ wetlands and fishery co-management project**


Works in Champasak, Stung Treng & Kratie. This focuses on setting up FCZs in Laos and Community Fisheries (CFIs) in Cambodia, dolphin conservation, environmental awareness, livelihood support and importantly fishery/wetland management plans for the 3 key areas of Siphandone, the Stung Treng Ramsar site and the Mekong Flooded Forest.



25

Reflections on work with WWF


- We do have the chance to follow through; BMZ is a 4 year project, HSBC is 5
- Have a very recognisable name and a world-wide profile which helps fund raising
- Of course there are limits to what an INGO can achieve
- Fishery co-management is not really about managing the fish, it is about managing the people, both fishers and their communities and the government agencies that support them



26


## THE CHALLENGES IN INLAND FISHERIES IN THE MEKONG DELTA

By Ms. Nguyen Thi Dieu Thuy  
 Fisheries Project Manager, WWF-Viet Nam




### Challenges in inland fisheries IN MEKONG DELTA and WWF'S WORKS

Nguyen Thi Dieu Thuy, WWF-Vietnam  
 Phnompenh, 12-14<sup>th</sup> November 2014




1




### Geography and Natural conditions of Mekong Delta

- Mekong Delta – low basin of Mekong River; 13 provinces, (5 inland provinces & 8 coastal provinces)
- Area: 4,055,400 ha, or 12,25% area of the whole country;
- Population in 2012: 17.39 million people (19.59% country's population)
- 2 season: dried and flood seasons
- Being active and high potential area for agriculture and fisheries development in all marine, brackish and fresh waters.



2



### Overview about fisheries and fisheries resources in Mekong Delta

- Mekong Delta is the most important area for food security and job creation in Vietnam.
- Fisheries production from the MD accounted for 71.41% aquaculture product and 40% wild capture product;
- Fish species: 322 species belong to 77 families;
- Fishes: 4 main groups: white, black, brackish and marine
- Inland capture fisheries largely depends on the hydrological regime;
- Full time fishermen and part time fishermen: e.g. in An Giang 67% population are fishers but only 7% are full time fishers
- Small scale, open access, spread everywhere in the Mekong Delta



3



### FISHERIES MANAGEMENT STATUS

- Attention focus on management of the marine fisheries rather than inland fisheries
- Inland fisheries follow the season, mainly part time fishers and fishing gears are: trawl, gillnet, Chinese trap, pushnet...
- Management resources are limited
- All provinces have developed the program Fisheries resources protection and development to 2020, but most of them don't have fund to implement.
- Few success co-management or community based management models.



4




### ISSUES and CHALLENGES

- Illegal, destructive fishing activities are still common
- Destructive fishing gears are trawl, small mesh size net, stow net, Chinese trap,....
- Fisheries resources are seriously depleted
- Lack of resources for fisheries management
- Fishermen are poor, low education
- Rare additional or alternative livelihoods, lives depend on fisheries resources;
- Labor force for fisheries is not stable;
- Open access (especially inland fisheries)
- Attention of the fisheries management bodies is not up to requirements
- Overlap policies




5



### ISSUES and CHALLENGES(cont.)

- Agriculture activities create loss of the natural habitats and reduce the quality of the habitats.
- Many important aquatic areas have been changed the use to agriculture
- Population growth and urbanization create negative impacts on fisheries and fisheries resources
- Building of dam/dykes create negative impacts to fisheries resources (prevent fish migration routes)




6



**Impact of Climate change and hydroelectric dams**

- Largely impact to fisheries, fisheries resources and fisher livelihood;
- The communities not yet fully aware of CC problem; not really interested in the CC response measures;
- Communities aware qualitatively of the impact to the flood season, flood quality, flood intensity, aquatic species (like *Cirrhinus sp.*), fish migration ability ;
- Building of the hydroelectric power dams created changes to hydrological regime, reduce the flood areas in the flood season, increase the salinity intrusion in the dry season
- Lack of freshwater and reduce sediment in the flood season, affect to the inland fisheries and resources
- Erosion



7

**DEVELOP FISHERIES PROTECTED/CONSERVATION ZONES**



8

**Areas identified as fisheries protected areas in Mekong Delta**


- Decision no. 1479/QĐ-TTg 13/10/2008: Planning for the protected inland water areas to 2020; identified 7 areas of which 5 areas are at national scale, 2 at provincial scale. Only 1 has been included in a National park.
- Decision no. 45/QĐ-TTg 8/ 01/2014: Master plan for biodiversity conservation of Vietnam to 2020 vision to 2030;
  - Include 14 areas relating to fisheries in Mekong Delta (among 34 areas of the whole country);
  - Up to date there are only 4 areas in this list have been established (1 is MPA)



9

**ISSUES**

- Overlap in management function prevents the establishment of the Fisheries protected areas
- Empowerment the local community with rights and responsibilities to protect resources is still impossible in many provinces
- Success in establishment of the fisheries protected area depends on the flexibility of local authorities in applying the policies/regulations



10

**WWF-Vietnam's efforts**

- Support to develop Tram Chim Ramsar sites, and expected 1 more (Lang Sen and U Minh)
- Support Ben Tre and An Giang provinces in preparing for fisheries protected areas
- Identify the issues which hinders the establishment of fisheries protected areas and from that identified solutions



11

**WWF-Vietnam working direction 2016-2020**

- Work with provinces to develop the fisheries community based management models
- Integrate the sustainable use and conservation of fisheries resources in the exist wetland PAs or National Parks
- Support the development of Fisheries Conservation zones at provincial scale.



12

# THE CHALLENGES OF VALUATING FISHERIES IN THE LOWER MEKONG BASIN

By Mr. Peter Degen  
International Technical Advisor, MRC Fisheries Programme

Cambodia • Lao PDR • Thailand • Viet Nam  
For sustainable development

Expert Meeting on  
Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands:  
15 Years Lessons Learnt

Fisheries Programme

## Challenges of Fisheries Valuations in the Lower Mekong Basin

Phnom Penh, Cambodia  
12-14 November 2014

www.mrcmekong.org

1

Outline

- Fisheries characteristics of Lower Mekong Basin
- Valuation Framework
- Methods and tools for Data Generation
- Results & Lessons Learnt
  - Fish yield (catch)
  - Value of fish
  - Fish consumption
  - Livelihoods
- Lessons Learnt

www.mrcmekong.org

2

### Fisheries characteristics of LMB

- Very high fish diversity, habitat diversity.
- High number of types of fishing gears and methods.
- Mainly subsistence fishing, small scale or medium scale - important part of rural peasant economy.
- Highly seasonal – during peak events intensive participation of large parts of population.
- Large part of fish catch is consumed at household level without entering market chains.
- Socially very complex - However, fishers have weak level of organization and political representation.
- Fisheries estimates use different approaches and assumptions.

www.mrcmekong.org

3

### Purpose of Fisheries Valuation

- Is part of establishing fisheries contribution to GDP
- Informs about importance of habitats and needs for management and protection
- Explains the different ways people are involved and depend on fisheries resources in terms of
  - Gender-specific participation,
  - Income,
  - Food & nutrition,
  - Livelihoods
- Helps to explore & understand potential impacts from water development on fisheries and its consequences for fishers.
- Contributes to better decision-making processes on water development.

www.mrcmekong.org

4

(Natural Resources)

### Valuation Framework

Total Economic Value			
Use Value			Non Use Value
Direct Value	Indirect Value	Option Value	
1. Production (catch/yield) 2. Marketing 3. Consumption ✓ Fishing ✓ Farming ✓ Livelihoods ✓ Recreation	Ecosystem functions and services • Water flow; • Nutrient cycling; • Natural fish nurseries; • Spawning; • Flood control;	Premium placed on possible future uses or application • Closed season • Sanctuary • Protected areas	Intrinsic significance of resources and ecosystems • Existence value • Bequest value • Culture value • Heritage value

www.mrcmekong.org

5

### Methods & Tools for Data Generation

- Fisher catch Monitoring (Abundance & Diversity)
- Monitoring of drift of larvae and juveniles
- Monitoring of *Dai* and *Lee* fisheries
- Fish migration and Spawning studies
- Household surveys (Cambodia, Luang Prabang, Songkram, An Giang)
- SIMVA surveys (Mekong corridor & floodplain areas)
- Yield per habitat monitoring (Delta, LMB)

www.mrcmekong.org

6



### Results – Fish Yield (catch)

- Any economic fisheries valuation will start with assessing the actual catch.
- Official catch statistics are often based on reports with little explanation on methods – statistics are often unreliable.
- Different studies use different methods, or methods are not well explained.
- Catch monitoring activities usually serve for establishing status and trends over time – not for extrapolating basin-wide yield.   
.....Unless adequate complementary frame surveys are conducted

www.mrcmekong.org

7

### Results – Fish Yield (catch)

**Example: First Fisheries Review LMB -1991-1992**

- Official statistics: 357,000 tonnes
  - 8% from aquaculture
- However, question raised – as much more fish was consumed:
  - Fish consumption in north-east Thailand alone – 322,000 t (Prapertchop, 1989) – 5-6 times > official statistics 59,000 t.

www.mrcmekong.org

8

### Results – Fish Yield (catch)

**Example:** Lymer, D., Funge-Smith, S., Khemakorn, P., Naruepon, S. & Ubolratana, S. (2008).   
A review and synthesis of capture fisheries data in Thailand – Large versus small-scale fisheries.

**Inland fisheries**

- Under-estimated by 500%
  - 200 000 tonnes (official production estimate)
  - 1 100 000 tonnes (Agricultural Census data)
- 3 million people engaged
- 40% of total value of fish produced
- ~ 48% of domestic FOOD fish supply in Thailand
- livelihoods, income
- food and nutritional security

www.mrcmekong.org

9

### Results – Fish Yield (catch)

**Example: National statistics on Inland fisheries production in Cambodia (1940-1997)**

Sources: Chevey and Le Poulin, 1940; Bardach, 1959; Nao, 1997; DoF, 2000

www.mrcmekong.org

10

### Results – Fish Yield (catch)

**Example National statistics on Inland fisheries production in Cambodia (1940-2012)**

Sources: Chevey and Le Poulin, 1940; Bardach, 1959; Nao, 1997; DoF, 2000; FIA 2013.

www.mrcmekong.org

11

### Results – Fish Yield (catch)

**1,000,000 Tonnes of Fish from the Mekong?**

(Jorgen Jensen, 1996. Catch & Culture Vol.2, No.1)

www.mrcmekong.org

12

### Results – Fish Yield (catch)

**Estimated inland capture fisheries production in the Mekong Basin in 2000, Catch Values in Tonnes**

Country	Annual catch based on scientific assessments (van Zalinge et al. 2000)	Annual catch according to official country statistics (FAO data)
Cambodia	289 000 – 431 000	245 600
Lao PDR	27 000	29 250
Thailand	303 000	209 404
Vietnam	190 000	161 000
<b>Total</b>	<b>809 000 – 951 000</b>	<b>645 254</b>

www.mrcmekong.org

13

### Results – Fish Yield (catch)

**Different estimates of LMB fish production from river capture fisheries**

Country	1999 (Van Zalinge and Thuok 1999)	2002 (Barlow 2002)	2004 (Van Zalinge et al. 2004)
Cambodia	290 000 - 430 000	508 000	682 150
Lao PDR	27 000	133 000	182 700
Thailand	303 000	795 000	932 300
Vietnam	190 000	597 000	844 850
<b>Total LMB</b>	<b>810 000 - 950 000</b>	<b>2 050 000</b>	<b>2 642 000</b>

www.mrcmekong.org

14



### Lessons Learnt – Fish Yield (catch)

- There is potential to improve the quality of catch monitoring data – closer coaching, follow up, support
- Conduct complementary village profiles (gears, fishing grounds, gender participation, seasonality, etc.) and targeted focus group discussions that allow for better interpretation and extrapolation of data
- Try to build partnerships with local fisher organizations engaging them in data collection as part of their own fisheries management planning (see “Closing the Co-Management Circle”)

www.mrcmekong.org

15

### Results – Value

#### Fish Production and Market Value in the LMB (Barlow 2002)

Fish and aquatic product source	Quantity (tonnes)	Price (US\$ per kg)	Value (US\$ millions)
Riverine capture fisheries	1 533 000	0.68	1 042
Aquaculture	260 000	1.05	273
Reservoirs	240 000	0.68	163

www.mrcmekong.org

16

### Results – Economic Value


- Van Zalinge et al. 2004, citing Jensen (1996), Sjørsvlev (2001), Sverdrup-Jensen (2002) and Hurtle and Bush (2003), valued the total inland Mekong fish production at more than **US\$ 1,700 million**,
- MRC 2005 valued it at about **US\$ 2,000 million**.
  - Riverine capture fisheries > 2/3
  - Aquaculture ~ 1/4
  - Reservoir fish production ~ 10%.

www.mrcmekong.org

17

### Results – Economic Value

- Total first-sale value: up to **US\$7.0 billion** per year.
- Most fish catches are consumed directly by households, as part of rural subsistence economy, which does not appear in national accounts.
- Inland fisheries make significant contributions to the monetized economies of riparian countries.
- Fisheries account for nearly **12%** of Cambodia's GDP, and fisheries value in Lao PDR is equivalent to **7%** of the country's GDP.



www.mrcmekong.org

18

### Lessons Learnt – Value

- Monitor local markets can be undertaken at relatively low cost – provided there is high commitment
- Promote inclusion of more detailed fisheries parameters into the Consumer Price Index (CPI) – at respective statistics office (Planning, Agriculture?)
- Conduct value chain studies for key fish species and products

www.mrcmekong.org

19

### Results – Fish Consumption

Estimated annual consumption (kg/capita) of freshwater fish products, including OAA & yield (t/as FWAE) in LMB by country based on 20 surveys (Hurtle 2007)

		Cambodia	Lao PDR	Thailand	Viet Nam	TOTAL
Per Capita Fish Consumption	Inland fish	32.3	24.5	24.9	34.5	29.3
	OAA	4.5	4.1	4.2	4.5	4.3
	Total	36.8	28.6	29.1	39.0	33.7
Yield of Inland fish & OAA	Inland fish	481,537	167,922	720,501	692,118	2,062,077
	OAA	105,467	40,581	190,984	160,705	497,737
	Total	587,004	208,503	911,485	852,823	2,559,815


www.mrcmekong.org

20

### Results – Fish Consumption

#### Contribution to nutrition

- In Average, > **50%** of the total animal protein intake of the people in LMB come from fish,
- While the world protein intake from fish is **16%**.



www.mrcmekong.org

21

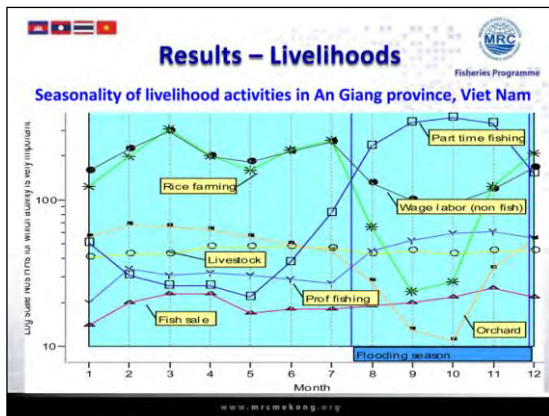
### Lessons Learnt – Fish Consumption

- Fish consumption survey is probably one of the best tools for valuating the size and structure of a fishery and its contribution to food security and nutrition of different segments of the population.
- Fish consumption surveys are costly and can be undertaken only in certain periodical intervals.
- Make attempts to include fish consumption questions into health, nutrition and food consumption surveys of other relevant organizations.

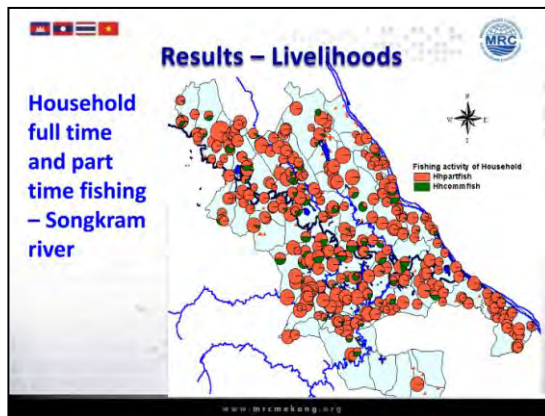
www.mrcmekong.org

22





23



24

### Lessons Learnt – Livelihoods

- The importance of fisheries for livelihoods of mainly rural population can be very complex.
- Measuring livelihoods assets is location specific and results are difficult to generalize
  - the use of variety of complementary data generation tools and their adaptation to local situations is key
- Good understanding of local culture is necessary – this takes time

www.mrcmekong.org

25

### Lessons Learnt – Livelihoods

- Livelihoods assessments in the context of fisheries management should be participatory and process oriented -promoting co-management partnerships
- “Closing the Circle of Fisheries Co-Management”
  - ✓ Support institutional building of fishers and develop partnership relations with their organizations
  - ✓ Define ways of generating and sharing of relevant fisheries management information for mutual benefits

www.mrcmekong.org

26

### Lessons Learnt – Livelihoods

- “Closing the Circle of Fisheries Co-Management”
  - ✓ Promote reciprocal partnership relations (not extractive data collection) based on mutual trust
  - ✓ Provide feed back on results of studies and how they support sector planning and decision making ..... and ultimately local fisheries

www.mrcmekong.org

27

### Lessons Learnt – General

- There is scope to improve the quality of fisheries monitoring data –commitment, funding
- Include fisheries questions into routine and non-routine censuses, surveys and baseline assessments of national statistics bureaus and other organizations (WB, ADB, ...)
- Current figures are adequate for estimating fisheries value in broad terms, though the methodology seems weak and includes assumptions.

www.mrcmekong.org

28

### Lessons Learnt – General

- More rigorous studies would be more expensive and take time, the new answers may likely confirm the current insights, though with increased certainty.
- Given the fast-paced and increasing development pressures focus should be on socio-economic information that support better understanding of both positive & negative potential impacts, from water development.
- Develop Mekong fisheries data generation and sharing platform integrating national and regional fisheries research stakeholders.

www.mrcmekong.org

29



## ASSESSING THE ECONOMIC AND WELFARE VALUES OF FISH IN THE LOWER MEKONG BASIN

By Ms. Hap Navy  
Deputy Director of Inland Fisheries Research and Development,  
Fisheries Administration of Cambodia

**ASSESSING ECONOMIC AND WELFARE VALUES  
OF FISH IN THE LOWER MEKONG BASIN**

**Market Study**

The Expert Meeting on Mekong Cooperation on  
Fisheries, Aquatic Resources and Wetlands: 15 Years  
Lesson Learnt  
12-14 November 2014

**Hap Navy**  
Deputy Director of Inland Fisheries  
Research and Development Institute  
(IFReDI)/FIA

1

### OUTLINE

- ✓ Issues
- ✓ Research need
- ✓ The welfare approach
- ✓ The valuation project
  - Objectives
  - Components
  - Geographical scope
- ✓ Market Component Study
  - Introduction
  - Methodology
  - Scope of the study
  - Data collection and analysis
  - Results: at fishers, traders and exporters level
  - Conclusion

2

### ISSUES

- Freshwater capture fisheries in the Lower Mekong Basin provide 47 to 80% of the animal protein consumed, as well as livelihood opportunities on a large scale.
- In absence of a solid estimate of the total economic value of these fisheries, their importance remains very poorly recognized by institutions and in development plans, which hampers rural development.
- The respective role of fish and agricultural resources in livelihoods and in rural welfare has never been quantified.
- Cambodia provides a unique opportunity to see research in valuation linked to policy development.

3

### THERE IS A RESEARCH NEED IN TERMS OF:

- ✓ **assessing the *relative* contribution of fisheries to welfare:**
  - role of fish in household income
  - role of other sources of income (agriculture and others)
  - contribution of fish to food security
  - contribution of fish to resilience
  - seasonal variability of these relative contributions

4

### THE WELFARE APPROACH

**Welfare:** *the state of doing well esp. in respect to well-being and prosperity*  
welfare = prosperity = well-being = life satisfaction

Indicators include:  
**wealth, nutrition, labor, health and resilience.**  
These indicators are quantified during surveys and their relative importance to household welfare is investigated.

**Welfare analysis** uses, at the household level, microeconomic techniques to convert goods and services into monetary value and subsequently evaluate relative income distribution, food security and well-being

5

### ECONOMICS VALUE APPROACH

**Markets and Biology Components**

$$\text{VALUE} = \text{PRICE} \times \text{PRODUCTION}$$

↓  
 Need a market  
price study

↓  
 Need a biological study

Price by species, by zone, by season,  
by quality -> **average price of a tonne  
of fish**

Production by zone  
-> **average capture fish production**

6

## OBJECTIVE

**The objectives of this project are to:**

- Assess the economic value of capture fisheries in Cambodia;
- Assess the welfare value of fish for rural populations in Cambodia and identify strategies that maximize this value;
- Establish a coordinated monitoring of fish resources through a network of universities;
- Inform a large range of stakeholders about the actual role of fisheries in national economy and livelihoods.

7

## COMPONENTS

### 1. Welfare Component

Answer, after four years (including 2 annual cycles of field surveys), the following questions:

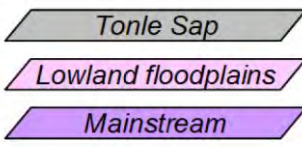
- What is the economic value of capture fisheries in Cambodia?
- What is the relative contribution of fisheries to welfare in diversified farming systems?
- How does fish support the welfare of poor and vulnerable social groups?
- How can the welfare and livelihood value of fish be increased?




8

### 2. Market Component

Assess, after 2 years, the price of fish (dominant species) in different agroecosystems in different seasons

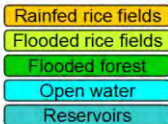





9


### 3. Biology Component

Use existing information and fill gaps in order to produce after 4 years an assessment of the fish production of **different habitats** of the main agroecosystems;








*Aquaculture*  
Update the production of the aquaculture sector



10

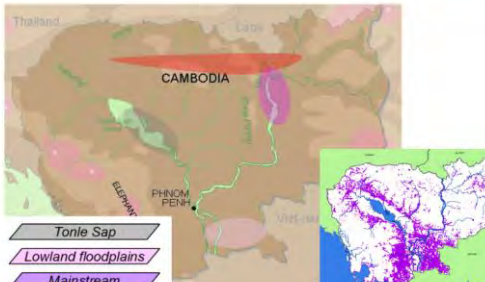
### 4. University Component

Develop a sustainable and low-cost network for the monitoring of fish resources, through coordinated annual BSc, MSc and PhD training programs focussed on fisheries

11

## Geographical scope



12

## MARKET COMPONENT STUDY

### Introduction

- Market component is one of the four components in the valuation project.
- It aims to collect new information about the monetary value of inland fish resources along the market chain. With other components, this information will provide information to estimate the total market value of inland fisheries in representative agro-ecological zones of Cambodia.

13

## Methodology

### Study areas

The study was done in three agro-ecological zones:

- Upper Mekong (Stung Treng and Kratie provinces),
- Tonle Sap (Pursat and Siem Reap provinces), and
- Lowland floodplains (Takeo and Svay Rieng provinces) and also in Phnom Penh city

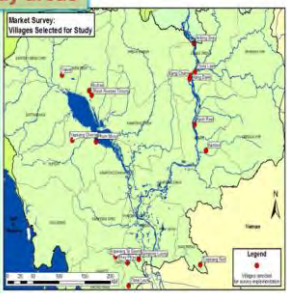


Figure 1: Map of Cambodia showing selected villages study areas in the 6 provinces.

14



### Scope of the study

Data collection: it was done once every 3 months, during 2012-2013. Fishing villages (with low, medium, and high fishing population), landing sites, markets, and border points were targeted.

### Data collection

Data were collected through individual interviews using 3 types of questionnaires with stakeholders (Fishers, Traders, Exporters)

### Number of sample

Stakeholders	No. of samples by zone				Total
	Mekong Main stream	Tonie Sap flood-plains	Lowland Flood-plains	Phnom Penh	
Fishers	408	409	408	0	1,225
Traders	66	66	64	45	241
Exporters	16	18	12	4	50
<b>Total</b>	<b>490</b>	<b>493</b>	<b>484</b>	<b>49</b>	<b>1,516</b>

15

### Data analysis

Primary data was stored in Access software program and analyzed using Excel and Access for price of fish by species, grade, month, zones and by stakeholder along the fish market chain.

Figure 2: Database structure for relationship in Access software program for fishers.

16

### Fish market at fisher level

Fishers sell fish to traders without grading system. Overall, the average price of fish was highest in Zone 1 (Mekong Mainstream).

Fig. 1: Average seasonal price of dominant fish species sold by fishers in Mekong mainstream.

Fig. 2: Average seasonal price of dominant fish species sold by fishers in Tonle Sap Floodplain.

17

### FISH MARKET AT FISHER LEVEL (Cont.)

Fig. 3: Average seasonal price of dominant fish species sold by fishers in Lowland Floodplain.

Fig. 4: Average seasonal price of dominant fish species sold by fishers in the three zones.

18

### FISH MARKET AT EXPORTER LEVEL

- Exporters traded fish by grading system, consisting of 3 grades defined based on species, size and quality.
- Only 2 species of fish were found commonly traded by exporters in the 2 zones – Mekong Mainstream and Lowland Floodplain.

Fig. 2: Average seasonal price of dominant fish species sold by exporters in the two zones.

19

### CONCLUSION

- Trade of fish by fishers to traders or exporters was done without grading system, while quality grades are used by traders and exporters.
- Fisher and traders in Zone 1 (Mekong Mainstream) could obtained the highest price of fish, especially during Period 4 (June – August).
- Exporters in Lowland floodplain could received the highest price of fish.

THANK YOU FOR YOUR ATTENTION!

20



## THE FISH ABUNDANCE AND DIVERSITY MONITORING IN THE MEKONG OF LAO PDR

*By Dr. Sinthavong Viravong  
Deputy Director of the Living Aquatic Resources Research Center, Lao PDR*

**FISH ABUNDANCE AND DIVERSITY IN LAO PDR**

By: **Sinthavong Viravong**  
Living Aquatic Resources Research Center

1

### Outlines

- Introduction
- Objectives
- Methodology
- Results
- Summary

2

### Introduction

- Lao PDR is a mountainous, landlocked country located in the heart of Southeast Asia.
- Total area: 236,800 km<sup>2</sup>;
- 87.7% of which the area laying in the LMB
- Discharged Contribution 35% to the LMB
- Total area of water resources for capture fisheries is more than 1.24 million ha
- Nearly 500 fish species found in the Lao PDR water bodies.

3

### Introduction

- Capture fisheries remained the important activity in supplying the most reliable sources of animal protein to rural people. And about 70% of total fish consumption was brought from capture fisheries.
- Current information for fisheries management planning have remained limitation and need to accelerate the investigation.
- Investigating activity implementation here by the regional countries, coordination with the Mekong River Commission

4

### Objectives

- To improve understanding the trend of the riverine fish abundance and species diversity in the Mekong, part of Lao PDR.
- Understanding the variation in the catch of fish in relation to the seasonal river hydrology.

5

### Methodology

- Study site: The study was carried out in four provinces (Luangprabang, Vientiane Capital, Bolikhamxay and Champassak Provinces.) with the total number of 5 selected locations/sites (before the year 2014)
- Using/selecting the total of 15 fishers to join this monitoring programme.

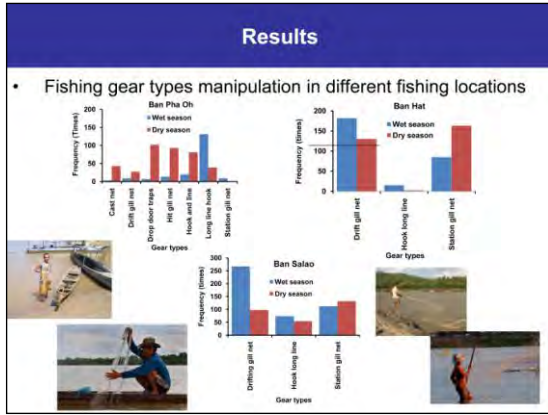
6

### Results

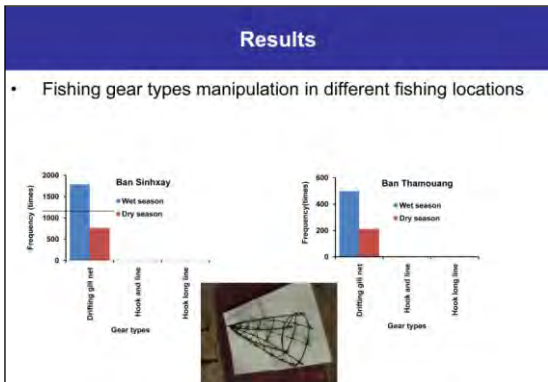
- Information on the catch in the Mekong at different locations by different time of period of the year 2010-2011 (2012):

	Fish species	Yearly Catch (kg)	Number of fish occurrence	Number of gears types used	CPUE (kg/fisher/hour)
Luangprabang	76(62)	2,828(2,544)	3,135(1,989)	7(7)	0.17(0.12)
Vientiane capital	49(27)	5,109 (1,116)	3,039(1,003)	1(1)	0.61(0.87)
Borikhamxay	60(57)	7,122(2,871)	9,010(3,575)	1(1)	1.23(0.9)
Champassak (Hatsalao village)	97(91)	4,347(1,359)	1,881(1,504)	3(3)	0.75(1.17)
Champassak (Had village)	95(100)	2,259(1,936)	2,979(2,740)	3(3)	0.35(0.62)

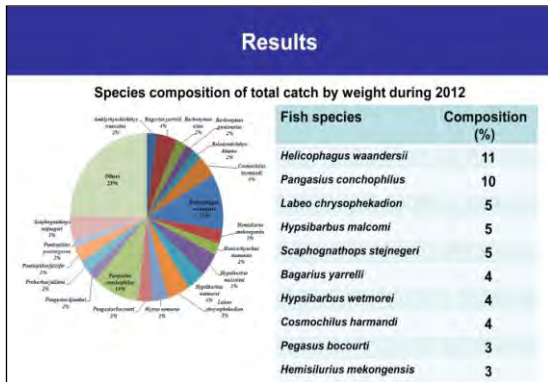
7



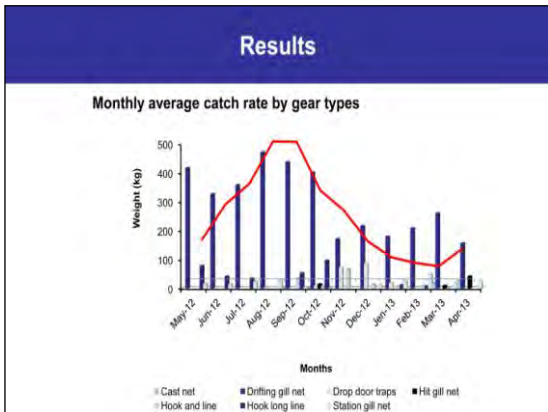
8



9



10



11

### Summary

- Four provinces and five locations were selected to monitor abundance and diversity of fish in the Mekong part of Lao PDR as representatives.
- Fishing in the Mekong river in the country rely mainly on the fish migration.
- The use of fishing gear types found difference in different part of the Mekong in the country.
- Number of fish species appearance in the catch varied year by year.
- Seasonal hydrology of the Mekong was the key factor triggered the river fishes to migrate.
- Long term fish catch monitoring on abundance and diversity can provide key information for the future planning of fisheries management in the river.


12





## THE POPULATION ASSESSMENT AND ITS APPLICATION ON THE DEVELOPMENT OF CONSERVATION STRATEGIES OF THE MEKONG GIANT CATFISH

By Dr. Naruepon Sukumasavin  
 Director, Planing Division, Mekong River Commission

**POPULATION ASSESSMENT AND RECOVERY PLANNING FOR THE CRITICALLY ENDANGERED MEKONG GIANT CATFISH, *Pangasianodon gigas***



Kai Lorenzen,  
 School of Forest Resources and Conservation, University of Florida  
**Naruepon Sukumasavin,**  
 Planning Division, MRC Secretariat  
 Zeb Hogan,  
 Center for Limnology, University of Wisconsin-Madison

1

**Mekong giant catfish**  
*Pangasianodon gigas*




- One of the world's largest freshwater fish (3 m, 250 kg), matures at about 20 years of age
- Long-distance migrant endemic to Mekong basin
- Herbivore/omnivore
- Highly revered 'flagship' species
- 'Critically endangered' on IUCN red list since 2003 (basis: > 90% decline in catch rates over 13 years)
- Cause of decline unknown, overfishing is suspected



2

The Lower Mekong Basin  
 Showing the Mainstream, Major Tributaries, Large Reservoirs and Flood Areas.




**Giant catfish distribution and catches**

Regular catches in:

- Chiang Khong / Huaysay drift net fishery
- Tonle Sap bag net fishery

★ Catch of adult  
 ★ Catch of sub-adult



3

**Many conservation initiatives...**




- Captive breeding programme established 1980 (Thai Dept. of Fisheries)
- Regulation of targeted fishing (Fisheries Departments)
- Buy and release of fish caught in Cambodia (NGO)
- Net buy-back etc. (NGOs)
- Habitat conservation (NGOs, Governments, Mekong River Commission)




4

**... but no coherent strategy**

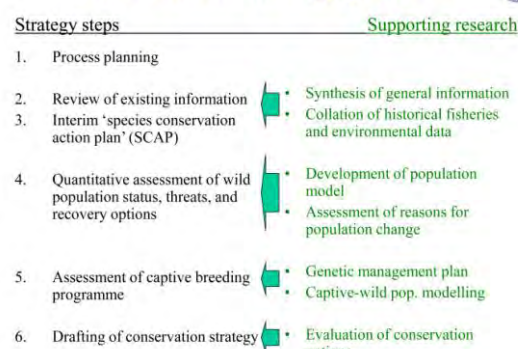


1. Status of population and importance/ effectiveness of conservation measures unknown
2. Many measures are controversial, e.g.:
  - Can traditional fishing be allowed to maintain public interest, or does it deplete the population?
  - Should the remaining wild spawners be left to spawn naturally, or brought into the captive breeding programme?
  - Should captive-bred fish be released to restore the wild population?




5

**Conservation strategy process**



Strategy steps	Supporting research
1. Process planning	
2. Review of existing information	<ul style="list-style-type: none"> <li>• Synthesis of general information</li> <li>• Collation of historical fisheries and environmental data</li> </ul>
3. Interim 'species conservation action plan' (SCAP)	
4. Quantitative assessment of wild population status, threats, and recovery options	
5. Assessment of captive breeding programme	<ul style="list-style-type: none"> <li>• Development of population model</li> <li>• Assessment of reasons for population change</li> </ul>
6. Drafting of conservation strategy	
	<ul style="list-style-type: none"> <li>• Genetic management plan</li> <li>• Captive-wild pop. modelling</li> </ul>
	<ul style="list-style-type: none"> <li>• Evaluation of conservation options</li> </ul>



6



### Sources of fisheries and environmental data



Historical publications






Breeding programme records



Fisher records and interviews

7

### Environmental change in the Mekong






- Hydrology.** Not yet strongly modified, no changes detected since 1960 despite dams constructed in 1990s. Greater modification likely in near future.
- Connectivity.** Increasingly reduced by dams, but only since mid-1990s
- In-river habitat.** Relatively unchanged for a long time, but recent rapids blasting etc. for navigational improvements.
- Catchment land use.** Gradual increase in agricultural land use over past 50 years.


-> Significant change only very recently, environmental change unlikely to account for observed population change.

8

### Giant catfish fisheries



Targeted fishery for mature fish on spawning migration. Traditional, linked to festival. Historically average catch of 4-10 fish per location. Brief 'boom' in 1980s/90s.



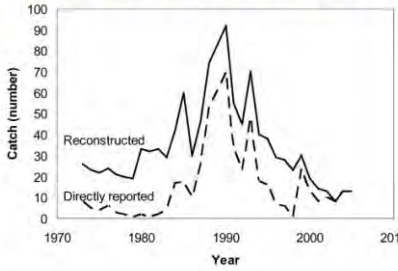
Regular incidental catches in Tonle Sap river dai net. Traditional (> 100 years), stable.

Occasional incidental catches elsewhere

-> Significant changes in fishing, likely to have impacted on the population

9

### Catch history (basin-wide)



- Historical catches likely to have averaged at 20-30 fish/year
- Massive increase in total catches during Chiang Khong / Huaysay fishing 'boom' 1983-1995 - ended when population was depleted

10

### The Chiang Khong / Huaysay fishing 'boom'

Traditional, ceremonial fishery targeting mature giant catfish on spawning migration

From 1982: live fish bought by Thai Dept. of Fisheries and induced to spawn

Media coverage attracts tourists to watch and eat catfish





Fish died after handling, sold for meat



Fishing effort explodes

11

### Population modeling to assess status and recovery options

- Length-structured matrix model with von Bertalanffy growth & Beverton-Holt stock-recruitment
- Most parameters estimated from direct measurement or comparative studies/meta-analysis
- Most uncertain:
  - level of compensatory density-dependence in stock-recruitment relationship
  - natural mortality rate.
- Model was run for
  - compensation ratio<sup>(\*)</sup> K= 5 (average from meta-analysis) and extreme values of K=100 and K=2
  - natural mortality M=0.06 and M=0.12.
- Carrying capacity and fishing mortality rate were estimated by fitting model to fisheries data (stock reduction analysis)

<sup>(\*)</sup> K= juvenile survival at very low population abundance relative to survival at carrying capacity

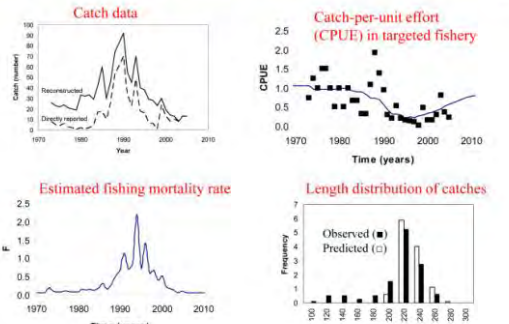
12

### Model Assumptions

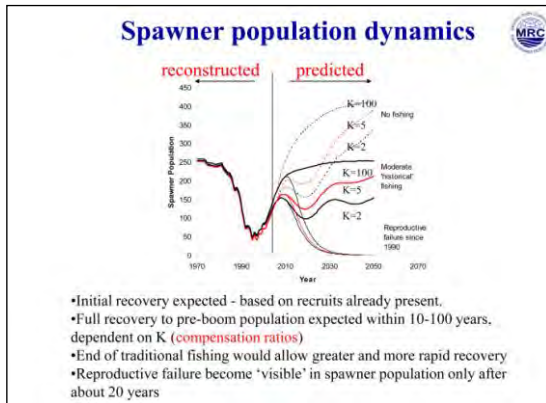
- MGC in the Mekong basin form a single population (all catches have been taken from the same population)
- The full population is vulnerable to fishing (there are no un-fished and thus, unobserved local populations)
- Reporting of MGC catches is near-complete and not size-biased (There is no unreported harvest of small MGC)

13

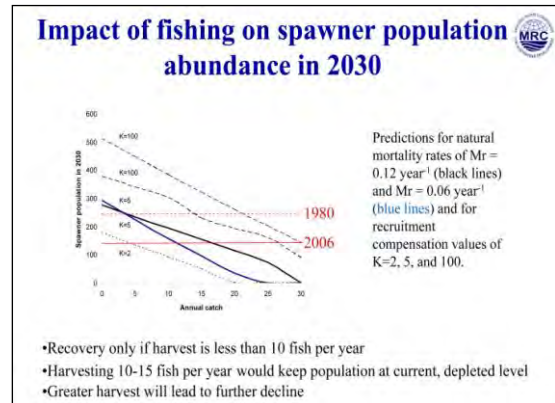
### Conditioning model on fisheries data



14



15



16

### Population status and impact of fishing

- The giant catfish is naturally rare, with an unexploited population of 355-2200 mature fish. (Conclusion supported by estimates of genetically effective population size).
- Population declined to 2-14% of unexploited abundance between 1982 and 1995, but is likely to have recovered to 7-40% by 2007.
- Chiang Khong/Huaysay fishing 'boom' was primary reason for decline. This problem has been addressed.
- A low level of traditional fishing is sustainable and provides certain benefits (maintaining public interest, monitoring) BUT the population would recover more quickly without it. Harvest should be less than 10 fish basinwide.

17

### Habitat modification: the big new threat

- Giant catfish likely to rely on a variety of habitats and basin-wide connectivity, but specific requirements unknown.
- Only the spawning area in Northern Thailand/Laos is clearly identifiable as essential habitat.
- Impacts of degradation in spawning or juvenile habitat will become 'visible' in the population only after 20 years!
- Precautionary approach is indicated.

18

### Captive breeding programme

- 'Almost killed the catfish' - BUT provides insurance against species extinction in the face of large uncertainties over habitat degradation and its impacts
- Captive population: 20,000 fish, genetically diverse, mostly offspring of wild spawners -> no further broodstock capture required. Genetic management plan has been devised and implemented.
- Even moderate releases of captive-bred fish can lead to significant ecological and genetic interactions with the small wild population.

-> Significant releases only if wild population fails to recover.

19

### Summary of conservation strategy

**Fishing.** For the next two decades, catches should not exceed 10 mature fish per year in order to allow some population recovery.

**Habitat conservation.** Maintaining the overall Mekong ecosystem (flows, physical habitats and connectivity) is important to ensuring the long-term survival of the species in the wild. Given that habitat use is largely unknown, no essential habitat can be identified except for the spawning area.

**Captive breeding.** The captive population of MGC maintained by the Thai Department of Fisheries provides a vital 'insurance', safeguarding the survival of the species should it become extinct in the wild. The captive population should be managed carefully so as to conserve its genetic diversity. For the time being, captive-bred fish should not (or only in very low numbers) be released into the Mekong or its tributaries.

**Aquaculture.** Escapes of MGC grown in commercial aquaculture could pose a significant threat to the wild population. Measures should be taken to minimize the risk of such escapes occurring.

20

### Conclusions

- Quantitative population assessment has proved highly informative even in an (apparently) data-poor situation, and was central to resolving controversies.
- The outlook for wild Mekong giant catfish is moderately positive IF essential habitat can be conserved. Unfortunately, it will remain difficult to identify and protect essential habitat.

21





## THE LESSONS LEARNT FROM MRC FISHERIES CO-MANAGEMENT

By Dr. Malasri Khumsri

Fisheries Management and Governance Specialist, Mekong River Commission

Cambodia • Lao PDR • Thailand • Viet Nam  
For sustainable development

MRC  
Fisheries Programme

### Lessons Leant on Fisheries Co-management in the Lower Mekong Basin

Malasri Khumsri  
Fisheries Management and Governance Specialist,  
MRC-Fisheries Programme

Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetland: 15 years Lesson learnt  
12-14 November 2014  
Imperial Garden Villa and Hotel, Phnom Penh, Cambodia

www.mrcmekong.org

1

For sustainable development • Fisheries Programme

### MRC-FP-PIP 2011-15

- Review of lessons learnt on fisheries co-management in the LMB
- 4 national experts to review of lessons learnt in MCs
- Synthesis of the national review report as the regional
- Expectation: March 2015

www.mrcmekong.org

2

For sustainable development • Fisheries Programme

### Why CM is needed in the LMB?

- Many of the important commercial fish species of the Mekong Basin are migratory, i.e. fish will spend different stages of their life cycle at often distant locations;
- In other cases, infrastructure development may affect fisheries far up- or downstream;
- Fishery of the LMB therefore requires management interventions on **various levels**.
- In some cases this may be on **national level**. In cases where **migration routes cross national borders**, regional collaboration may be required;
- However, in most cases management is best addressed at the local level, involving fishers and local government staff;
- The LMB fishery is affected by and affects people on a variety of scales and levels, **makes management by multiple stakeholders an important condition for a sustainable fishery**

www.mrcmekong.org

3

For sustainable development • Fisheries Programme

### Why CM is needed in the LMB?

- LMB fishery is affected by and affects people on a variety of scales and levels, makes management by multiple stakeholders an important condition for a sustainable fishery.
- “**Fisheries co-management**” is perceived to provide some of these ingredients, that is, local knowledge and stakeholder involvement.
- Therefore, MCs have expressed interest in co-management and requested the MRC Fisheries Programme through its component “Management of River and reservoir Fisheries (MRRF), Fisheries Management and Governance (FMG) and FP-PIP 2011-15 (outcome 4)” to support the development and strengthening of this concept in a number of inland water bodies in the Region.
- It is expected that this will contribute to improvement, of productive inland capture fisheries in the LMB, by building awareness regarding resource use and conservation leading to better management decisions by fisheries communities and government

www.mrcmekong.org

4

For sustainable development • Fisheries Programme

### Importance elements in setting up co-management in the Lower Mekong Basin.

www.mrcmekong.org

5

For sustainable development • Fisheries Programme

### 1<sup>st</sup> element

- Co-management always involves government and organized resource user groups;
- It is broad involvement in the sense that government and resource users take part in the process of formulating, implementing, monitoring and evaluating reservoir management plans.
- Co-management is often confused with community management, where it is communities alone that manage the resource. In co-management it is **communities (resource users) and government who jointly manage**.

www.mrcmekong.org

6

For sustainable development • Fisheries Programme

## 2<sup>nd</sup> element

- Co-management under the MRC-FP has tried systematically to facilitate two way information/knowledge flow between government units/officers and resource users.
- This has occurred, among other occasions, during management plan formulation, during capacity strengthening workshops, or during reviews of management plans where management activities are monitored and evaluated.
- On all occasions a common pool of knowledge about the fisheries has been developed.

www.mrcmekong.org

7

For sustainable development • Fisheries Programme

## Co-management is defined by the Management of River and Reservoir Fisheries (MRRF-FP)

The MRRF working defining for co-management

- A formalised process of sharing responsibility by government and organised user-groups in decentralised decision making

www.mrcmekong.org

8

For sustainable development • Fisheries Programme

## Participatory Fisheries Management Arrangements in the LMB supported by FP-FMG

Country	Year	Counterpart Agency	Focus	User Organizations	Co-Managers
Lao PDR	1995-2008	DLP	Nam Ngum Reservoir	Village data collectors	NA (DLFLAR/RC)
	2000+	LARR/COLF	Irrigation reservoirs	RFMCs	RFMC/Commune Gov (LARR/COLF)
	2004+	LARR/C/PAFO	River fisheries, Khong	Village Groups/FCZs	Village Groups/PAFO (LARR/C/PAFO)
Vietnam	1991+	RIA 02	Irrigation reservoirs	Multiple Fisher Unions ~2001	User Organizations/Commune (RIA 02/SM7)
		RIA 02	Rice/krum farms	Previously established Clubs, cooperatives	UG/Commune (RIA 02/GaF)
		RIA 02	Deep Ponds	Newly established Club	UG/DF (RIA 02/GaF)
Thailand	1987-2000	IFRDC/DoF	Sarabum Reservoir	Village data collectors	NA
	2000+	IFRDC/DoF	Irrigation reservoirs	Community Groups	NA, attempts to collaborate with TADs, UG/TAO/DoF (GAF/FRDC)
	2004+	IFRDC/DoF	River fisheries, Songkhram	Community Groups, Village Committees, TADs	(VOTAC/DoF (GAF/FRDC))
Cambodia	2000+	FAFCDO	Irrigation reservoirs, Siem Reap	Community Fisheries (CFs)	CF/Commune Gov. (FAFCDO)
	2003-2009	FAFCDO	River fisheries, Tonle Sap, Upper Mekong	CFs	CF/Commune Gov. (FAFCDO)
	2005+	FAFCDO	Irrigation reservoirs, Siem Reap	CFs, CF Federations (CFF), CCF, PCFF	CF/Commune Gov. (FAFCDO), CCF/Commune Gov. (FAFCDO), CFF/Government (multiple levels)

www.mrcmekong.org

9

For sustainable development • Fisheries Programme

## Activities related CM-FP-PIP 2011-15

Activities	Implementation Duration
1. Promotion of Fisheries Co-management in the Lower Mun River (LMR), the tributaries of Mekong river basin, Thailand	2012-2013
2. Follow-up Support and Strengthening the Fisheries Co-management in Mekong River Basin of Thailand, Lum Sai Bai River, Amnatcharoen province, Thailand	2012-2013
3. Strengthening Local knowledge for identification of fish spawning grounds in Nam Kham and Songkhram River Basin, Sakon Nakhon and Nakhon Phanom provinces, Thailand	2013-2014
4. Strengthening Boeng Chonlen Community Fisheries by Facilitating Formulation and Implementing of Its Management Plan, Kandal Province of Cambodia	2013
5. Community Fisheries Strengthening through Implementing CFIAMP and Promoting Livelihood Activities in Takeo Province	2014

www.mrcmekong.org

10

For sustainable development • Fisheries Programme

## Examples of Fisheries Co-management: Lao PDR

- 'FCZs' in Champassak
  - Since 1993, 68 FCZs, cooperation NGO/PAFO; building on traditions existing in all of Lao PDR
- 'Community fisheries'
  - Since 1991, NGO/Donors/GoL cooperation; >40 waterbodies, 13 districts, 3 southern provinces
  - Small waterbodies collectively managed for 'community benefits' (cash; fish)
  - Management strategies
    - Frequently involves stocking - new!
    - Harvesting: group fishing; renting out; fishing day

www.mrcmekong.org

11

For sustainable development • Fisheries Programme

## Examples: Thailand

- Village Fish Pond project
  - Since 1982 - within Rural Poverty Alleviation Plan
  - Rehabilitation/establishment of ponds as food source, managed by Village Fishery Committee, technically and financially supported by DoF
  - Over 20 years, 2,773 new ponds; 2,812 water bodies stocked
- Fisheries co-management established and strengthened in the Mekong basin
  - Fisheries co-management in reservoirs (Huay Lung and Nam Oon), in Udonthani and Sakon Nakhon provinces
  - Fisheries co-management in rivers (Lum Sai bai, Song Khram and Mun River)

www.mrcmekong.org

12

For sustainable development • Fisheries Programme

## Examples: Viet Nam

- Since late 1980s, fisheries co-management policy (Main objective: sustainability)
- "From open-access to carefully managed and supervised people's fisheries"
- 1997 Evaluation co-management projects
- 1998/2003 Decree provides legal framework for peoples' participation at commune level
- Definition of "Co-management - the Vietnamese way" (MOFI WS 2001; VIFEP study group)

www.mrcmekong.org

13

For sustainable development • Fisheries Programme

## Examples: Cambodia

- Community fisheries (CFs) management
- Strengthen the CFs by facilitating formulation and implementing of its Management Plan

www.mrcmekong.org

14



For sustainable development • Fisheries Programs

**What has the development been?**

- From local management initiatives to larger scale implementation ('Up-Scaling') (all 4 countries)
- Attempts to develop and implement national 'models' (MCs)
- Integration with other sectors on (sub-) district/commune level (Thailand)
- The (sub-) district as 'the' locale for CM

www.mrcmekong.org

15

For sustainable development • Fisheries Programs

**MRC/FP: Interest in CM**

- National fisheries policies emphasizing 'co-management'/'community involvement'
  - Cambodia 2000; Lao PDR 1994; Thailand 1998; Vietnam (since late 1980s)
- Large gaps between policy and practice
  - Suitable mechanisms for implementing Government's policies on peoples' participation in NRM lacking
- Creating examples, guidelines, and experienced staff
  - Experience from fisheries co-management such as Nam Ngum, Cambodia
  - Reservoir fisheries CM → MRF (1995)

www.mrcmekong.org

16

**Lesson Learned about CM in the LMB**

1. Strong and motivated community's leader are the potent fore for collective arrangement and challenging local people involve in fisheries management
2. Capacity building is required for sustainable CM
3. Legitimate user rights and active collaboration between local people and government are important in promoting of CM;

17

**Lesson Learned about CM in the LMB**

4. Fisheries co-management does comes wherever and whenever resources management problems have emerged; collective arrangement has developed when a resources they dependent on experience management problems
5. No blueprint formula or model for fisheries co-management, to ensure success in fisheries co-management initiatives
6. Thus, think about the situation where CM will be used, and then adapt the CM process to the situation or community

18





# THE LESSONS LEARNT ON COMMUNITY FISHERIES MANAGEMENT IN CAMBODIA OVER THE PAST 15 YEARS OF EFFECTIVE MEKONG FISHERIES MANAGEMENT

By Ms. Kaing Khim  
Deputy Director General, Fisheries Administration of Cambodia



**Lesson learnt on Community Fisheries Management in Cambodia**

By Kaing Khim  
Deputy Director General of Fisheries Administration, Cambodia

To be Presented for the Expert Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 15 years lesson learnt

12-14 November 2014  
Phnom Penh, Cambodia

1

### Introduction

- The fisheries sector is a major contributor to poverty reduction, employment, food security, and national economic growth.
- Fisheries Governance Issues:
  - . Conflicts between small-scale and large-scale fishers;
  - . Population growth led to over fishing;
  - . Less income for small-scale fishers etc.
- To tackle the present needs and problems faced, the management of fisheries is required to develop and change over time according to the situation, demands and needs.

Therefore, the government decided to reform the fisheries policy:

- 1<sup>st</sup> reform in 2000 (abolished 56% of total fishing lots)
- 2<sup>nd</sup> reform in 2012: abolished all fishing lots and rights given to local users (both men and women) for small-scale fishing activities and to manage, protect and develop the natural fisheries resources sustainably through Community Fisheries (CFI) establishment.

As a result of the reforms, a total of 469 CFI in 2011 and expanded to 516 CFIs in 2012 have been established in the whole country for the tenure rights of small-scale fisheries governance.


Having seen the impacts of one decade reform, it raises the question of what are the lessons learnt of the Community Fisheries management and development in Cambodia so far?

Therefore, it was an assessment to explore the factors driven and lessons learnt of the Community Fisheries management through participatory approach in 2012.

2

### How the Assessment has been done?

- Participatory assessment through Focus Group Discussion and CFI members' interviews
- Purposive sample size selection: 60 CFIs selected (15 CFIs for Marine and 45 CFIs for Inland) from 469 CFIs (2011)
- Interviewed with 1,095 CFI members from 60 selected CFIs (15-20 members/CFI)
- Conducted 120 FGD (60 women groups and 60 men groups)
- 3 regional consultation workshops conducted for feedbacks on the preliminary results (Mekong, Tonle Sap and Marine region)
- A national consultation workshop conducted to finalize the results.

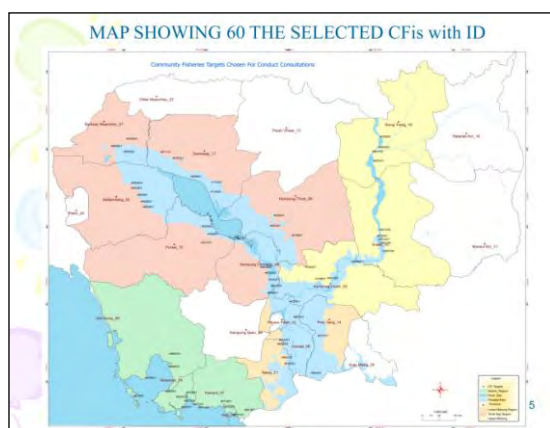


3

**Table 1: Percentages of Sample Sizes by Sex, Age and Region**

REGION	Sex (%)		Age (%)		TOTAL
	Male	Female	Below 30	Above 30	
Tonle Sap	54	46	30	70	100 (n:421)
Mekong	56	44	30	70	100 (n:411)
Marine	56	44	29	71	100 (n:263)
<b>TOTAL</b>	<b>55</b>	<b>45</b>	<b>30</b>	<b>70</b>	<b>(n:1,095)</b>
Total Members of 60 selected CFI	17,140	14,810	9,400	22,550	31,950

4



5


### What is a Community Fisheries?

All Cambodian citizens have the rights to form Community Fisheries in their own areas on a voluntary basis to take part in the sustainable management, conservation, development and use of fishery resources sustainably (*Article. 59 of Fishery Law*).

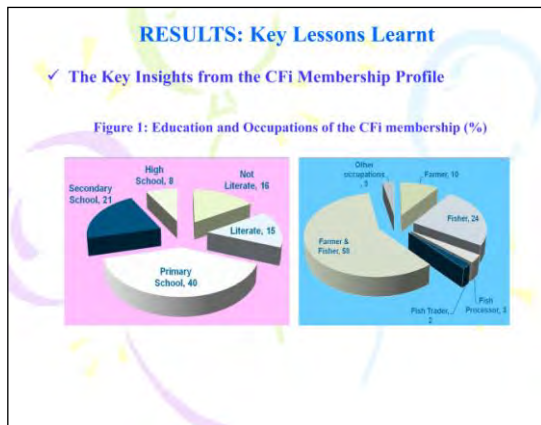
The Community Fisheries (CFI) is:

- A cooperative arrangement between the government and a group of local people of one or more villages voluntarily joint together establish the Community Fisheries.

CF is a kind of fisheries co-management approach.



6



7

### RESULTS: Key Lessons Learnt

✓ The Key Insights from the CFI Membership Profile

Figure 2: Asset ownership of the CFI membership

ASSET OWNERSHIP	OWN	DO NOT OWN	TOTAL
	% (n)	% (n)	% (n)
Farm Land	87 (960)	13 (135)	100 (1,095)
Land on which house stands	85 (924)	15 (157)	100 (1,081)
Fishing equipment	83 (860)	17 (181)	100 (1,041)

The average land holdings ranged from 0.77 of dry land to 2.30 hectares of rice farming. This feature points that to the strong agrarian moorings of the Community Fisheries membership. This might affected from the government land policy reform regarding the social land concession (land title for both men and women). However, it is still a problem of CFI floating villages, who did not have and own land => they don't want to move from living in floating villages as their skill preferences and traditional related with fishing livelihood activities.

8

### RESULTS: Key Lessons Learnt

✓ The Key Insights from the CFI Membership Profile

- The CFI members are composed of people having different education levels, mainly at the primary school (40% of the total respondent, figure 1). It is indicated that both non illiterate and literate people having equal right and no discrimination to be CFI members.
- The CFI members are composed of persons with multiple and diverse occupational activities. Fishing is the full time activity of only about quarter of the membership;
- The cash income from fishing of the CFI members is very modest;
- The importance of Community Fisheries as a people's organization its significant participation of men, women and youth is beyond doubt;
- The prime objective of the 2000 Fishery Reform was to ensure that the rural communities of Cambodia obtain access to fish for food and livelihoods. This objective has been substantially achieved (90% of FGD respondents), and was reflected in the deep reform in early 2012 by the government, abolished all fishing lots in the country. The "fishery success" must however be viewed against the overwhelming and the continued importance of agriculture for the members of the Community Fisheries.

9

### RESULTS: Key Lessons Learnt

(Factors Supporting and Influencing the Management and Empowerment of CFI)

- Legal framework**
  - Immediately after the reform in 2000, the government provided all related legal instruments for guidance the Community Fisheries establishment and management. Those legal instruments are the fishery law, the Royal decree for CFI establishment, sub-decree on CFI management (20% women of CFI committee), CFI guideline, gender mainstreaming policy and strategy in fisheries sector, which have been consulted with all key stakeholders at all levels. 95% of FGD expressed that the legal framework is the key factor that empowers the CFI and women.
  - The Strategic Planning Framework for Fisheries 2010-2019: Including Community Fisheries development and gender mainstreaming indicators.

10



11

### RESULTS: Key Lessons Learnt

- Freedom and Tenure Rights**
  - Free access and ownership of the fisheries natural resources in term of utilization and management. Under the first fishery reform, 56% of the total fishing lot areas were abolished in 2000; granting more freedom and rights to the public users, especially fishers and poor people; more accessibility to the fishing grounds and managing the fisheries resources sustainably via the CFI establishment with the structure of free election of each CFI committee (20% women) and people freely voluntary to be the member.
  - Moreover, one of the key features of the CFI is that it grants clear and unambiguous collective tenure rights to members managing the fishery resources in a clearly demarcated physical area with CFI fishing area agreement, which is part of the registration documents between the CFI and the Fisheries Administration.

12

### RESULTS: Key Lessons Learnt

- Freedom and Tenure Rights**
  - There is the crucial issue of freedom and tenure rights signaled three important achievements:
    - Firstly, the most important feature of CFI was that it has given people the freedom to relate to the natural resources (expressed by 98% of respondents);
    - Secondly, this freedom of access to resources has helped to reduce the level of poverty in the village (expressed by 95 percent of respondents); and
    - Thirdly, the CFI was a good example of sharing of responsibilities and ownership, as the co-management approach, and the lessons learnt can be shared with others in the world (expressed by 92% of respondents), especially for Mekong region.

13

### RESULTS: Key Lessons Learnt

- Government and Development Partners' Involvement**
  - Community Fisheries in Cambodia would not have existed without the active role of the government in creating and promoting it in the first step. 90% of FGD are in overwhelming agreement that Fisheries Administration (FiA) officers played a key role in providing technical support for setting up CFI organizations and coordinating the official registration of the CFI and implementing other CFI driven activities. Also, the key role of the local authorities was highlighted.
  - 96% of FGD indicated that the fishery officers should continue their strong interactions with the CFI – particularly with regard to conservation activities and apprehension of illegal fishers.

14



## RESULTS: Key Lessons Learnt

### • Government and Development Partners' Involvement

- Moreover, the non-governmental assistance, through the development partners (including NGOs), has been and continues to be important for CFI activities. They provide the important support to CFI and complementing and extending the government areas of assistance (78% of FGD). The most valuable assistances are the skills and capital inputs for improving CFI members' livelihood activities (especially enhancing gender roles, addressing with climate changes and disaster).

Therefore, the usefulness of the government and non-government involvement is both equally important and valuable. While the government is more responsible for legal and technical support, the non-government agency, as development partners, assist the development activities. Both play key roles in coordinating and supporting the implementation of CFI activities, building capacity and the confidence of the CFI committee and members, driving force CFI functioning which is the key led to the CFI empowerment.

15

## RESULTS: Key Lessons Learnt

### What is the opinion of the members about their one decade of CFI management?

1. There is overall increase in participation of men, women and youth of the fish related activities and conservation activities;
2. Overall fish related activity has increased, but members still consider agriculture to be their most important livelihood activity for non floating village CFIs;
3. 98% of total FGD expressed their greater concern, interest and taken actions in conservation;
4. Among those, 56% highlighted, with participatory manner, women and young have taken keen interest in and have led the creation of fish conservation/fish sanctuary zones and protection of their fisheries resources actively.

*CFI members have shown that conservation to be the key to resource sustainability and were willing to take concrete actions to achieve this (not only words). The role of women in promoting this achievement has been significant.*



16

## Main Challenges

- Community Fisheries depend on the external support;
- Community Fisheries are lack of budget and resource to implement their activities and tenure rights;
- Community Fisheries Committee perform their roles and tenure rights on a volunteer basis and there is no regular incentive sources.
- Capacity of Community Fisheries committee are still limited (especially for women CFI committee members).
- Landless CFI members in floating villages – limited their livelihoods, depending only fishing activity;
- Lack of information regarding with catch information and data, no recording;
- Take time for doing CFI fishing area demarcation (mapping), need to consult all stakeholders in the areas ;
- Traditional attitude is still the main obstacle to enhance women roles; such difficult to get voluntarily women to stand as candidates for election and also even those stand still difficult to get the high votes to be members of CFI leader team (CFI committee).

17

17

## Key Important Points

- ✓ CFI is a local unique institution for the fisheries governance's tenure (through free election by members);
- ✓ It has two times of fisheries reform and made it a people-oriented small-scale fishery through CFI tenure;
- ✓ It has functioned for one decade and needs to function for more to bring the benefits to all CFI members for poverty alleviation;
- ✓ CFI Area Agreement created the clear tenure rights (not for land tenure). These include boundary mapping and demarcation of fishing ground. But still is a big problem related with land tenure, especially CFI boundary covering private land;
- ✓ Access rights to fishery resources of CFI members are more secured;
- ✓ CFI have shown that people consider conservation to be the key to resource sustainability and were willing and empowered them to take concrete actions to achieve this.
- ✓ CFIs have been building trusts, unity and fostering cooperation in the community. This function is important, even more than catching fish!

18

18

## Conclusion and Recommendations

- The significance of Community Fisheries as a people's organization with the significant participation of men, women and youth is beyond doubt, especially for conservation actions. Therefore, it should be paid more attention on the roles of local people (both management and stopping illegal activities) and participatory approach.
- CFI members have understood that legal instruments and guidance are the key factors driving the tenure rights and empowerment of the CFI. These should be reviewed and amended after more than one decade of experience and lessons learnt; including CFI sub-decree and guidelines, and also approach to generate benefits and income activities for CFI.
- Right to CFI to collect fishing fee as a legal right to migrants/ non-CFI members to fish in demarcated CFI fishing areas.
- Greater capacity building should result in greater participation of CFI members and CFI function and empowerment, especially enhance their skills in order to improve their livelihoods, which could result in good and sustainable management of CFI as well as sustainable fisheries resources management.

19

## Conclusion and Recommendations

- The roles of related government agencies including local authorities and non-government development partners are equally important and valuable for coordinating and supporting the CFI to be functioned and empowered and to manage the fisheries resources sustainably, especially capacity building, trusts and confident of CFI members and CFI functioning.
- Those roles and interaction should be kept continuously and keenly fostered in the future via participatory approaches. However, the role of respected and resourceful persons and related stakeholders, including women also needs to be considered and recognized.
- Any development plan or project undertaken in the demarcated fishing area of a CFI should be undertaken only after consultation with CFI members and after making an environment impact assessment (EIA) with the participation of CFI members. The benefits of such projects should be shared with CFI.

20

## Conclusion and Recommendations

- To overcome with lacking of CFI fund, the possible alternative livelihoods and fishing larger scale should be considered to support and give the right to CFI committee to operate as for CFI organization as whole, not for individual investment. So that CFI fund can be generated income from these activities and also more function and empowerment could be made and incentive created for CFI committee members.
- CFI has empowered people and given freedom to access resources which has in turn resulted in reduction in poverty and better resource conservation and management. The tenure rights of the CFI should be strengthened through assisting all established CFI officially registered and demarked. It is also required to more focus on cross cutting issues, gender equity, climate changes..., in CFI management and development.

21




## THE DEVELOPMENT OF FISHERIES CO-MANAGEMENT IN LAO PDR: PAST EXPERIENCES AND FUTURE PERSPECTIVES





*By Mr. Sommano Phounsavath*

*Director, Division of Fisheries of the Department of Livestock, Agriculture and Fisheries, Lao PDR*

**DEVELOPMENT OF FISHERIES CO-MANAGEMENT  
IN LAO PDR: PAST EXPERIENCES AND FUTURE  
PERSPECTIVES**


By: Mr. Sommano Phounsavath, Director, Division of Fisheries,  
Department of Livestock and Fisheries, Lao PDR  
E-mail: sommanop@gmail.com



Experts Meeting on Mekong Cooperation on Fisheries,  
Aquatic Resources and Wetlands: 15 years lessons learnt  
12-14 November 2014, Phnom Penh, Cambodia


1



**Presentation Outline**

1. General information;
2. Status of fishery resources in Lao PDR;
3. Institutional and legal framework;
4. Development of fisheries co-management in Lao PDR;
5. Lessons learned;
6. Conclusions and Recommendations.


2



**General information:**

- Lao PDR is a mountainous, landlocked country located in the heart of Southeast Asia.
- Total area: 236,800 km<sup>2</sup>;
- Total population: 6.5 million;
- 75 to 80 per cent still live a rural lifestyle;
- The people of Lao PDR, especially in the rural communities, still rely heavily on aquatic resources, i.e. fish and other aquatic animals, as the most reliable sources of animal protein.


3



**Topography of Lao PDR**

- 87.7 per cent of the country area (207,674 km<sup>2</sup>) drains into the Mekong River;
- Making up 26.1% of the Mekong Basin;
- Contributing about 35% of the Mekong River's discharge and another 12.3 % in the north-eastern area drains to the north of Viet Nam into rivers that flow to the China Sea.
- Capture fisheries and aquaculture in Lao PDR are based on water resource ecosystems mainly consisting of rivers and streams, hydropower and irrigation reservoirs, diversion weirs, small water bodies, flood plains and wet-season rice fields;
- The total area of water resources for capture fisheries is more than 1.2 million ha.

4



**Status of the fishery resources in Lao PDR**

- The total area of water resources for inland capture fisheries is estimated to be more than 1.2 million ha.
- The estimated consumption of inland fish is approximately 167,922 tonnes per year.
- Consumption of other aquatic animals is estimated at 40,581 tonnes per year.
- Total estimated value at almost US\$150 million per year.
- The people of Lao PDR, especially in the rural communities which account for more than 75 per cent of the population, still depend upon the country's fish and other aquatic animals as their most reliable sources of animal protein intake.
- More than 481 fish species have been identified in Lao PDR, including 22 exotic species, and more species are being discovered regularly.
- Among other aquatic animals, about 37 amphibians, seven species of crabs and 10 species of shrimps have been recorded, but these records would cover only about 15 per cent of the estimated total. (Phonvisay, 2011)

5



**Status of the fishery resources in Lao PDR**

- The total area of water resources for inland capture fisheries is estimated to be more than 1.2 million ha.
- The estimated consumption of inland fish is approximately 167,922 tonnes per year.
- Consumption of other aquatic animals is estimated at 40,581 tonnes per year.
- Total estimated value at almost US\$150 million per year.
- The people of Lao PDR, especially in the rural communities which account for more than 75 per cent of the population, still depend upon the country's fish and other aquatic animals as their most reliable sources of animal protein intake.
- More than 481 fish species have been identified in Lao PDR, including 22 exotic species, and more species are being discovered regularly.
- Among other aquatic animals, about 37 amphibians, seven species of crabs and 10 species of shrimps have been recorded, but these records would cover only about 15 per cent of the estimated total. (Phonvisay, 2011)

6



### Status of the fishery resources in Lao PDR

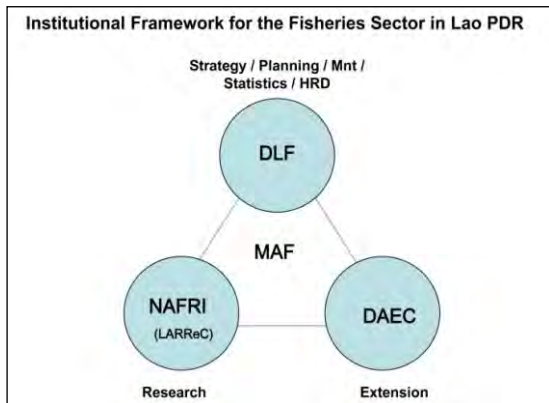
- The total area of water resources for inland capture fisheries is estimated to be more than 1.2 million ha.
- The estimated consumption of inland fish is approximately 167,922 tonnes per year.
- Consumption of other aquatic animals is estimated at 40,581 tonnes per year.
- Total estimated value at almost US\$150 million per year.
- The people of Lao PDR, especially in the rural communities which account for more than 75 per cent of the population, still depend upon the country's fish and other aquatic animals as their most reliable sources of animal protein intake.
- More than 481 fish species have been identified in Lao PDR, including 22 exotic species, and more species are being discovered regularly.
- Among other aquatic animals, about 37 amphibians, seven species of crabs and 10 species of shrimps have been recorded, but these records would cover only about 15 per cent of the estimated total. (Phonvisay, 2011)

7

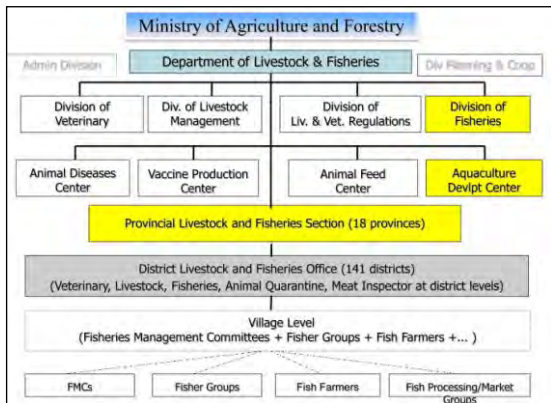
### Types of Fisheries and Estimated Fish Production in Lao PDR (DLF, 2007)

Types of Fisheries	Water resource	Total area (ha)	Production (kg/ha/year)	Production (Tonnes)
Capture Fisheries	Mekong River and tributaries and five northeast tributary rivers	304,704	70	21,329
	Large Reservoirs (hydropower):	96,030		8,405
	Nam Ngum Reservoir	45,000	133.3	6,000
	Nam Theun-2 Reservoir	45,000	33.3	1,500
	Others: Hsany In: 3,750 ha; Nam Louk: 1,200 ha; Nam Mang: 1,000 ha	6,030	150	905
	Shallow lakes, small natural pools, peat swamps and wetlands	114,800	150	17,220
	Irrigation reservoirs and irrigation weirs	60,000	150	9,000
	Rice-fields, small streams and floodplains:			
	Wet-season rice-fields	612,850	50	31,643
	Dry-season irrigated rice-fields	153,677	see note	
Wet-season irrigated rice-fields	344,820	see note		
Flooded areas	30,000	50	1,500	
Sub - Total:		1,228,384		89,497
Aquaculture	Fish ponds	22,000	1,500	33,000
	Oxbow lakes and irrigation weirs for aquaculture	15,000	600	9,000
	Rice-fish culture	5,000	250	1,500
	Cage culture	-	(4,500 cages x 2.5 tonnes)	11,250
	Sub - Total:		42,000	
TOTAL		1,280,384		143,847

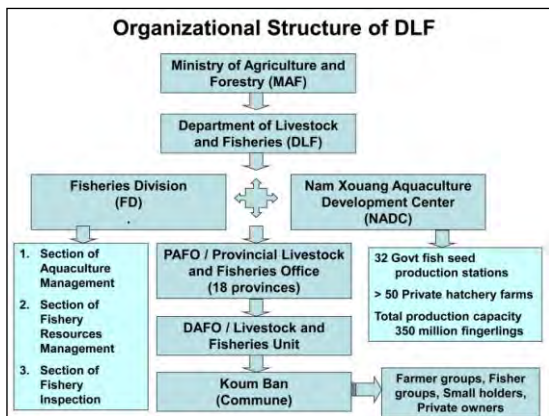
8



9



10



11

### Lao Fishery Law (2009)

- The Lao fishery law was developed by the DLF with the active participation of central and local authorities and other key stakeholders;
- The fishery law was endorsed by the national assembly on 9<sup>th</sup> July 2009;
- The fishery law was officially declared in force on the 20<sup>th</sup> July 2009 by a presidential decree No 074.

12

### Lao Fishery Law (2009)

The Lao fishery law consists of 10 parts, 10 chapters and 72 articles:

- Part I: General provisions;
- Part II: Fishery;
- Part III: Fishery enterprise & protection;
- Part IV: Use of aquatic animals;
- Part V: Prohibition;
- Part VI: Conflict resolution;
- Part VII: Fishery mnt & inspection;
- Part VIII: Reward & sanction measures;
- Part IX: National fish release day;
- Part X: Final provisions.

13

### Lao Fishery Law (2009)

#### Article 6. Basic principles of fisheries

- Engagement in aquaculture, conservation, protection, development and expansion of the species of fish and other aquatic fauna in a sustainable manner shall be work in which all people participate;
- Engagement in aquaculture, conservation, protection, development and expansion of the species of fish and other aquatic fauna shall be the important tasks in the management of fisheries of fish and other aquatic fauna;
- Exploitation of aquatic fauna shall be in accordance with laws and regulations, effective and sustainable without creating negative impact on environment, society or nature;
- Establishment and protection of conservation zones for aquatic species and of their habitats, and food sources are to create the best conditions for their growth and proliferation and are aimed at maintaining the ecosystem balance;
- Conservation, protection, development, exploitation of aquatic fauna, the management and inspection of fisheries shall be in conformity with international treaties to which the Lao PDR is a party.

14





**Lao Fishery Law (2009)**


**Article 48. Fishermen's associations**

A Fishermen's Association is a social organization, voluntarily established by and with the agreement of members involved in fisheries and is under the management of the relevant Agriculture and forestry sectors.

Fishermen's cooperatives may also be established provided that the relevant sectors are in agreement.

The management, operations, rights and responsibilities of these associations and cooperative are defined in specific regulations.

15



**Lao Fishery Law (2009)**


**Article 50. Establishment of Fisheries Management Committees (FMCs) in Water Bodies**

The Fisheries Management Committees in Water Bodies, which shall include the participation of fishermen, shall be established in order to ensure the effective management of fisheries resources.

- The District Governor, the Municipal Head shall approve the request and appoint the committee as proposed by the village authority;

- The Provincial Governor, the Capital Mayor shall approve the request and the appointment of the Committee. In the event that the boundaries of the fisheries resource area are in two districts or municipalities in the the province upon the proposal from the relevant District Governors or the Municipal Head;

16




**Lao Fishery Law (2009)**

**Article 50. Establishment of Fisheries Management Committees (FMCs) in Water Bodies (continued)**

- The Minister of Agriculture and Forestry shall approve and appoint the Committee, in the event that the boundaries of the fisheries resource area are in two provinces, capitals or more upon the proposal of the relevant Provincial Governors or the Capital Mayor;

The decision of the District Governor, the Municipal Head and the Provincial Governor, Capital Mayor to the appointment of a Fisheries Management Committee shall be proposed and submitted to the relevant agriculture and forestry sectors for control and inspection.

17




**Lao Fishery Law (2009)**

**Article 51. Structure of Fisheries Management Committees in Water Bodies**

Committees for the Management of Fisheries in Bodies of Water shall comprise representatives from the various organizations as identified below:

1. Representatives of the village, district or provincial fisheries organizations (local authorities);
2. Representatives of the fishermen;
3. Representatives of village or district social organizations;
4. Village, District or Municipal Security Officers;
5. Representatives of other relevant sectors as deemed necessary.

18




**Lao Fishery Law (2009)**

**Article 52. Rights and duties of Fisheries Management Committees in Water Bodies**

1. To prepare plans for the management and development of fisheries within their own water resource areas, namely: identified fisheries areas, conservation zones, protected areas, fish spawning grounds, areas for the expansion of fish species, fish release areas and others;
2. To propose plans and regulations for the management of fisheries including the use of fishing gear and methods, seasons and prohibitions related to the catching or trapping of certain protected aquatic animals and submit these to the municipal, district administration authorities for their consideration, approval and adoption;
3. To disseminate and publicize the fisheries management plans and regulations by means of posters and announcement in the mass media;

19




**Lao Fishery Law (2009)**

**Article 52. Rights and duties of Fisheries Management Committees in Water Bodies (Continued)**

4. To protect the rights and benefits of the fishermen including the settlement of disputes arising in the management of the water resources areas under their control;
5. To guide, follow up, and inspect the implementation of fisheries management regulations in the areas under their control;
6. To seek funding for the support to fisheries management and development in the water resources areas under their control;
7. To collect annual statistics related to fisheries, including the production, details of the fishermen, fish conservation zones and summaries and reports and submit these to the local authorities and the relevant sectors;
8. To exercise other rights and duties as assigned by the relevant sectors.

20




**Lao Fishery Law (2009)**

**Article 53. Village fisheries regulations**

At the village level, the management of fisheries operations shall be regulated through the issue of regulations governing fishing in certain designated areas, namely set aside as conservation, protection and development areas, and the use of fisheries resources as established by the village authority in consultation with the Fisheries Management Committee, villagers, neighbouring communities and in coordination with the Village Agriculture and Forestry Unit or the district, municipal Agriculture Forestry Offices in the event that the regulations apply to many villages within a single district.

The village fisheries regulations shall come into force after endorsement by the District Governor and the Municipal Head.

21



**Lao Fishery Law (2009)**

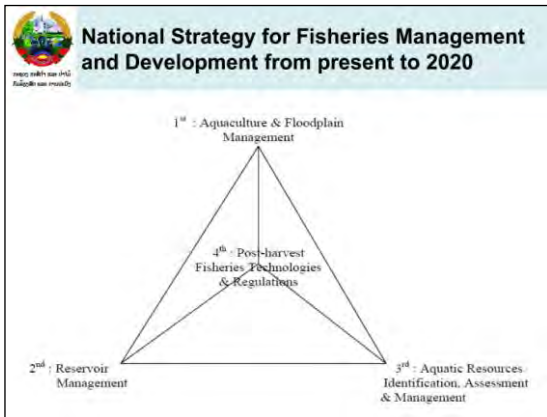
**Article 54. Contents of the Regulations**

At the village level, the fisheries regulations shall include the following:

1. The purpose;
2. Any fish conservation zones or prohibited fishing areas;
3. The species of fish and other aquatic animals;
4. The fishing gear and methods;
5. The policy for rewards for good work and penalties;
6. The implementation;
7. Other information as deemed necessary.

22





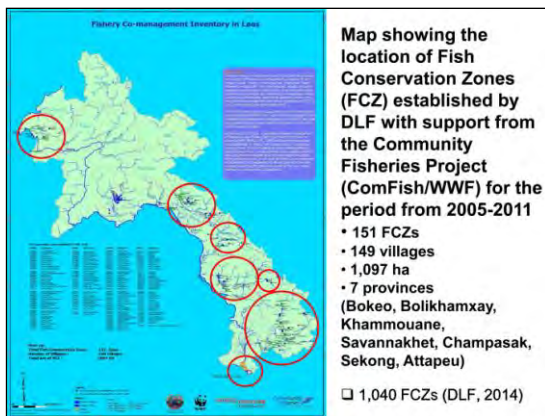
23

- ### List of previous projects on CM
- IDRC Indigenous Fisheries Management Project, Champasak province;
  - Dolphin protection project in Khong islands, CHP (72 FCZs established);
  - ACIAR supported project "Small-scale Wetland Indigenous Fish Management (SWIM), CHP;
  - AIT Aquaculture Outreach Program, Savannakhet province;
  - Regional Development Committee (RDC), SVN;
  - ComFish project (DLF/WWF-Laos) in 7 provinces;
  - SEAFDEC Rehabilitation of fish habitats Nam Houm;
  - Etc.

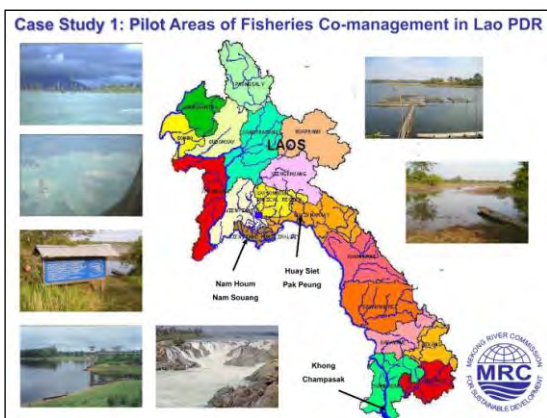
24



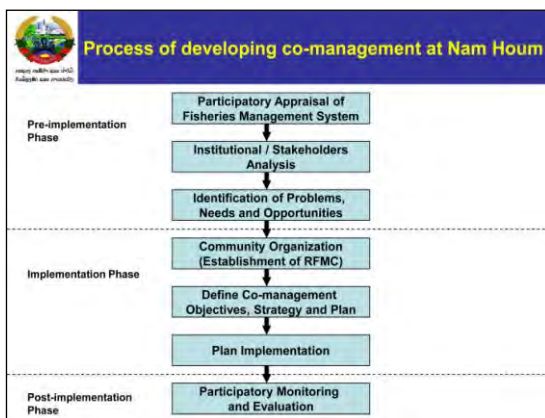
25



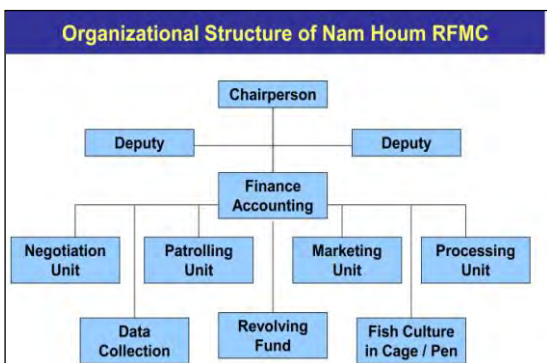
26



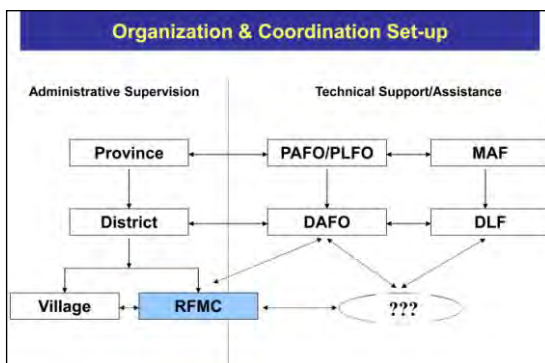
27



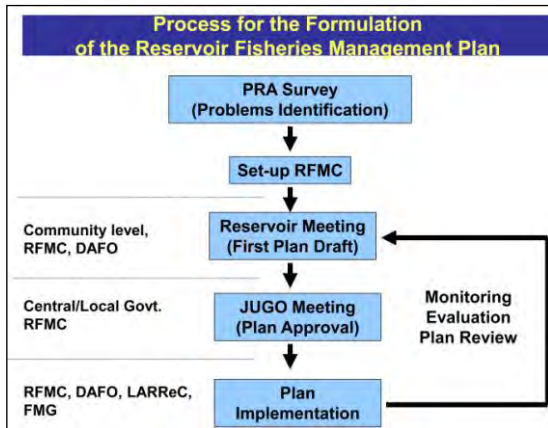
28



29



30



31

### Nam Houm Reservoir Fisheries Management Plan

← The "Reservoir Fisheries Management Plan" will look like this!

- The main activities for year 2008 are for example as following:
  1. Improve RFMC organization and fishing groups;
  2. Create awareness on fishing regulations;
  3. Conduct patrolling of fishery and FCZs during the spawning season;
  4. Stocking / enhancement activities;
  5. Conduct trial on fish culture in cage;
  6. Create reservoir management fund;
  7. Data collection (catch data).

32

### Examples of Co-management Functions Shared Between the RFMC and Local Govt. (DAFO) at Nam Houm

Role / Management function	RFMC	DAFO
Develop / improve fishery regulations	X	X
Enforcement / patrolling	X	X
Stocking	X	-
Fish processing / marketing	X	-
Capacity-building	-	X
Develop reservoir management plan	X	X
Implement reservoir management plan	X	-
Monitoring & Evaluation	X	X

33

### Roles of RFMC and DAFO in M&E

RFMC	DAFO
<ul style="list-style-type: none"> <li>Develop and implement reservoir fisheries management plan;</li> <li>Organize monthly meeting to monitor and evaluate plan implementation;</li> <li>Submit monthly and quarterly progress report to DAFO;</li> <li>Submit annual report to DAFO</li> <li>Join annual evaluation meeting.</li> </ul>	<ul style="list-style-type: none"> <li>Technically assist to develop and implement reservoir fisheries management plan;</li> <li>Join monthly RFMC meeting;</li> <li>Submit RFMC monthly and quarterly progress report to DGO and PLFO/PAFO;</li> <li>Submit annual report to DGO and PLFO/PAFO;</li> <li>Join annual evaluation meeting.</li> </ul>

34

### Development of Reservoir Fisheries Management Plan at NH

- The first reservoir fisheries management plan was jointly developed by the Nam Houm RFMC and district authorities (DAFO) with assistance from the MRF component staff in year 2001.
- The Reservoir Fisheries Management Plan is first developed at the reservoir level with all representatives from the four villages.
- Then, the Reservoir Fisheries Management Plan is brought for joint discussion and approval at the annual review meeting that is organized each year at the central level.
- After that the Reservoir Fisheries Management Plan has been adopted, the local gov. (DAFO) gives technical support for its implementation with assistance from LARReC/FMG.

35

### Establishment of Fish Conservation Zones

- A permanent FCZ was established in front of the main dam (1,500 m from the dam) and declared as a closed area for all types of fishing gears for the whole year round.
- There are four seasonal FCZs located in headwater areas or small streamlets feeding the reservoir. These zones are declared as closed area during the main fish spawning season that usually starts from May to August.
- These FCZs are regularly monitored by the patrolling unit especially during the spawning season (beginning of wet season).

36

### Capacity Building for Nam Houm RFMC

AT NAM HOUM RESERVOIR DEVELOPMENT CENTER, VIENTIANE, IN-VISITATION SUPPORTED BY LARReC/FMG - MRF

37

### Participatory Collection of Catch and Market Data

Poster content: ផលិតផលនៃការត្រួតពិនិត្យការប្រមូលទិន្នន័យ និង ទីផ្សារ នៅ បឹងប្រាសាទ (Participatory Collection of Catch and Market Data at Nam Houm Reservoir) - ឆ្នាំ ២០០៨

38





Use of Mobile Hatchery for Stocking at Nam Houm

39



Enforcement Activities at Nam Houm

- With the support from the FMG component, we built display boards and warning signs to inform the local villagers about the fishing regulations and Fish Conservation Zones.
- These warning signs are setup in each FCZ and at boat landing of each village.
- The RFMC conduct regular patrolling especially during the spawning season (May-August)

40



Fish Culture in Cage at Nam Houm

- At present, there are more than 300 fish cages that are operated by local fish farmers in the reservoir.
- This year, with the support from the FMG component, the RFMC is implementing an experimental trial on fish cage culture (Indian carp - catla).
- This activity will help the RFMC to create income for their reservoir management fund

41



Negotiation for Fish Marketing Concession at Nam Houm

- The period from May to October is the peak season (high catch), in average about 100-200 kg of fish per day can be purchased from the local fishers by the fish collection unit.
- The period from November to April is the period of low catch. In average only 30 kg of fish per day can be collected. The fish prices increase.

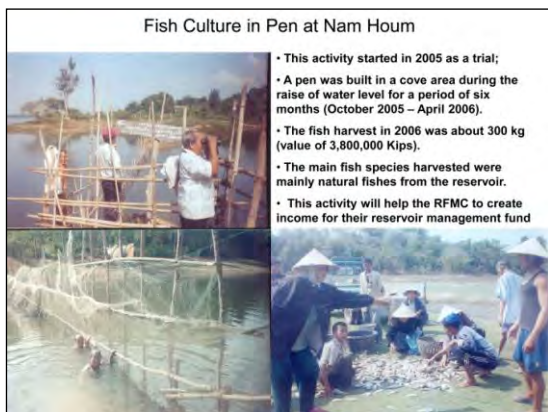
• In August 2005, the MRRF component facilitated a Consultation Meeting on Fish Marketing at Nam Houm with the district authorities to negotiate for fish concession.

42



Training on Fish Processing

43



Fish Culture in Pen at Nam Houm

- This activity started in 2005 as a trial;
- A pen was built in a cove area during the raise of water level for a period of six months (October 2005 – April 2006).
- The fish harvest in 2006 was about 300 kg (value of 3,800,000 Kips).
- The main fish species harvested were mainly natural fishes from the reservoir.
- This activity will help the RFMC to create income for their reservoir management fund

44



A new renovated office for the Nam Houm RFMC

- This year, the MRC Fisheries Programme through the FMG component supported the renovation of a function office for the Nam Houm RFMC.
- This office is located at the main landing site at Ban Ang Nam Houm.
- It has one function room that can be used as a meeting or training room and an exhibition room for the photo display on the various RFMC activities, publication (documents, reports, manuals...), posters, fishing gears, etc.
- This office will also function as a demonstration facility for the numerous visitors/organizations that are interested in the Nam Houm RFMC activities.

45




Exchange Visits at Demonstration Site: Nam Houm

46



### Case Study 2: Nam Ngum 1

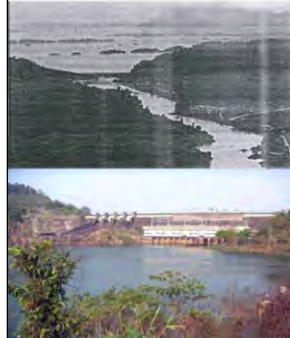


**Nam Ngum 1969 (Joel Halpern)**

- First pre-impoundment study has been carried by the Interim Mekong Committee in year 1969;
- Pantulu (1969) noted that no important commercial fisheries exploitation existed above or below the dam site on the Nam Ngum river;
- Post-impoundment studies have been conducted since dam closure by various institutions (Smithsonian Institute, 1975; Interim Committee, 1982, 1984, 1989, 1993; Burapha development consultants, 1992; Mekong Secretariat, 1993; Jacob, 1995; MRC/FP, 1995-2004).

47


### General Information about Nam Ngum 1



Reservoir area	477 km <sup>2</sup>
Mean depth	19 m
Shoreline length	430 km
Catchment area	8,460 km <sup>2</sup>
Construction	1968 / 1971
Hydropower capacity	110 MW
Water storage	700 x 10 <sup>6</sup> m <sup>3</sup>
Storage level	212 m (asl)
Conductivity	100 µS cm <sup>-1</sup>

48

### General Information about Nam Ngum 1



- Population: 16,658
- Local fishers: 3,437
- Full-time fishers: 1,597
- Average catch: 0.5 kg/net/night (gillnet)
- Fish production (1998): 6,833 Tons (value 6 million USD)
- Avg. fish production: 18.7 Tons/day
- Avg. yield: 143 kg/ha/year
- 55 Fish species
- Fish consumption: 60 kg/person/year

49

### Previous Implemented Projects on Fisheries Management and Development at Nam Ngum 1

Project	Organization	Years	Objectives
1. Development and Management of Fisheries in Nam Ngum Reservoir	Mekong Committee (Netherlands)	1978-83	Implementing specific pilot development project in the Nam Ngum reservoir in order to evolve basinwide strategy for management and development of reservoir fisheries
2. Development of Fishermen Communities in the Nam Ngum Basin (Phase I)	Mekong Committee (Switzerland)	1988-90	Improvement of socio-economic condition of pilot fishing communities and sustainable development of reservoir fisheries
3. Development of Fishermen Communities in the Nam Ngum Basin (Phase II)	Mekong Committee (Switzerland)	1991-92	(Same as above)

50

### Previous Implemented and On-going Projects on Fisheries Management and Development at Nam Ngum 1

Project	Organization	Years	Objectives
4. Management of Reservoir Fisheries in the Lower Mekong Basin (Phase I)	Mekong Committee (Denmark)	1995-98	Sustainable high yield of reservoir fisheries under local community agreement with government
5. Management of Reservoir Fisheries in the Lower Mekong Basin (Phase II)	Mekong Committee (Denmark)	1999-2003	Sustainable high yield of reservoir fisheries under local community agreement with government
6. Support on Fish Processing	FAO	2000-2003	Support to local fishing communities to develop fish processing activities
7. Pilot study on right-based fisheries and co-management	SEAFDEC	2008-2011	Support to local fishing communities and local govt. on promotion of small-scale fisheries management

51

### Nam Ngum Fisheries Regulations

No 567/AF (MAF, 1995) - 39 articles

- Part 1 General principles on the management of fishing activities in the Nam Ngum reservoir
- Part 2 Rules for fishing activities in the Nam Ngum reservoir
- Part 3 Delineation of wild life and environment reserves
- Part 4 Protected fish species and reptiles in the Nam Ngum reservoir and Nam Song estuary
- Part 5 Restrictions
- Part 6 Purchase and sale of fish in the Nam Ngum reservoir
- Part 7 Fishing fees in the Nam Ngum reservoir
- Part 8 Fines
- Part 9 Implementation

52

### Nam Ngum Fisheries Regulations

No 567/AF (MAF, 1995) - 39 articles

The main important fishing regulations:

- Fishing gear restrictions,
- Protected fish species,
- Closed areas and season,
- Fishing license, fees and fines, and
- Regulation on leasing right (fish marketing concession).

The restricted fishing gears are: dynamites, shot guns, poison, electro-fishing devices, harpoons, spears, beach seine, drag nets and gears of all mesh size lower than five centimeters.

The protected fish species are: *Pangasius gigas*, *Pangasius sanitwongsei*, *Pangasius hypophthalmus*, *Probarbus jullieni*, *Wallagonia miosstoma*, and also some types of aquatic animals such as the soft-shelled turtle (*Amyda sp.*).

Fish sanctuaries (Nam Ngum, Nam Xong, Nam Tou and Nam San).  
- Nam Ngum estuary (Kaeng Noi)- permanent closed and conservation area for the whole period of year, when the three other rivers are closed only during the fish spawning season from May to September of each year.

53

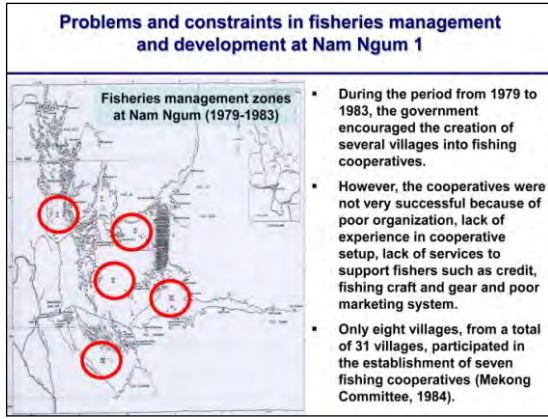


54





55



56



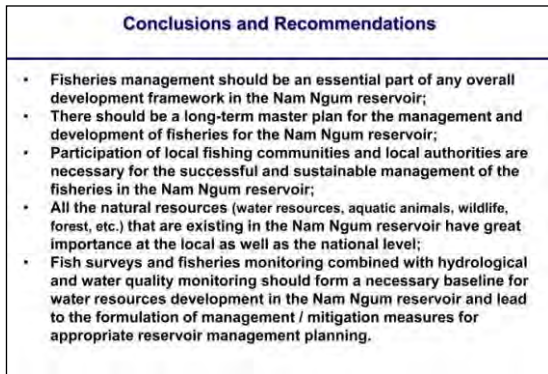
57



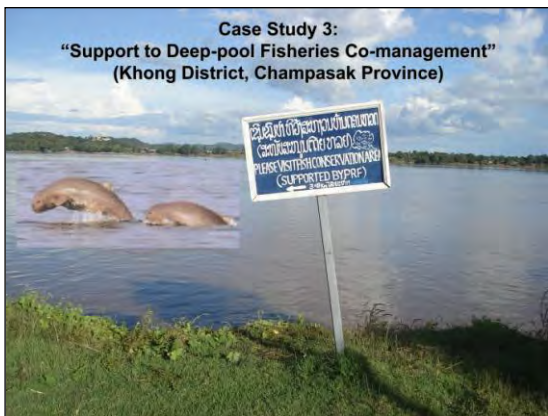
58



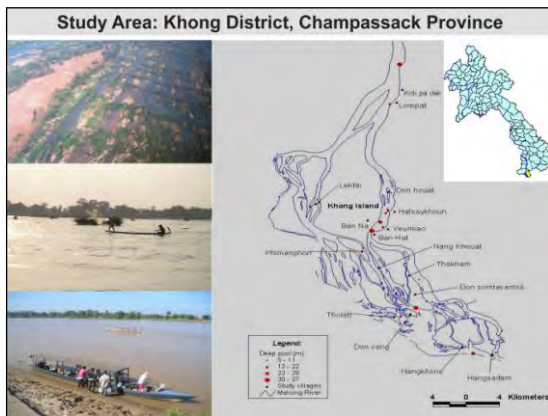
59



60




61



62



### Study of deep pools using hydro-acoustic method



**Objectives:**


- Identify fish quantity (biomass) and seasonal movement of fishes that inhabit or use deep pools as refuge in the Khong area (Champassack).
- Develop appropriate methods for the long-term monitoring of fishery in Mekong deep pools.

**Outputs:**

- Biological data for estimation of fish composition (fish species) and fish biomass (fish length) in deep pools of Khong area collected
- Number and quantity of fish for each representative deep pool estimated

63

### Villages surveyed in Khong District (Champassack prov.)



**Surveyed villages (total 15 villages)**


Ban Kokpadek Ban Dontan Tavan Tok  
 Ban Ban Lomphat Ban Don Tholathi  
 Ban Don Lek Fai Ban Don Xang  
 Ban Don Houat Ban Hang Sadam  
 Ban Tha Kham Ban Hang Khone  
 Ban Veun Khao Ban Hat  
 Ban Phimanphon Ban Don Nang Khouat  
 Ban Hatsaykhone

**FCZ Villages where was conducted CPUE monitoring**

Ban Kokpadek  
 Ban Hatsaykhone  
 Ban Hat  
 Ban Don Tan Tavan Tok

64

### Survey Methodology



- Conduct fishermen interviews (use of local traditional knowledge).
- Mapping of deep pool area (location, fishing grounds, fishing seasons, used fishing gears, fish species caught, etc.).
- Collect CPUE data (Catch Per Unit Effort) using three types of fishing gears (deep drag net, gillnet, hook and line) to identify fish species and collect fish length data.
- Use of hydro-acoustic equipment (echosounder) to survey deep pools (measure water depth, bottom conditions, fish biomass)
- The survey was conducted in two periods: Oct-Nov 2003 and Feb-Mar 2004

65

### Use of simple PRA Tool - Village Mapping



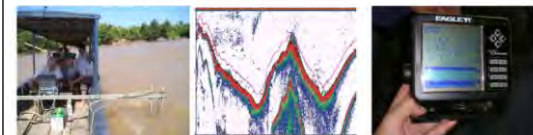
**Types of information gathered:**

- Location, area and boundaries of deep pools and Fish Conservation Zones
- Location of rapids and streams
- Number of fishers
- Used fishing gears
- Fishing grounds
- Fishing seasons
- Fish species caught
- River bed / bottom conditions
- General information

66


### Results from the Deep Pool Survey

- In total 17 deep pools in 15 villages of Khong District (Champasack prov.) were surveyed, from which, 14 deep pools are Fish Conservation Zones
- Location (GIS coordinates) and water depth of deep pools identified
- The CPUE data identified in total 38 fish species using deep pools in the dry season
- Fish length data collected to estimate fish biomass (density) of each specific/representative deep pool



67

### Map of Surveyed Deep Pools in Khong Area



Vang Nonghai (7 m) Ban Don Houat	Veun waa (37 m) Ban Kokpadek
Veun Padouk (19 m) Ban Don Lek Fai	Vang Lomphat (19 m) Ban Lomphat
Bung Pa Koang (21 m) Ban Don Lek Fai	Vang Don Samlan (22 m) Ban Hatsaykhone
Veun Ta Kong (24 m) Ban Na	Vang Khumphi (20 m) Ban Hatsaykhone
Vang Tha Wat (7 m) Ban Phimanphon	Vang Khan Fuan (20 m) Ban Veun Khao
Vang Tha Wat (7 m) Ban Don Nang Khouat	Veun Songkham (39 m) Ban Hat
Veun Tholathi (20 m) Ban Don Tholathi	Veun Wa Tha Hor (33 m) Ban Donsom Tavantok
Vang Pa Kha (27 m) Ban Hang Khone	Vang Xang (11 m) Ban Don Xang
	Vang Hang Sadam (10 m) Ban Hang Sadam

68

### Use of Local Traditional Knowledge and Scientific Knowledge



Fishermen Interviews

CPUE Data Collection

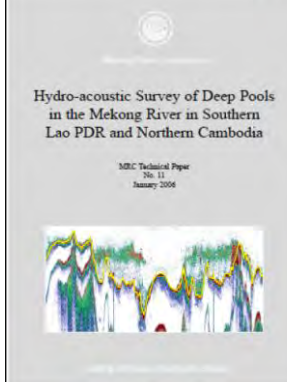
Hydro-Acoustic Survey

Participatory Planning

69

### Hydro-acoustic Survey of Deep Pools in the Mekong River in Southern Lao PDR and Northern Cambodia

MOIC Technical Paper No. 11 January 2006



70



**Participatory Workshop on Management of Deep Pools**




MRC/MRRF sponsored a JUGO Workshop on Management of Deep Pools and Fish Conservation Zones in Khong District Champassack Province (29 Sep - 01 Oct 2004)

Workshop objective - to start-up a dialogue and collaboration between the Government authorities and fishing communities in order to develop and implement a jointly agreed management plan for the deep pools in selected target villages of the Khong district in Champassack province

71

**Participatory Workshop on Management of Deep Pools**



*Specific workshop objectives:*

- To exchange experiences among the workshop participants
- To identify lessons learned and/or problems related to fisheries management aspects
- To identify to what extent the participants share perceptions of river ecology and fisheries management
- To formulate and agree on a short and simple "action plan" of a series of activities to be jointly undertaken in the near future

72

**Participatory Workshop on Management of Deep Pools**



*Workshop participants:*

- Central fisheries agencies
- Local authorities
- Fishing communities
- Local fishers representatives
- 45 participants (Government 10, local users 22, resource persons 13)

*Workshop process:*

- Review of previous activities (projects, studies, surveys) conducted in the Khong area (1993-2004)
- Field visit to FCZ village (exchange of experience among villagers and Govt. officers)
- Joint evaluation (lessons learned) and formulation of "action plans" for community, district and provincial levels

73



74

**Participatory Workshop on Management of Deep Pools**

*Summary of joint proposals by local authorities and fishing communities:*

- Establish local committee responsible for the management of deep pools at the village and district level;
- Improve and/or enforce the existing fisheries regulations;
- Create public awareness on the importance of deep pools and regulations;
- Conduct additional studies of deep pools in order to better understand their ecology and functions;
- Conduct survey of deep pools to identify their location and boundaries for further demarcation as Fish Conservation Zones where appropriate;
- Conduct further studies of migratory and sedentary fish species inhabiting or using deep pools as dry-season refuge;
- Create village and/or district funds for the management of deep pools;
- Develop participatory monitoring system for the evaluation of deep pools management;
- Promote alternative livelihood activities to compensate the lost of fishing grounds.

75

**Consultation Process for Deep-pool Management in Khong**



Technical workshop

Consultation meeting

Planning workshop

Rapid appraisal survey

76

**Process for Developing Village Draft Proposals in Khong**



Feedback on findings

Joint brainstorming / planning

Joint brainstorming / planning

Presentation of draft activity plan

77



78



**Lessons Learned: Entry Points for Co-Management**

- Community ponds / CBF:**
  - Establish FMCs;
  - Develop village fishing regulations / enforcement;
  - Stock enhancement (training on seed production / nursing, etc.).
- Reservoir fisheries:**
  - Establish RFMCs, participatory planning, M&E;
  - Stock enhancement, promote aquaculture, alt. livelihoods, etc.
- River fisheries:**
  - Establish FMCs, participatory planning, M&E;
  - Fish Conservation Zones (FCZs);
  - Develop village fishery regulations and enforcement;
  - Promote alternative livelihoods, aquaculture, fish processing, etc.

79

**Lessons Learned: Participatory M&E**

**MONITORING**

- Participatory monitoring is a requirement for a successful and effective project implementation;
- Participatory monitoring increase awareness and ownership/stewardship of local communities;
- Participatory monitoring ensure that the interests/benefits of the local communities are secured;
- Less administrative and financial burden for the local Government authorities.



80

**Lessons Learned: Participatory M&E**

**EVALUATION**

- Participatory evaluation is a pre-requisite for an effective and sustainable project implementation;
- Participatory evaluation increase project transparency;
- Evaluation must be done for each year;
- All key stakeholders must be able to participate in the joint evaluation;
- Need to raise awareness of local authorities and communities about participatory M&E.




81

Although we have achieved some successful experiences, but we understand that many things still have to be done for the sustainable management of fisheries in Lao PDR...

*Our future priorities will focus on:*

- Promote establishment of community revolving fund for Fisheries Management and Development through income-raising activities;
- Develop revolving fund or small credit schemes for local fishers and other income-raising groups (e.g. fish processing group, fish cage farmers, fish marketing unit, etc.);
- Establish fishing license system / collection of fees from local fishers;
- Improve fish marketing system and promote fish processing, fish culture and other alternative livelihoods (e.g. agriculture, animal raising, service...);
- Facilitate better participation of local fishing groups into management activities (i.e. planning, M&E, enforcement, patrolling, fish collection & marketing, etc.)
- Further strengthening of FMC members and local Govt. staff in fisheries management and technical aspects.



82

**Conclusions and Recommendations**

- In the country, many attempts have been made to create local institutions carrying some fisheries management responsibilities, but most have failed when it came to ensure their financial sustainability once donors / support withdraws;
- Local govt. agencies are just not well equipped well enough to provide the required services for fisheries management, usually because of technical and financial limitations;
- The FMC functions as a key player within the established CBFM and fisheries co-management system;
- Through the FMC, the fishers can actually take part in decision making processes regarding the management of their community's fisheries resources.
- But how the economic sustainability of the FMC is secured?



83

**Conclusions and Recommendations**

- There is a need to clearly define and specify the roles, functions, responsibilities and authorities of the various institutions and administrative levels that are concerned with fisheries management;
- A self-sufficient system must be developed through institutional building exercises in order to promote the establishment of effective, financially viable and functioning fisheries management institutions at the local level;
- Strategic plan for fisheries management and development of each specific water body must be included into the overall river basin management and development plan (macro-level) and the community development plan (micro-level);
- The fisheries sector must be considered during the planning process for Integrated Water Resources Management (IWRM) along side with other key sectors .



84





## PROMOTING REGIONAL GENDER MAINSTREAMING IN FISHERIES IN THE LOWER MEKONG BASIN

*By Mr. Hap Navy  
Deputy Director, Inland Fisheries Research and Development Institute,  
Fisheries Administration of Cambodia*



### Regional Network for Promoting Gender in Fisheries Development (NGF)

#### History, Activities and Lesson Learnt Experiences from NGF since 1997 up to present

1

### Background

- NGF was set up in 1997 in each member country
- The Regional NGF in LMB was established in 2000,
- This year is the 13 years of NGF
- The NGF is an independent organization, which support by MRC Fisheries Program

2

### Background (cont.)

- The NGF is a member of TAB
- The Regional NGF consists of 2 coordinators (officers) from each MRC member countries.
- The Regional NGF coordination responsibility is rotated among the member country in one year basis

3

### Objectives

1. Ensure equal benefit among women and men in fisheries development in the region
2. Increase awareness of women role in fisheries sector
3. Provide information on gender to ensure that gender aspects are taken in to account in the design of fisheries development and management activities.

4

### Main Activities of NGF

- Sharing information on gender in fisheries sector
- Extend of national network to local level, including provincial, district and communities / grassroots level
- Conducting study on gender and women in fisheries management and development
- Gender-sensitive technology transfer activities in fisheries community
- Capacity building for the NGF members in the fisheries sector.

5

### How does NGF works?

- Annual planning for the regional network and implementation at the national level in the riparian countries
- Exchange information and sharing experience between the NGF members
- Seeking fund within the country and from different donors.
- Integrate the gender issues and activities into fisheries development projects and management in riparian countries.

6

### Lessons Learnt from 13 Years' Experiences of NGF

- NGF Network is very important for knowledge creation and information distribution on gender in fisheries
- Linked research output to policy, information to action/plan and implementation
- Increased supported by national and international organization
- Improved communication and development gender mainstreaming policy and strategy in fisheries sector
- Integration of gender issues into project activities and work plan

7

### Lessons Learnt (cont.)

- Increased awareness of women role in fisheries sector
- Increased capacity/ability of women in fisheries sector for fisheries management, development and implementation
- Improved the communication linkages between relevant departments, project, donors, IOs, NGO agencies in relation to gender in fisheries

8

### Problems or Constraints

- Lack of gender knowledge and awareness for men staffs, especially for management team;
- Low participation of men staffs with gender activities/events
- Lack of and limited budget for running gender activities in the fisheries sector in the riparian countries
- Still lack of and limited on gender knowledge and awareness for staffs at all level in the fisheries sector, in the riparian countries

9

### Conclusion

- Existing of the regional network for promoting gender in fisheries development in the Lower Mekong Basin (NGF) is very important network for gender and women in fisheries sector in the riparian countries
- NGF - more an "open network", can bring us together, to exchange experiences, sharing information, and develop gender policy and strategy, annual work plan, join study for gender in fisheries for the region.
- Through this network, we can seeking fund and develop partnership with different organization, agencies, and institutions at national and international level
- Increase knowledge and awareness on gender to leadership and staffs at all level in the fisheries sector

10

### Recommendation

- Should integrate the gender issues and gender activities into fisheries development projects and management in riparian countries
- Should have strong and continue support to NGF
- Should allocate more budget for gender activities in the fisheries sector in the riparian countries

11





## Asserting Rights

- **Rights to fish and recognition (before fisheries reform)**
- ✓ **Rights to livelihoods (during reform process)**
- ✓ **Rights to better of (after deep reform)**



7

## Community and Livelihoods

1. Integrated Cfi workplan with commune investment plan/ commune development plan
2. Generating the saving scheme in the community, especially Cfi in Kampot and Kampong Chhnang province
3. Generating the souvenir Kep province
4. Generating fish processing (smoked-fish and salt-sundry fish)
5. Other income generating activities

8

## Community and Livelihoods

6. However, the culture norm has been changed, especially in coastal provinces.
7. Strong leadership in saving group and crab bank
8. Good at extension activities “ young generation/youth”
9. Good and communication and gathering people for any events
10. Initiation and creation related to livelihood activities

9

## Community and Livelihoods

The most significant changed is number of poorest has been positively changed from 70% poor to 30% as the poor in the commune. Before project starting, many families were facing their food shortage up to 6 months, but nowadays the food shortage still remaining about 2-3 months. In relation to this, the commune chief gives the indicators to proof that people are now better off since there are many new houses building and many motorbikes being used in the commune. Beside this, he did not hear any complain from the people about food shortage.

10

## Way forward consideration

1. Gender and Rights still the gap at the community level
2. Gender division of labor still an issue at community and household level
3. Level of education is the gap of women expressing their voice into the society as whole
4. Capacity is the gap in connecting women into community's work, livelihood activity as well linking them into market
5. Networking among women from one community to another still not functioning well in practice
6. Gender mainstreaming still not yet spread/ apply at local level

11

## Conclusion and Recommendation

- \* Co-management on Cfi is strong suggested
- Improving capacity of local facilitators and Cfi committees and stakeholders is needed
- \* Annual forum on Cfi management is very important to share all practical lesson learns to researchers, development agencies for their consideration or interest in development planning.
- \* Technical and financial still need to be considered toward Cfi management and planning

12

## Recommendation

- There should have resources persons in the village/ commune (NGOs should consider to build human resource for future building knowledge of communities
- NGOs should strengthen the communication and coordination between local authority and communities
- Sub-decree and community by-law awareness should has been done annually or adhoc base
- NGOs and Government, especially the fisheries competencies should continue the existing support to communities in the commune

13



## THE CHALLENGES IN MITIGATING THE IMPACTS OF WATER DEVELOPMENT ON FISHERIES

*By Mr. Peter Degen  
International Technical Advisor, MRC Fisheries Programme*

Cambodia • Lao PDR • Thailand • Viet Nam  
For sustainable development

Expert Meeting  
on  
Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands:  
15 Years Lessons Learnt

**Challenges of Mitigating Impacts from  
Water Development on Fisheries**

Phnom Penh, Cambodia  
12-14 November 2014

www.mrcmekong.org

1

### Hydropower dams in the Lancang – Mekong Mainstream

**8 mainstream dams in PRC**  
**11 mainstream dams LMB**

- 9 in Lao PDR
- 2 in Cambodia

Source: SEA 2010

2

### Number of species of long- distance migrants found in the sections of the LMB possibly barred by mainstream dams

35 species  
443 species  
90% of total catch

Source: SEA 2010

3

### Estimated impact on fisheries

Source	Estimated losses in tonnes
SEA 2010	700 000 – 1 400 000
Barlow et al. 2008	700 000 – 1 600 000
BDP2	600 000

- ✓ 600,000 tonnes, represents the annual inland fish production of the whole West Africa.
- ✓ .....i.e. building 11 mainstream hydropower dams implies an ecological and food security risk equivalent to depriving 15 west-African countries of all their freshwater fish (FAO statistics)

www.mrcmekong.org

4

### Estimated impact on fisheries

77 tributary dams in the basin by 2030

- ✓ Obstruction of 37% of fish migration routes
- ✓ Loss of > 250,000 ha of floodplains.
- ✓ Losses in fish production in absence of mainstream dams cannot be precisely quantified.
- ✓ Reservoir fisheries could partly compensate for these losses
  - likely production from 1500 km<sup>2</sup> reservoir surface are estimated at 10,000 tonnes (SEA 2010)

www.mrcmekong.org

5

### Impacts and potential Mitigation Measures at various stages

Construction		
Key Impact	Description	Mitigation Measure
Water Quality	Sediment effects from erosion of cleared surface	✓ Erosion and clearance controls
Habitat	Alteration of the channel and clearance	✓ Unavoidable

www.mrcmekong.org

6

**Impacts and potential Mitigation Measures at various stages**

### Filling / Commissioning

Key Impact	Description	Mitigation Measure
Hydrology	Storage of water reduces total discharge for the period, severe impacts if filled during dry season	<ul style="list-style-type: none"> <li>✓ Fill during the wet season,</li> <li>✓ Extend filling duration</li> </ul>

www.mrcmekong.org

7

**Impacts and potential Mitigation Measures at various stages**

### Operation

Impact	Description	Mitigation Measure
Barrier effects on fish passage	Fish migrating to spawn, or returning after spawning, both up and downstream, downstream drift of eggs, larvae and juveniles, up-or downstream migrations of juveniles.	<ul style="list-style-type: none"> <li>✓ Fish-ways on low barriers,</li> <li>✓ collection and propagation or trap-and- transport of spawning fish below barriers,</li> <li>✓ creation of alternative spawning habitat,</li> <li>✓ replacement of wild fishery with lentic species</li> </ul>
Flow pattern	Seasonal flows altered, diurnal variation if for peak load hydroelectric generation	<ul style="list-style-type: none"> <li>✓ Managed water discharge releases</li> <li>✓ Regulating ponds can minimise diurnal variation.</li> </ul>

www.mrcmekong.org

8

**Change in hydrologic regime**

Schematic view of how a reservoir may even-out seasonal variation Under natural conditions, discharge in the Mekong system peaks in August-September each year

www.mrcmekong.org

9

**Impacts and potential Mitigation Measures at various stages**

### Operation

Impact	Description	Mitigation Measure
Trapping of organic detritus, sediment and nutrients in dam	Residual biomass on dam site, plus detritus input from catchment. Decomposition causes anoxia, and other water quality effects	<ul style="list-style-type: none"> <li>✓ Clearing and burning prior to construction to reduce initial biomass.</li> <li>✓ De-stratification and/or aeration to reduce negative effects in dam and downstream.</li> <li>✓ Aeration of discharges or multi-level off-takes to improve discharge quality, but loss in productivity may be unavoidable.</li> <li>✓ Sediment through-flow or bypass systems to maintain sediment load downstream.</li> </ul>

www.mrcmekong.org

10

**Impacts and potential Mitigation Measures at various stages**

### Operation

Impact	Description	Mitigation Measure
Stratification	Stratification promotes generation of toxic compounds and ions, e.g. methane, hydrogen sulphide, depletion of DO and lower temperatures	<ul style="list-style-type: none"> <li>✓ De-stratification (impeller)</li> <li>✓ Multi-level off-takes for power generation</li> </ul>

www.mrcmekong.org

11

**Impacts and potential Mitigation Measures at various stages**

### Operation

Impact	Description	Mitigation Measure
Water Loss	Diversion for use or evaporation from dam surface raises concentration of ions, increasing salinity, and reducing flow downstream	<ul style="list-style-type: none"> <li>✓ Design and operation of dam to limit surface area/volume ratio,</li> <li>✓ Measures to minimise abstraction, including full pricing, control of water losses in distribution systems</li> </ul>

www.mrcmekong.org

12

**Impacts and potential Mitigation Measures at various stages**

### Operation

Key Impact	Description	Mitigation Measure
Food Chain Effects	Effects on invertebrates as above, including barrier effects. Lentic food chain replaces complex riverine food chain, and invertebrate assemblage modified downstream due to modified inputs and habitat. Change in food sources leads to change in fish species composition.	<ul style="list-style-type: none"> <li>✓ Mitigated by measures above,</li> <li>✓ but changes in the invertebrate assemblage are inevitable</li> </ul>
Exotic species	Dam facilitates introduction and invasion by exotic fish and weeds.	<ul style="list-style-type: none"> <li>✓ Various measures</li> <li>✓ Conduct proper risk assessments</li> </ul>

www.mrcmekong.org

13

**Impacts and potential Mitigation Measures at various stages**

### Closure

Key Impact	Description	Mitigation Measure
Multiple effects	Effects would include a gradual reversion to the original riverine conditions.	<ul style="list-style-type: none"> <li>✓ Rehabilitation of riverine habitat.</li> <li>✓ Mitigation of impacts on fishers.</li> </ul>

### Catastrophic

Many effects	Dam failure directly affects the fishery and fishers downstream	<ul style="list-style-type: none"> <li>✓ Normally subject of Engineering Risk Assessment.</li> <li>✓ Should include land-use management downstream to minimise consequences.</li> </ul>
--------------	---	---

www.mrcmekong.org

14






**Dam development increases water level in the Mekong in the dry season, which translates into additional irrigated fields, which translates into additional rice field fish production**



www.mrcmekong.org

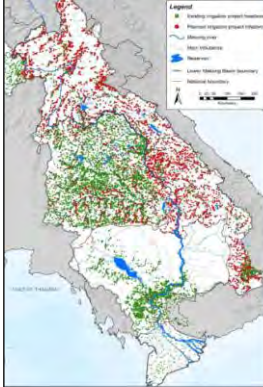
15



- ✓ Higher discharge in dry season is not synonymous of additional irrigation schemes, since the latter result from an economically- and politically- driven development process largely independent from hydrology;
- ✓ Irrigation means more crop production per unit of land area/year, not necessarily extension of the rainfed rice area – no increase of fish productivity of *rainfed* rice fields
- ✓ More crops per year implies intensive use of herbicides and pesticides, – drastic reduction of the fish productivity (e.g. case of Vietnam).
- ✓ With irrigation development using IPM and fish-friendly engineering fish production can be increased.

www.mrcmekong.org

16




**Irrigation – a long Tradition**

- ✓ >14,000 small dams, sluices & irrigation weirs in LMB
- ✓ Mostly built without fisheries considerations
- ✓ Focus: increase rice production - export
- ✓ Obstruct fish migration
- ✓ Cumulative effects severely impact on fish & aquatic animals

www.mrcmekong.org

17



**Fish biological & ecological factors**

- ✓ Proximity to Mekong mainstream (main “fish migration highway”)
- ✓ Proximity to other important fish habitats (spawning, nursing, feeding, refuge)
- ✓ Prevalent fish diversity (white fish?) and OAA
- ✓ Fish catch composition down-stream & up-stream (species, size)
- ✓ Seasonal fish availability
- ✓ Migratory behaviour and swimming capacity of prevailing fish species/guilds

www.mrcmekong.org

18



**Physical infrastructure factors**

- ✓ Design and size of weir
- ✓ Type and design of headworks (gates, sluices)
- ✓ Adjacent landscape

**Water management factors**

- ✓ Ownership of irrigation scheme
- ✓ Rules and regulations for water management

www.mrcmekong.org

19



**Socio-economic factors**

- ✓ Land ownership of irrigated land
- ✓ Socio-economic situation of local communities
  - ✓ Incidence of poverty
  - ✓ Landless people
  - ✓ Fishing and other livelihoods activities
    - Spatial and seasonal perspectives
- ✓ Community organizational structures
  - Participation in management of irrigation scheme
  - Participation in fisher organization (committee)

www.mrcmekong.org

20





**THE CHALLENGES IN RAISING THE PROFILE OF MEKONG FISHERIES IN A POLICY AND INSTITUTIONAL ENVIRONMENT THAT FAVORS OTHER SECTORIAL INTERESTS**

*By Dr. Chris Barlow  
Fisheries Program Manager, ACAIR*

Australian Government  
Australian Centre for  
International Agricultural Research

**Mekong fisheries,  
conflicting agendas,  
some lessons (learned?)**

Chris Barlow – Fisheries Program Manager, ACAIR

1

**Maintaining fisheries in conjunction with  
other uses of inland waters**

Content of this presentation

3 major tension points around inland fisheries  
(and a 4<sup>th</sup>, sometimes, some places)

7 Lessons from the Mekong

Considerable overlap between these points

ACIAR

2

**3 Major tension points**

1. **Habitat loss**  
Loss of connectivity, interrupts life cycles, fewer fish  
e.g., Weirs, dams, flood control, roads, forest removal,  
bunding, "land reclamation"

3

**3 Major tension points**

1. **Habitat loss**  
Loss of connectivity, interrupts life cycles, fewer fish  
e.g., Weirs, dams, flood control, roads, forest removal,  
bunding, "land reclamation"

2. **No government revenue from fisheries**  
Fish are part of informal economy  
Fisheries not easily taxed  
Secondary industries can be taxed, earn export dollars

ACIAR

4

**3 Major tension points**

1. **Habitat loss**  
Loss of connectivity, interrupts life cycles, fewer fish  
e.g., Weirs, dams, flood control, roads, forest removal,  
bunding, "land reclamation"

2. **No government revenue from fisheries**  
Fish are part of informal economy  
Fisheries not easily taxed  
Secondary industries can be taxed, earn export dollars

3. **Lack of political support**  
Fisheries seen as old, outdated production system  
Fish not essential, can eat any meat  
Development equals industrial economies

ACIAR

5

**3 Major tension points, and a 4<sup>th</sup>...**

1. **Habitat loss**  
Loss of connectivity, interrupts life cycles, fewer fish  
e.g., Weirs, dams, flood control, roads, forest removal,  
bunding, "land reclamation"

2. **No government revenue from fisheries**  
Fish are part of informal economy  
Fisheries not easily taxed  
Secondary industries can be taxed, earn export dollars

3. **Lack of political support**  
Fisheries seen as old, outdated production system  
Fish not essential, can eat any meat  
Development equals industrial economies

4. **Fishing pressure**  
Fishing pressure always, Overfishing sometimes  
Increasing human populations increase fishing pressure  
Mekong - huge fishing pressure,  
maybe not overfishing, yet

ACIAR

6

## Lessons from the Mekong (outside influence of fisheries personnel)

### 1. Political leaders make value judgements

e.g., electricity supply, economic development, physical infrastructure, government income...

Versus...

livelihoods, community cohesion, long-term food security, ecosystem functioning, biodiversity

ACIAR

7

## Lessons from the Mekong (outside influence of fisheries personnel)

### 1. Political leaders make value judgements

### 2. Decisions about resource use can be unrelated to resource management

e.g., geopolitical interests, trade, security

ACIAR

8

## Lessons from the Mekong (outside influence of fisheries personnel)

### 1. Political leaders make value judgements

### 2. Decisions about resource use can be unrelated to resource management

e.g., geopolitical interests, trade, security

### 3. Decentralisation hinders national planning

Provinces have power / authority  
Decisions with implications beyond the Province

ACIAR

9

## Lessons from the Mekong (which fisheries personnel can influence)

### 4. Comparison of formal and informal economies

The trade-off is

Hydropower and irrigation \$\$\$



Fisheries \$\$\$

Food production  
Electricity generation  
Secondary industry  
Government revenue

Food security  
Livelihoods  
Biodiversity  
Ecological functioning

Formal economy  
Easy to measure  
Focused income

Informal economy  
Difficult to measure  
Generalised wealth

10

## Lessons from the Mekong (which fisheries personnel can influence)

### 5. High quality technical information essential

And -- COMMUNICATION, COMMUNICATION, COMM...



11

## Lessons from the Mekong (which fisheries personnel can influence)

### 6. Integrated planning is essential



ACIAR

12

## Lessons from the Mekong (which fisheries personnel can influence)

### 7. Need to promote positive interventions

Most fisheries management is stopping decline  
Promote interventions which increase production - e.g., fishways, rice-fish production, culture-based fisheries, community managed sanctuaries



13

## Summary

### 4 Tension points

Habitat loss  
No government revenue from fisheries  
Lack of political support  
Fishing pressure

### 7 Lessons (learned?)

Political leaders make value judgements  
Decisions on resource use unrelated to management  
Decentralisation hinders national planning  
Comparison of formal and informal economies  
COMMUNICATION - High quality technical information  
Integrated planning is essential  
Promote positive interventions

14



## THE LESSONS BEING LEARNT RIGHT NOW: WATER INFRASTRUCTURE DEVELOPMENT AND FISH PASSAGE IN THE MEKONG

By Dr. Lee Baumgartner  
 Science Director, The Murray-Darling Freshwater Research Centre,  
 La Trobe University, Australia

**The challenges of keeping floodplains and wetlands in rapidly growing cities**

**Lessons learnt from 24 years of observing Vientiane, Lao PDR**

Drs. Jean O. Lacoursière and Lena B.-M. Vought  
 Man & Biosphere Health thematic research platform

SEAFDEC Expert Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 15 years lesson learnt  
 12th - 14th November 2014, Phnom Penh, Cambodia

Phou Luang Marsh, Vientiane, Lao PDR (source: Jean O. Lacoursière, 6th October 2014)

1

**... lessons learnt from 24 years of observing Vientiane**

- ✓ 1990: part of the group who created and trained the first cross-ministries "Wetland Teams" in Lao PDR, Vietnam and Thailand... Interim Mekong Committee's project "Study to Formulate Plans for the Management of the Wetlands in the Lower Mekong Basin" (SIDA supported).
- ✓ facilitated the "Wetland project" and was part of evaluation/assessment (for SIDA) of MRC's Environment and Fisheries Programmes, as well as the Wetland Alliance Program (WAP).
- ✓ last "Chief of the Environment Unit" of MRCS (1999-2000), coordinated the development of the first MRC-EP.

the Lao team selected "urban wetlands" as training sites...  
 water quality monitoring of the city's outflow (Hong Ke channel), discontinued in 1997 by the WQML-MAF, was picked-up by our research activities 1999-2010.

2

**... lessons learnt from 24 years of observing Vientiane**

Already in 1990, concerns about possible impacts of drainage network rectification, if **sewage treatment was not addressed**, were present among officials of the "Lao wetland team" and city practitioners...

rectification work initiated 1996 with ADB support by the Vientiane Urban Development and Administration Authority (VUDAA).

since 2000, 5 teams of HKR students (2000, 2006, 2012, 2014 and "now") have followed 12 key wetlands within Vientiane...

**Nong Chank Wetland**

3

**... lessons learnt from 24 years of observing Vientiane**

Provide policymakers and practitioners with decision support (HRD)

**CITYBLUES** — practical implementation of ecological & engineering principles in integrated stormwater management

2004-2007

CITYBLUES: working in urban environments  
 CITYBLUES: the shades of urban aquatic ecosystems...  
 ...the sadness of their disappearance

A too-common example of the complex linkages between alteration of the hydrologic cycle and resulting changes in aquatic ecosystem functioning...

Focused on roles of plants in water quality maintenance, (incl. HRT)

- ✓ Lao PDR
- ✓ Cambodia
- ✓ Thailand
- ✓ UK
- ✓ Sweden (coordinator)

4

**... all of Vientiane drains to a 54 km wetland-river system which outflows to the Mekong River**

Well... before 1999: aquatic plants + sediment = natural water treatment  
 Part of "Ecosystem Services" provided by urban aquatic ecosystems

ca. wetland area lost (2013):  
 30 % since 1999  
 >60% since 1990

Has Vientiane population quadrupled (4x) between 1999 and 2001?

"natural" channels and wetlands condition vs "rectification" of channels and wetlands "reclamation"

Nong Chank channel

5

**... all of Vientiane drains to a 54 km wetland-river system which outflows to the Mekong River**

How far has the urban pollution reached (length of impact zone)?

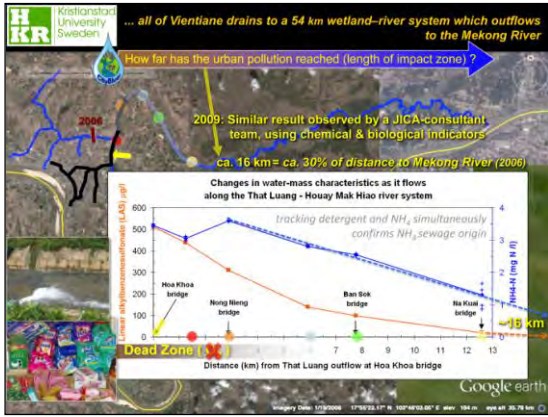
Label the water mass... and follow it (study of the fate of contaminants)

Station 2 (1.24 km)  
 Station 3 (2.89 km)  
 Station 4 (5.92 km)  
 Station 5 (7.77 km)  
 Station 6 (12.6 km)

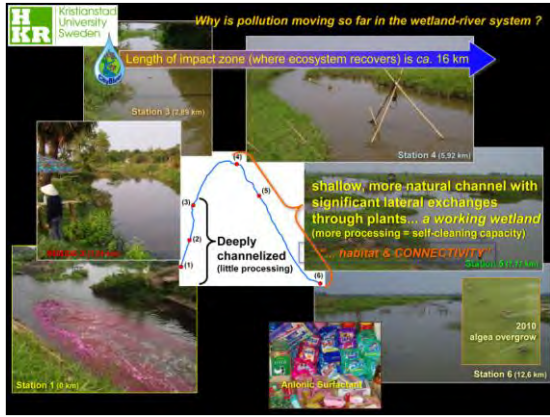
Q: ca. 1.2 m³/s

6





7



8

Interviews (2013) of "elders" in 7 villages along the wetland-river system highlighted that:

- even if the upper-1/3 was rectified by hand in 1975-1976, water quality remained good and daily catch per fisher was high (10-30kg). Some changes in algae types was observed, but villagers from the lower 2/3 were still using the water for cooking and washing without problems;
- water quality in all sections started to decrease 10-15 years ago, with a significant decrease in catch and the apparition of both a "bad taste" in fishes and some "skin itchiness" amongst fishers;
- the last 5 years have seen "bad fish taste" and "itchy skin" problem move downstream... and daily fisher catches down to 0,5-1kg.

9

... the pitfalls of "silo-thinking"

- all practitioners dealing with environmental "issues" are always waiting for sanitation engineers to fix the problem first...
- and... sanitation engineers were unable to act because policymakers are invariably aiming for the large centralized treatment plants!

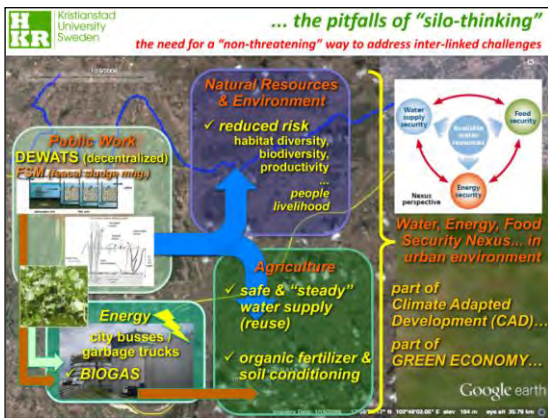
Could sanitation and drainage engineers be the next allies in the struggle to maintain functioning aquatic ecosystems in and around urban centers?

Can the wetlands/fisheries practitioners help in the struggle to establish the rapid roll-out of a decentralized and "lower tech" approach to sanitation?

Small drainage basin survey	% of 856 buildings
frequency	(25% commercial)
> 1 time / yr	3%
1 time / yr	26%
1 time / 2-3yr	30%
never	41%

Source: JICA 2010

10



11

CITYBLUES ++ Climate Compatible Development in Vientiane

Research Platform & Partnership

Helping HoI An achieve its Eco-City Vision

CITYBLUES ++ Energy + Food-Security

Keep water clean as it flows through and out of the city...

Vientiane, Laos PDR

1990

2000

1990

1990

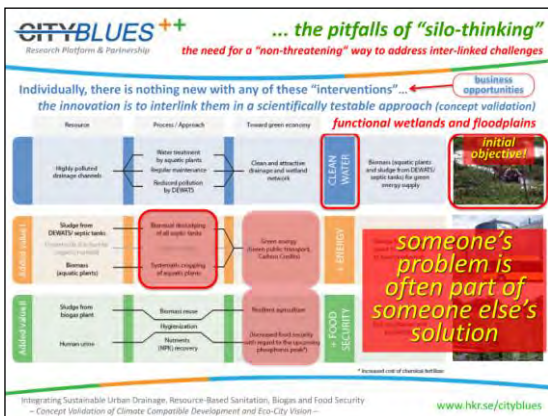
2000

2010

2012

Partners: KRINOVA, SEI, REBPOUGH, BODAC, DPWT

12



13

CITYBLUES ++ A dialogue platform for cross-sectorial "brain storming" and ACTION!

Science is not enough...

Anchoring of the "question process" (OWNERSHIP by practitioners that have the headches to find solutions) is key to supporting decision-making and business opportunities

Approach adopted after hearing too often...

"Too many high-level discussions and not much on the ground"

"We need to see, smell and feel the effect of each interventions"

Partners: KRINOVA, SEI, REBPOUGH, BODAC, DPWT

14



**CITYBLUES++**  
Research Platform & Partnership

A dialogue platform for cross-sectoral "brain storming" and ACTION!

**Lessons learnt:**

- ✓ cross-sectoral "brain storming" does **weaken** "silo-thinking"... and win-win solutions **which directly benefit "aquatic resources"** do actually emerge, **but...**
- ✓ the "validation process"... **THE NEED TO SEE, SMELL AND EVEN TASTE** (in the case of water resources) **THE ACTUAL EFFECT OF EACH INTERVENTIONS...** is central to their acceptability, as these solutions are often "outside" institutionally accepted ones.

**demonstration site... Vientiane: large scale + cross-sectoral = funding challenges !**

difficult to "compete" with even small infrastructure investment projects

15

**CITYBLUES++**  
Research Platform & Partnership

A dialogue platform for cross-sectoral "brain storming" and ACTION!

**Decentralized Wastewater Treatment Systems (DEWATS)**

Completed (3):

- ✓ primary school
- ✓ noodle factory
- ✓ a private home

Designed (2 for City):

- ✓ Cu Lao Cham
- ✓ new development area

**Organic farm** in Cam Thanh is operational and receiving visitors.

**Challenges + Opportunities**

- ✓ ca. 90,000 inhabitants... up to 45,000 tourists per day (septic tanks, no central sewage treatment plant)
- ✓ Cu Lao Cham
- ✓ mandated to become the **first Eco City of Vietnam** (official review in 2014)

**W.A.T.E.R. Project Team**

Integrating Sustainable Urban Drainage, Resource-Based Sanitation, Biogas and Food Security  
- Concept Validation of Climate Compatible Development and Eco-City Vision -

[www.hkr.se/cityblues](http://www.hkr.se/cityblues)

16

**CITYBLUES++**  
Research Platform & Partnership

A dialogue platform for cross-sectoral "brain storming" and ACTION!

**ACTION FOR THE CITY**  
Bringing people together for livable cities

NGO linking communities and local government authorities. Hoi An authorities requested their assistance in developing:

- use **CITYBLUES++** as an enabling framework, adding / linking more dimensions to their equity and sustainability approach.

**Project "Mitigating Inflows of Tourism Related Pollutants to the Nipa Palm Wetlands of Cam Thanh Commune", IUCN Mangrove for the Future - Small Grant Facility program [wrapping-up]**

Integrating Sustainable Urban Drainage, Resource-Based Sanitation, Biogas and Food Security  
- Concept Validation of Climate Compatible Development and Eco-City Vision -

[www.hkr.se/cityblues](http://www.hkr.se/cityblues)

17

**CITYBLUES++**  
Research Platform & Partnership

Lessons learnt from 24 years of observing Vientiane, someone's problem is often part of someone else's solution...

**Earlier attempt... 2007-2010**

**Pollution & flood solutions for Vientiane Capital City using wetlands** (ກຸ່ມວິທະຍາສາດສຶກສາແລະແກ້ໄຂບັນຫາລະບົບນ້ຳສະໜອງແລະນ້ຳປຸງອາຫານຂອງເມັງຄອນລາວ)

**functional wetlands and floodplains in urban and peri-urban zones**

**initial objective!**

**lesson learned... size does matter!**

Integrating Sustainable Urban Drainage, Resource-Based Sanitation, Biogas and Food Security  
- Concept Validation of Climate Compatible Development and Eco-City Vision -

[www.hkr.se/cityblues](http://www.hkr.se/cityblues)

18

**Kristianstad University Sweden**

**The challenges of keeping floodplains and wetlands in rapidly growing cities**

How far has the urban pollution reached (length of impact zone)?

2006: =16 km, ca. 30% of distance to Mekong River

April 2013: > 36 km, ca. 70% of distance to Mekong River (based on NH)

To reduce flooding risks in Vientiane, the entire (54 km) wetland-river system was "rectified" early 2013

**URBANISATION (lost of wetlands) IS NOW A CROSS-BOUNDARY ISSUE ?**

19

**Kristianstad University Sweden**

**The challenges of keeping floodplains and wetlands in rapidly growing cities**

How far has the urban pollution reached (length of impact zone)?

**Once the sanitation problem is taken care of... the challenge is far from being over !**

Stream Quality: Good, Fair, Sensitive, Impacted, Damaged, Severely Damaged

Watershed Impervious Cover: 10%, 25%, 40%, 60%, 100%

30%

20

**Kristianstad University Sweden**

**CITYBLUES++ Energy + Food-Security**  
Keeps water clean as it flows through and out of the city

**The challenges of keeping floodplains and wetlands in rapidly growing cities**

Lessons learnt from 24 years of observing Vientiane, Lao PDR

someone's problem is often part of someone else's solution...

Jean O. Lacoursière  
Professor in Sustainable Water Management  
coordinator CITYBLUES++  
jean.lacoursiere@hkr.se  
www.hkr.se/cityblues

Lena B.-M. Vought  
Professor in Limnology  
lenavought@hkr.se

Integrating Sustainable Urban Drainage, Resource-Based Sanitation, Biogas and Food Security  
- Concept Validation of Climate Compatible Development and Eco-City Vision -

[www.hkr.se/cityblues](http://www.hkr.se/cityblues)

21



## THE CHALLENGES OF KEEPING FLOODPLAINS AND WETLANDS IN RAPIDLY GROWING CITIES

*By Dr. Jean Lacoursière  
Professor, Sustainable Water Management, School for Education and Environment,  
Kristianstad University, Sweden*

**A lesson being learned right now:  
Water infrastructure development and  
fish passage in the Mekong**

**LA TROBE UNIVERSITY**  
The Murray-Darling  
Freshwater  
Research Centre

Oudom Phonekhampheng, Douangkham Singhanouvong, Garry Thorncraft, Lee Baumgartner, Jarrod McPherson, Tim Marsden, Craig Boys

SEAFDEC Meeting on Fisheries, Aquatic Resources and Wetlands: 15 years lessons learned  
Phnom Penh, 2014

1

**The problem?**

Thousands of migration barriers  
Throughout the Lower Mekong  
Basin

Creating severe declines in  
commercial and sustenance  
Fisheries on floodplains

2

**The problem?**

3

4

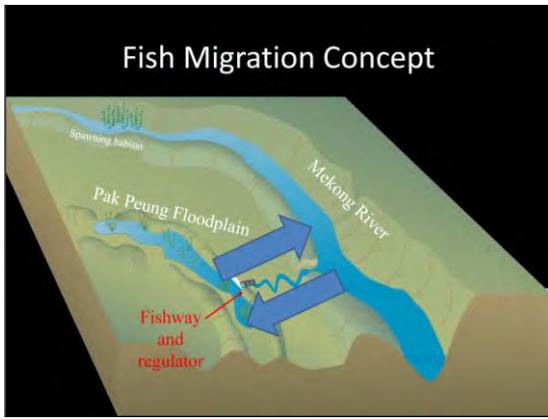
**Fish Migration Concept**

5

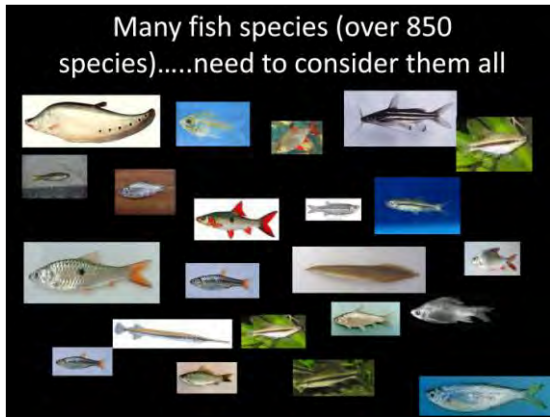
**Fish Migration Concept**

6





7



8

### Social Importance of fish

LMB – approx 2.2 million tonnes per annum  
About 2% of total world fish catch

Importance of fish in sustenance diets

	Fish	Beef	Pork	Chicken
	kg/person/year	kg/person/year	kg/person/year	kg/person/year
Lao PDR	29 (48% animal protein)	5	8	5
Cambodia	37 (79% animal protein)	2	3	2

9



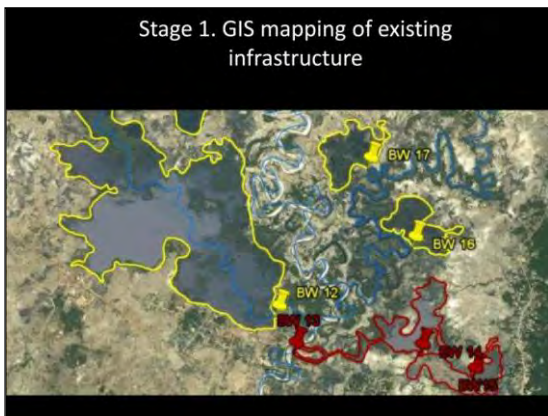
10



11



12

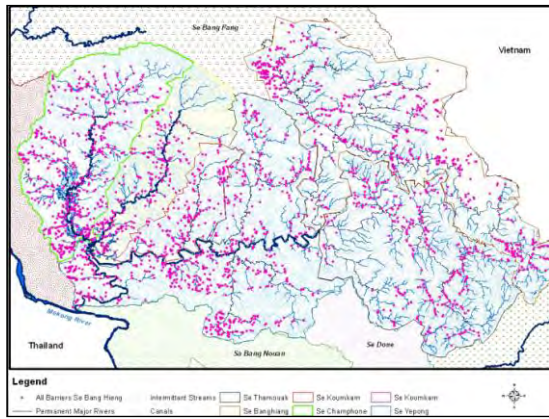


13

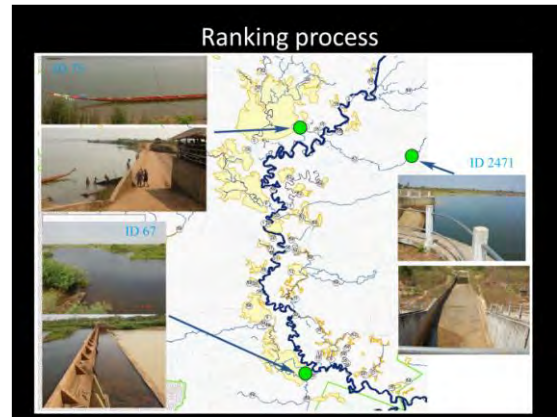


14

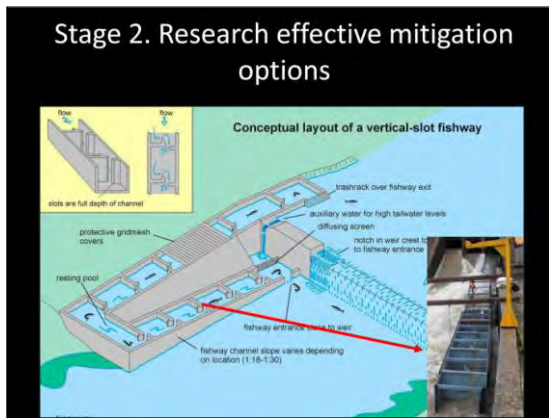




15



16



17



18



19



20



21



22



Different designs



23



24

Stage 3. Construct a permanent fishway at the experimental site



25



26



27



28

Pak Peung Demonstration Fishway



29

Stage 4. Return to the Mekong



30



- To return to the Mekong fish must leave the wetland through undershot gates

31

### Fish welfare

- Pilot experiments in Australia and Laos PDR show that more fish are injured or killed by undershot weirs than overshot weirs – BUT why were fish impacted?

32

### Undershot fish mortality

- Nongteng pilot experiments

33

### Understanding how fish are injured - pressure

34

### Understanding how fish are injured - shear

35

### Installation and testing of overshot Layflat gates

- 'Fish-friendly' overshot Layflat gates have successfully replaced undershot gates at over 50 sites in Australia;

36

- Will be retro-fitted upstream of existing gates at Pak Peungn(demonstration site)

37

### Lessons learned - Positive

- Focus on upstream fish migration is not enough
- Need conceptual models to help understand system function
- Need to work in the field with actual migrating fish is the key
- Many species of fish (over 130) were attempting lateral migrations into wetlands (white/black/grey)
- Engage and employ villagers in all aspects of work
- Demonstration sites are very effective!!

38

## Lessons learned – Work in progress

- Good interaction with village/district/province but need to work on relationships with developers
- Sometimes it is OK to prove the experts wrong  
“Perception that fishways did not work”
- We have some data that can help to develop guidelines but not often used
- Need to demonstrate benefits

39

## Acknowledgements:



National, Provincial, District and local community participants in the project – local engagement in all aspects of the work crucial to the projects success



Want to know more about the MDFRC?

Subscribe to [LIMNOSPHERE](#), the MDFRC newsletter

by visiting [www.mdfrc.org.au](http://www.mdfrc.org.au)

Follow @MuDFReaCk on Twitter





40



## ASSESSING CLIMATE CHANGE VULNERABILITY FOR LOWER MEKONG BASIN CAPTURE FISHERIES AND AQUACULTURE

*By Mr. Rick Gregory  
Consultant, AIT Thailand*






### Assessing climate change vulnerability for LMB capture fisheries and aquaculture

Rick Gregory

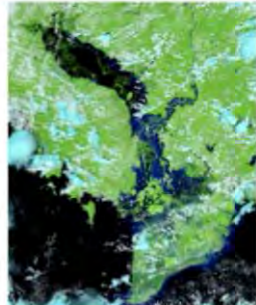
Presented at Experts Meeting on Mekong Cooperation on Fisheries Aquatic Resources and Wetlands: 15 years Lessons learned 12-14 November 2014

1






### Presentation Structure

- Overview of Mekong Capture fisheries and Aquaculture
- Climate Change variables affecting fisheries
- Climate change scenarios for Chiangrai, Thailand.
- Vulnerability Assessments
- Some Conclusions




2

### Overview

- Fisheries & aquaculture are vitally important for food and for the livelihoods of people of the Mekong Region. Virtually all rural families are involved in fishing at some time of the year and small-scale capture fisheries remain a 'livelihood of last resort' for many rural families. In recent decades aquaculture has boomed, providing livelihoods to hundreds of thousands of households.
- Climate change will challenge these traditional and contemporary ways of life, at fundamental levels.



3






### Capture Fisheries

- **Biodiversity:** The number of fish species in the Mekong basin is estimated at > 1,200.
- **Productivity:** Stable, estimated 2 million tonnes per yr. (probably under reported).
- **Systems:** Traditional fishing gears and techniques.
- **Fishers:** Predominantly small-scale.
- **Importance for food security:** Supports Basin wide fish consumption levels of 30-40kg per person per year. Processed fish products important during lean periods. Also has a large influence on coastal marine fisheries. **Likely to stay an important food source.**

### Aquaculture



- **Biodiversity:** Wide range of indigenous and exotic fish 'closed' and available.
- **Production:** Latest estimates 2 million tones. Exponential growth. Dominated by Pangasius culture in Vietnam's Mekong Delta.
- **Systems:** Extensive, semi intensive and intensive systems. Some systems still dependent upon capture fisheries for wild caught juveniles and low value fish, for feed
- **Farmers:** Predominantly small-scale
- **Importance for food security:** Important in urban markets and for small-scale farmers.

4


- Mekong ARCC Project looked at the possible effects of a mid-range climate change projection to 2050 on.....
  - Fisheries/Aquaculture,
  - Agriculture,
  - Livestock
  - Non Timber Forest Products.
- The Project assembled a team of international and national experts for each of these sectors

5

### Climate change related threats for Capture Fisheries & Aquaculture

- Increased temperatures
- Decreased rainfall
- Decreased water availability
- Drought
- Increased rainfall
- Increased water availability
- Flooding
- Storms and Flash flooding
- Sea level rise
- Salinity changes



6

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Understanding Synergies

- These threats should not just be considered in isolation or in a single farming system context.
- E.g. Increased temperatures + decreased water availability = tough conditions for fish
- E.g. in coastal areas, increased sea levels combined with higher rainfall will may exacerbate conflicts between shrimp farmers and rice farmers.

7

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### The challenge

- To develop a methodology that facilitates a robust vulnerability assessment of the Mekong's capture fisheries and aquaculture.
- In assessing the climate change vulnerability of fisheries, it appears to be important to **treat capture fisheries and aquaculture differently**.
- **Capture fisheries** has been treated in a similar way to the ARCC NTFP component, i.e. focused on species.
- **Aquaculture** has been treated in a similar way to the ARCC Livestock component, i.e. focused on species and farming systems.

8

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Finding the 'signal in the noise'.


- The largest single threat to the diversity and productivity of the Mekong's fisheries is the **alteration of river morphology** caused by physical structures.
- A wide range of other threats exist.
  - Overfishing, resulting from increased numbers of fishers and sizes of gears.
  - Aggressive fishing methods, e.g. explosives
  - Loss of productivity through habitat destruction/change
  - Radical changes in land use patterns and run off patterns from upland areas.
  - Establishment of exotic fish populations from aquaculture escapees.

9

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### The ARCC Climate Adaptation & Mitigation Fisheries (CAM) Vulnerability Assessment.

- A mainly quality assessment framework which allows for a systematic appraisal of the threats and impacts on species and production systems, in the context of a geographic area, based on 2050 projections of new weather patterns and climate conditions.



10

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

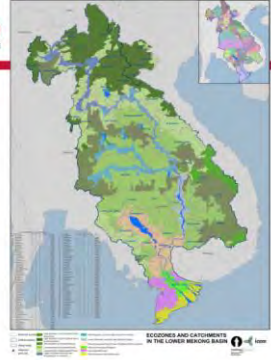
### Capture & Culture



11

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Mekong Eco-zones



12

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Classifications of Fish Species

The Capture Fisheries CAM focuses on fish species and basic characteristics

- **Upland fish:** Inhabiting cool forest streams, these species are likely to be the most vulnerable to temperature increases and may well to shift their range to higher elevations.
- **Migratory (white) fish:** Sensitive to poor water quality and loss of connectivity of 'highways' and habitats.
- **Black fish:** Air breathing fish able to withstand harsh environmental conditions.
- **Estuarine fish:** Found in the Coastal and Delta areas of the Mekong in Vietnam.
- **Exotic fish:** Generalist, opportunistic species which have the potential to become established in the wild.

13

**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Species & Systems Databases

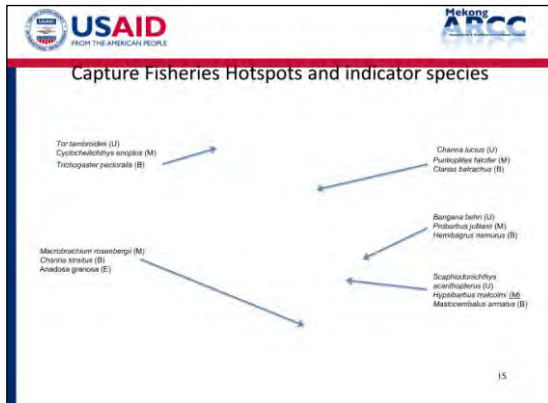
In the CAM framework a indicator species, for each of the fish groups is taken from a 30 aquatic species database which provides:

A summary of bio-information available on the species  
The likely presence of the species in the hotspot area.

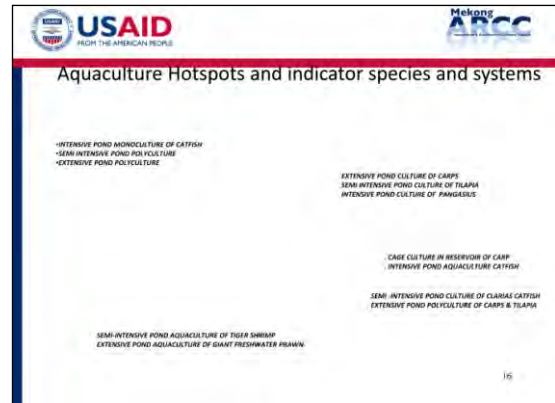
The database also included some information on aquaculture system parameters.

14

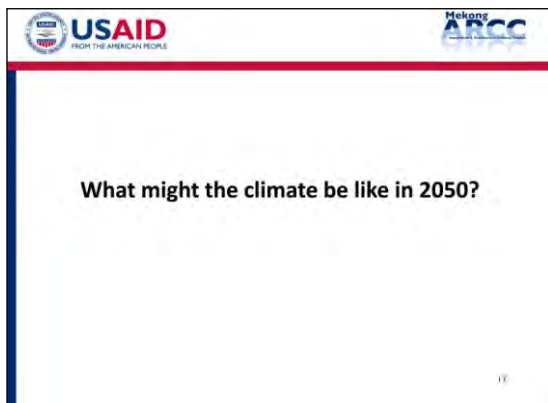




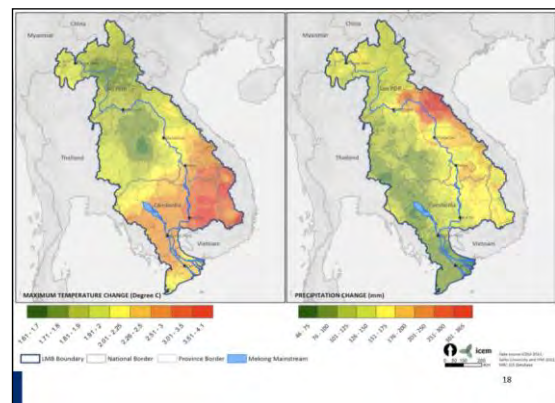
15



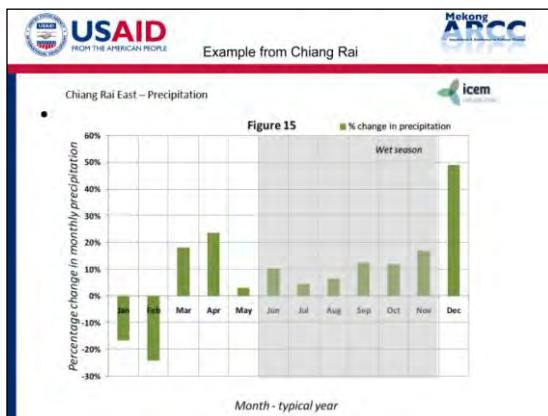
16



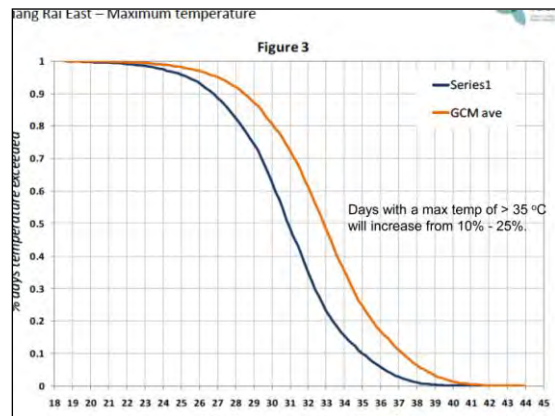
17



18



19



20

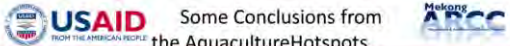
CAPTURE FISHERIES			AQUACULTURE		
Species	Threat	Vulnerability	System & species	Threat	Vulnerability
1. Tor tambroides (L) AND OTHER CARP SPECIES, COMMON MIGRATORY, SEMI-MIGRATORY, AND RESIDENT FISH. CRUCIAL FOR FOOD SECURITY IN SOME AREAS.	Increase in precipitation	medium	INTENSIVE POND MONOCULTURE OF CLARIAS CATFISH	Increase in temperature	high
	Increase in precipitation	low		Increase in precipitation	low
	Increase in precipitation	high		Increase in precipitation	medium
	Increase in water availability	medium		Increase in water availability	medium
	Increase in water availability	medium		Increase in water availability	high
2. Cyclocheilichthys sinensis (M) AND OTHER RESIDENT, SEMI-MIGRATORY, AND MIGRATORY FISH. IMPORTANT FOR FOOD SECURITY.	Increase in temperature	medium	SEMI-INTENSIVE POND POLY-CULTURE OF TILAPIA, BASS, AND CARPS	Increase in precipitation	medium
	Increase in precipitation	low		Increase in precipitation	medium
	Increase in precipitation	medium		Increase in precipitation	medium
	Increase in water availability	medium		Increase in water availability	medium
	Increase in water availability	medium		Increase in water availability	high
3. Trichogaster pectoralis (B) AND OTHER MIGRATORY, SEMI-MIGRATORY, AND RESIDENT FISH. IMPORTANT FOR FOOD SECURITY.	Increase in temperature	medium	EXTENSIVE POND POLY-CULTURE OF CARPS & TILAPIA	Increase in temperature	medium
	Increase in precipitation	low		Increase in precipitation	low
	Increase in precipitation	medium		Increase in precipitation	medium
	Increase in water availability	medium		Increase in water availability	high
	Increase in water availability	medium		Increase in water availability	high

21

Some Conclusions from the Capture Fisheries Hotspots

- Migratory white fish may be less vulnerable, due to the longer and wetter monsoon.
- Black fish appear to be 'climate-resilient' and may increase in the proportion of fish catches.
- Estuarine fish, particularly the sedentary species, look highly vulnerable.
- Several invasive species are likely to increase their range, under the changing conditions.

22



**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Some Conclusions from the Aquaculture Hotspots

- Aquaculture appears to be **more vulnerable to climate change scenarios** than capture fisheries, although it tends to have a high adaptive capacity.
- Intensive, semi-intensive and extensive aquaculture systems all appear to be vulnerable to climate change.
- Intensive aquaculture looks particularly vulnerable in lowland and coastal areas.
- Intensive systems have a high risk of failure but have the greater adaptive capacity
- Semi-intensive and extensive systems may have a lower risk of failure, but also have a lower adaptive capacity.
- So, whilst aquaculture may become possible or more viable in new (higher elevation areas), this will not come close to compensating for the production losses from lowland areas.

23

23



**USAID** FROM THE AMERICAN PEOPLE **Mekong ARCC**

### Some Final thoughts

- It should not be forgotten that fishing and farming communities in SE Asia are **extremely resilient** to the vagaries of the weather and seasons, which in the case of the Mekong River and floodplain are already extreme.
- However, **climate change will test the limits** of the Mekong's people's capacity to produce food and generate incomes.
- These communities must not be left to adapt by themselves. They must be supported to acquire:
  - Awareness of the changing conditions to come.
  - Techniques and innovations suitable for the changing conditions

24

24



# THE POTENTIAL IMPACTS OF CLIMATE CHANGE ON THE FISHERY RESOURCES IN THE LOWER MEKONG BASIN

By Mr. Ngor Peng Bun  
 Capture Fisheries Specialist, MRC Fisheries Programme

Cambodia • Lao PDR • Thailand • Viet Nam  
 For sustainable development



Fisheries Programme

## Potential Impacts of Climate Change on Fisheries in LMB


Ngor Peng Bun, So Nam and Peter Degen  
 MRC Fisheries Programme, Phnom Penh, Cambodia

Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetland: 15 years lesson learnt  
 12-14 November 2014  
 Imperial Garden Villa and Hotel, Phnom Penh, Cambodia

www.mrcmekong.org

1

For sustainable development • Fisheries Programme




## Outline

1. Fisheries in the LMB
2. Climate change in the LMB
3. Potential impacts of climate change in fisheries in LMB countries
4. CC vulnerability of people's livelihoods and food security
5. Fisheries adaptation to climate change
6. Conclusion

www.mrcmekong.org

2

For sustainable development • Fisheries Programme



## Size of LMB fisheries

The Annual LMB fish production is approximately **3.9 million tonnes**

**LMB fish production** =


- 2% of World fisheries production
- 43% of Africa fisheries production
- 19% of America fisheries production
- 4% of Asia fisheries production
- 12% of SE Asia fisheries production
- 24% of Europe fisheries production

- LMB fish production represents about **20%** of the world inland fish production.
- This **inland capture fish production** is higher than anywhere else in the world.

www.mrcmekong.org


3

For sustainable development • Fisheries Programme



## Economic Value of the LMB fisheries


- Total first-sale value: estimated up to **US\$7.0 billion / year**.
- Mostly fish is consumed directly by households, as part of rural subsistence economy – not recorded in official statistics
- Inland fisheries make significant contributions to the monetized economies of all four riparian countries.
- Fisheries accounts for nearly **12%** of Cambodia's GDP, and fisheries value in Lao PDR is equivalent to **7%** of the country's GDP.



www.mrcmekong.org

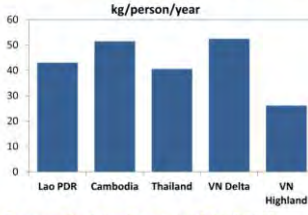
4

For sustainable development • Fisheries Programme



## Contribution of inland fishes to food security

- > **60 million people** live in the LM watershed (100 million by 2025)
- Regional average of per capita fish consumption **46kg/person/year**
- Significantly higher than world rate of **24 kg/person/year**.




Country/Region	Consumption (kg/person/year)
Lao PDR	~45
Cambodia	~55
Thailand	~40
VN Delta	~55
VN Highland	~25

In LMB, much more freshwater fish harvested than cattle produced.  
 In Cambodia and Laos, fish production is twice the combined production of pork and chicken" (ICEM, 2010).

www.mrcmekong.org

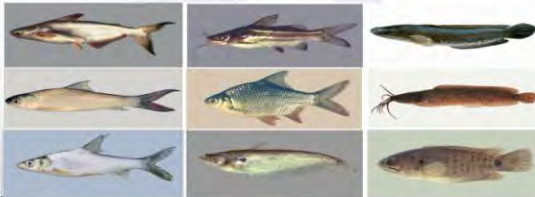
5

For sustainable development • Fisheries Programme



## Contribution to nutrition

- In Average, > **50%** of the total animal protein intake of the people in the Lower Mekong Basin come from fish,
- World protein intake from fish is **16%**.



www.mrcmekong.org

6



For sustainable development • Fisheries Programme

## Is climate change occurring in the LMB countries?

**Yes**

www.mrcmekong.org

7

For sustainable development • Fisheries Programme

## Average maximum daily temperature in wet season, LMB

- By 2050, largest increase in temperature will occur in 3-5 river basins – increase of 4°C.
- Wet season, average maximum daily temperature from 1.7 to 5.3°C.
- Dry season, temperatures will increase from 1.5 to 3.5°C.

Source: ICEM, 2013

www.mrcmekong.org

8

For sustainable development • Fisheries Programme

## Average maximum daily precipitation in wet season, LMB

- Annual precipitation increase by 3-18% (35 – 365 mm).
- Increase of magnitude and frequency of extreme events such as storms, floods, and drought
- Increased seasonal variability in rainfall with wetter wet seasons and drier dry seasons.

Source: ICEM, 2013

www.mrcmekong.org

9

For sustainable development • Fisheries Programme

## Number of drought months, LMB

- Projections for severe drought are centered on NE Khorat Plateau in Thailand, but the largest increases in drought will occur in the Mekong floodplain in Cambodia & Southern Lao PDR.
- Mekong River Delta, during the dry season, maximum salinity is projected to increase by > 50% as compared to the reference period of 4 g/l.

Source: ICEM, 2013

www.mrcmekong.org

10

For sustainable development • Fisheries Programme

## Potential impacts of climate change on fisheries

www.mrcmekong.org

11

For sustainable development • Fisheries Programme

## Climate change impacting fisheries via different pathways

Changes in: **GLOBAL WARMING**

- Sea level rise
- Rainfalls/floods
- River flows
- Lake levels
- Thermal structure
- Storm/drought severity
- Acidification

Effects on:

- Production Ecology**
  - Fish species composition
  - Fish production & yield
  - Fish distribution
  - Diseases
- Fishing & aquaculture operations**
  - Fishing safety & efficiency
  - Fishing infrastructure
  - Aquaculture installations
- Communities**
  - Damage to livelihood assets
  - Risk to health and life
  - Displacement ...
- Wider society & economy**
  - Adaptation costs
  - Market impacts
  - Water allocation
  - Floodplain & coastal defense

Source: Badjeck et al. 2010

www.mrcmekong.org

12

For sustainable development • Fisheries Programme

## Potential impacts of climate change on fisheries

- Expected Higher Temperature (1)
  - Reduce oxygen solubility in water
  - Increase metabolic rates of fish
    - In food limited environments, this potentially reduces fish growth and survival rates.
  - As temperature tolerance ranges of fish are species-specific.... Resulting in:
    - Stenothermal species may be displaced to regions where water temperature more closely match their thermal optima, and be replaced by Eurythermal species.
    - Limited reproduction success – less abundant
    - Alteration of species composition for capture fisheries.

www.mrcmekong.org

13

For sustainable development • Fisheries Programme

## Potential impacts of climate change on fisheries

- Expected Higher Temperature (2)
  - Thermal stratification and wind-driven mixing of water column (in lakes and reservoirs):
    - Reduction of nutrients in surface layers.
    - Sudden overturn of cold anoxic deep waters can cause fish mortalities
    - Reduction in fish stocks and thus fish yield.
  - Aquaculture:
    - Stimulate shifting location,
    - Culture of different species
    - Losses to disease (and higher operating costs)
    - Higher capital costs for aeration equipment or deeper ponds.

Photo: Kent Hurtle

www.mrcmekong.org

14



For sustainable development • Fisheries Programme

### Potential impacts of climate change on fisheries

☐ Precipitations/Rainfalls/Flows (1)


Change in spatial and temporal patterns of precipitation is expected to impact on flows. Change in flows affect habitat availability, system productivity and fish population processes: growth, survival and reproduction

⇒ **WET SEASON:** expected higher precipitations/flows mean more extensive and prolonged floodplains are inundated

✓ **GOOD NEWS** for fish as it potentially increases overall system productivity.

✓ **BUT, NOT** all species can benefit as increased river flows may:

- Hamper upstream spawning migrations
- Erode spawning beds or sweep eggs and juveniles past downstream nursery and feeding habitats.
- Rapid changes in water level diminish reproductive success of channel-margin spawning and nest-building fish.
- Changed timing of flows also can disrupt spawning behaviour.
- These may impact on fish stocks and also have implication for aquaculture that depends on capture fisheries – seed and feed supply.



www.mrcmekong.org

15

For sustainable development • Fisheries Programme

### Potential impacts of climate change on fisheries

☐ Precipitations/Rainfalls/Flows (2)

**DRY SEASON:** greater precipitation and water availability may create favorable conditions for fish to survive.

✓ **But,** increased dry season water levels may diminish primary production and habitat diversity within the system by:

- Permanently submerging fringing forests and vegetation causing permanent die-back and;
- Effectively reducing the size of the flood margin or ATTZ

✓ Increasing hydrologic variability in river systems could favor generalist species at the expense of specialist species – locally adapted fish species.

www.mrcmekong.org

16

For sustainable development • Fisheries Programme

### Potential impacts of climate change on fisheries

☐ Extreme events (storms, severe drought)

Large waves and storm surges; Inland flooding from intense precipitation; Salinity changes; Introduction of disease or predators into aquaculture facilities during flooding episodes can cause:

- ✓ Loss of aquaculture stock and loss/damage to aquaculture facilities and fishing gear.
- ✓ Impacts on wild fish recruitment.
- ✓ Higher direct risk to fishers; and
- ✓ Higher capital costs needed to design cage moorings, pond walls, jetties, etc. that can withstand storms/floods.
- ✓ Lower water quality, availability and flows
  - Higher salinity
  - Loss of wild and cultured stocks;
  - Intensified competition for fishing areas
  - Migration by fisher-folks;
  - Increased production costs.



Photo: Thai DoF, 2011

www.mrcmekong.org

17

For sustainable development • Fisheries Programme

### Potential impacts of climate change on fisheries

☐ Sea level rising/salinity

A combination of lower flow and sea level rise, may cause increase in saline intrusion into river deltas, leading to changes in estuary systems:

- ✓ Shift to brackish water: Displacing stenohaline species, whilst increasing biomass of more tolerant euryhaline species – giant river prawn.
- ✓ Shift in species abundance: distribution and composition of fish stocks and aquaculture seed.
- ✓ Loss of land: reduced area available for aquaculture; and loss of freshwater fisheries.
- ✓ Salt water infusion into groundwater: reduced freshwater availability for aquaculture and species.
- ✓ Loss of coastal ecosystems (mangroves): reduced recruitment and stocks for capture fisheries and seed for aquaculture.

www.mrcmekong.org

18

For sustainable development • Fisheries Programme

### CC vulnerability of people's livelihoods and food security



www.mrcmekong.org

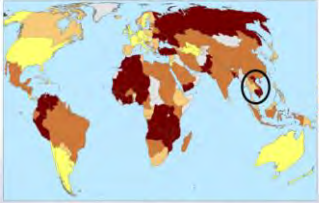
19

For sustainable development • Fisheries Programme

### Vulnerability of people's livelihoods

☐ Using the indices of exposure, sensitivity and adaptive capacity, Allison et al. (2009) compared vulnerability of 132 countries:

- ✓ Cambodia and Viet Nam are amongst most vulnerable ranked 27 & 30, respectively;
- ✓ Lao PDR ranked at 37 and Thailand ranked at 82



www.mrcmekong.org

20

For sustainable development • Fisheries Programme

### Vulnerability – capture fisheries

Species	Threat	Vulnerability
	Increase in temperature	High
	Increase in precipitation	Medium

☐ Upland fish species: Highly impacted by increased temperature, decreased precipitations, storms and flash flood.

☐ White/grey species: highly impacted by increased temperature and decreased precipitation.

☐ Black fish: impacts range: medium – low

☐ All guilds are important for food security

Species	Threat	Vulnerability
3. HIGHLY IMPACTED: SMALL & MEDIUM SIZED BLACK FISH, IMPORTANT FOR FOOD SECURITY.	Increasing salinity	High
	Increase in temperature	Medium
	Increase in precipitation	Medium
	Decrease in precipitation	Low
	Increase in water availability	Medium
	Increase in water availability	Medium
	Drought	Medium
	Flooding	Medium
	Storms and Flash Floods	Medium
	Sea level rise	Medium
Increasing salinity	Medium	

Source: ICEM 2013

www.mrcmekong.org

21

For sustainable development • Fisheries Programme

### Vulnerability – aquaculture

System & species	Threat	Vulnerability
	Increase in temperature	High
	Increase in precipitation	Medium
	Decrease in precipitation	Very High
	Decrease in water availability	Medium
	Increase in water availability	High
	Drought	Very High
	Flooding	High
	Storms and Flash Floods	High
	Sea level rise	High
	Increasing salinity	High
	Increasing salinity	High
	Increase in temperature	Medium
	Increase in precipitation	High
	Decrease in precipitation	Medium
	Decrease in water availability	High
	Increase in water availability	High
	Drought	High
	Flooding	High
	Storms and Flash Floods	High
	Sea level rise	High
	Increasing salinity	Medium

☐ Intensive pond monoculture: Very high-high impacts.

☐ Semi-intensive pond polyculture: High-medium impacts.

☐ Extensive pond polyculture: Medium-low impacts

www.mrcmekong.org

22



For sustainable development • Fisheries Programme

## Vulnerability of people's livelihoods

- ❑ **Climate change** altering fisheries production are likely to have the greatest impact on people who depend on fishing and fish farming as a primary livelihood source.
- ❑ They are often poorer than those who own land and have other primary sources of income. They can afford only limited access to healthcare, education and other public services.
- ❑ Thus: effects of climate change on fisheries in LMB will affect those least equipped to cope/adapt with major changes.
  - ⇒ **Fishing and fish farming dependent people are highly vulnerable to impacts of climate impacts.**



www.mrcmekong.org

23

For sustainable development • Fisheries Programme

## Fisheries adaptation to climate change



Photo: Cambodia Human Development Report, 2011



www.mrcmekong.org

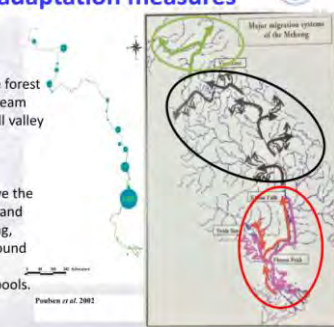
24

For sustainable development • Fisheries Programme

## Fisheries adaptation measures

Capture Fisheries:

- ❑ **Upland fish:**
  - ✓ to retain or rehabilitate forest cover to protect the stream environments and small valley catchments.
- ❑ **Migratory white fish:**
  - ✓ to maintain and improve the connectivity of habitat and their access to spawning, nursing and feeding ground and dry season refuge habitats such as deep pools.



Source: ICEM, 2013.

www.mrcmekong.org



25

For sustainable development • Fisheries Programme

## Fisheries adaptation measures

Capture Fisheries:

- ❑ **Black fish:**
  - ✓ creation and management of dry season refuge areas and CFI conservation areas from which they can repopulate the flood plains each wet season.
- ❑ **Estuarine species:**
  - ✓ maintenance of habitat – replanting mangrove forests
- ❑ **Invasive aquatic species:**
  - ✓ Application of good aquaculture and stock enhancement practices, monitoring and enforcement

Source: ICEM 2013.

www.mrcmekong.org

26

For sustainable development • Fisheries Programme

## Fisheries adaptation measures

Aquaculture:

- ❑ Invest on-site storage to reduce risks of water availability
- ❑ Promote small farm ponds - Thailand
- ❑ Strengthen pond embankments to protect against floods (flash flood and storms).
- ❑ Shift in species – stenothermal vs eurythermal species – adjusting stocking density to manage unexpected high temperatures.
- ❑ Reforest mangroves in derelict shrimp farms for coast line protection and siltation.

Source: ICEM 2013.

www.mrcmekong.org

27

For sustainable development • Fisheries Programme

## Conclusions

- ❑ LMB countries are expected to be impacted by climate change according to various climate change studies/models. Fisheries potentially will be impacted via various pathways.
- ❑ Changes in temperature, rainfalls/flows and sea level will have impacts on fish reproduction, growth, migration, catch, species composition and stocks.
- ❑ Change in fisheries resources will directly affect the livelihoods of people – fishing and fish farming dependent communities
- ❑ Adaptive measures are fish-guild/species specific.


www.mrcmekong.org

28

For sustainable development • Fisheries Programme

## Modelling work being implemented by MRC FP

- ❑ **Fisheries-Hydrology Model** is on-going with FP and expected to complete by June 2015.
- ❑ The model will be used with MRC hydrology scenarios (including CC and water development scenarios) to project change in fish catch and species composition in relation to **climate change**.



www.mrcmekong.org

29




## THE FUTURE WORK ON INLAND FISHERIES IN THE MEKONG RIVER BASIN

By Dr. David Lymer

Fishery Resources Officer, Fisheries and Aquaculture Department, FAO

### Future work on inland capture fisheries in the Mekong River Basin

David Lymer  
FAO



1

### Examples of future FAO work in the region

- Theoretical Production
- Consumption
- Nutrition
- Valuation
- Impacts
- Collaboration with other sectors

2

### Inland fisheries

- Inland fishery 11.6 million tonnes (2012)
- Catch trends are currently unavailable to most inland fisheries
  - Lack of species data
  - Lack of reliable total catch
- Figures are often under-estimates
  - Certainly in developing countries
  - Hidden rural production and consumption
- Mekong river
  - Produce 20-30% of global inland fish catch

3

### Theoretical potential production (TPP) from inland capture fisheries in Asia

TPP = Average Yield<sub>aquatic habitat</sub> x Total Area<sub>aquatic habitat</sub>

Asia	(Kg/ha) Yield <sub>AH</sub>	Area (km <sup>2</sup> )	TPP (tonnes)
Lakes	156.1	1 092 57	17 055 049
Reservoirs	57.6	99 916	575 516
Rivers and streams	48.9	148 248	724 933
Floodplain, freshwater marsh	166.6	1 001 859	16 640 878
Other wetlands (rice paddy, swamp)	116.6	1 019 372	11 885 878
			46,882,253 (official = 17%)

4

### Consumption surveys show access to inland fish important

Show that there is a lot of hidden fish out there and is a valuable contribution to diets that goes unremarked or undervalued.

	Percentage freshwater fish of total consumed (%)	Population	Total freshwater fish consumed (tonnes) (population x consumption x % freshwater fish)
Lao PDR	100 <sup>1</sup>	6 395 713	122 158
Thailand	36	66 402 316	750 373
Cambodia	71	14 364 931	644 073
Viet Nam	40	89 047 397	520 037
	~ 50%		2 036 641

5

### Inland fisheries contribution to nutrition in Lower Mekong basin – based on consumption study

Table 3. Three different models of contribution of freshwater fish consumed to nutritional requirement for the total population of the 4 countries in the Lower Mekong River Basin

	Protein	Calcium	Iron	Zinc	Vitamin A
Small freshwater fish species	10.9%	23.1%	26.7%	48.8%	72.8%
Large freshwater fish species	12.2%	9.4%	13.9%	13.8%	9.3%
All freshwater fish species	11.6%	15.9%	19.9%	30.3%	41.1%

6

## Is replacing fish with other animal protein sources a viable option?

Table 4. The cost (land and water) of replacing the fish produced in the Mekong river basin

	Fish Protein Environmental Replacement Cost (FPERC) per food item		Fish protein Environmental replacement costs in Mekong river basin equivalents (MRCEq) per food item		Increase in total water withdrawal (%) compared to current level
	land (km <sup>2</sup> )	water (km <sup>3</sup> )	land (eq)	water (eq)	
Beef	1929300	24	2.43	0.05	39%
Pig	20710	12	0.03	0.03	20%
Chicken	7630	7	0.01	0.02	12%

7

## Impacts- Increasing competition for freshwater

- Water use expected to double by 2050
  - Agriculture uses 70%
  - Industry 20%
  - Domestic use 10%
- > 460 million ha of irrigated land in 2050
  - Africa - irrigation programmes
  - Asia – intensifying production
- Water availability in 30% of the world's rivers is expected to be reduced due to increased water abstraction and climate change.

8

## Fishing is not typically the main impact on the status of inland fishery resources

- Dam, dike and levee Construction
- Diversions, abstraction
- Damming: 88% of large European rivers, 63% Asia, 62% Africa, 50% Latin America
- Draining of wetlands
- Deforestation/land use changes
- Urbanization
- Pollution
- Navigation
- Acid deposition
- Exotic species
- Climate change
- Overharvesting

**Most of these are related to water quantity and quality:**

**Most solutions are rarely "fishery management solutions"**

IPCC (2013) increases in temperature, local changes of precipitation and changes in the variability of water quantities  
Climate variation exaggerates other impacts

9

## Rationale for future work on inland capture fisheries in the Mekong River Basin

- Overlooked in official statistics
- 50% of consumed fish
- Important animal protein, micronutrients and vitamin source
- Valuation - Replacements costs are high in terms of land and water
- Production is underreported and there is theoretical room for growth
- Impacts mainly from outside the sector – needs for cooperation with other sectors

10

## International instruments and mechanisms that address freshwater ecosystem management

### FAO code of conduct

- Ecosystem approach to fisheries management (EAF)
- UN Watercourses Convention
- UNECE Water Convention
- 1992 Convention on Biological Diversity (CBD)
- Ramsar Convention
- Convention on Migratory Species (CMS)

11

## Asia-Pacific Fishery Commission (APFIC)



- Mandate to work in inland fisheries
- APFIC/FAO culture based fisheries workshop in may 2015 Sri Lanka
  - share regional experiences
  - we will review regional guidelines being developed

12

## THE NETWORK ON SUSTAINABLE HYDROPOWER DEVELOPMENT IN THE MEKONG COUNTRIES (NSHD-M)

By Dr. Phouvin Phousavanh  
Faculty of Agriculture, National University of Lao PDR

Preparing for Experts Meeting on Mekong Cooperation on Fisheries, Aquatic resources and Wetland: 15 Years Lesson Learnt, 12 – 14 November 2014, Phnom Penh, Cambodia

**giz**

### NSHD-M

## Network on Sustainable Hydropower Development in the Mekong Countries



Phouvin PHOUSAVANH (PhD)  
Freshwater Fisheries Ecologist  
Faculty of Agriculture  
National University of Laos  
*(NSHD-M member from Laos)*

1

### Background

**giz**


- The development of the water resources of the Mekong River and its tributaries has seen the establishment of a number of large dams within the member countries.
- In 2000, the World Commission on Dams (WCD) published its report *Dams and Development: A New Framework for Decision-Making*.
- German Development Cooperation through GIZ agreed to facilitate learning experiences between member countries to promote the sustainable development of the Mekong's water resources, minimising negative effects and optimising benefits.

↳ This led to the establishment of **NSHD-M**

2

### Countries Member of NSHD-M

**giz**



- Established in late 2012
- 25 Universities and research institutions

Total network members 127 people from 5 countries

Disciplines: water engineering, civil engineering, agriculture, fishery, water resources management, biodiversity, environmental management, economy, social studies.

A key function of the NSHD-M is human resource development, advanced training, dialogue and regional networking for the sharing of information and good practices.

3

### NSHD-M aims to

**giz**

- Enhance knowledge and skills on sustainable hydropower development (SHD) at academic and research institutions
- Share knowledge and experiences on SHD in the Mekong countries
- Increase awareness on SHD at all levels of decision making
- Strengthen the capacity of stakeholders, including planners and decision makers, to cope with the challenges of SHD.

↳ **Better decision making towards Sustainable Hydropower Development by stakeholders in the Mekong region**

4

### Network Activities

**giz**


- Sharing of knowledge and experiences
- 6 training manuals are developed by international consultants with inputs from network members on key aspects of SHD:
  - Dealing with Social Aspects and Hydropower Development
  - Sustaining River Basin Ecosystems in Hydropower Development
  - Hydropower and Economic Development
  - Comprehensive Options Assessment in Hydropower Development
  - Climate Change and Hydropower Development
  - Transboundary Cooperation and Hydropower Development

<http://www.cdri.org.kh/nshdmekonglibrarypublications/trainingmanuals.html>

5

### SHD key topics

**giz**



#### TM Dealing with Social Aspects and HD

- Social Impact Assessment
- Involuntary Resettlement
- Compensation Policy and Benefit Sharing
- Outstanding Social Issues
- Stakeholder Participation

Note: HD: Hydropower Development

6



### SHD key topics

#### TM Sustaining River Basin Ecosystems in HD

- Biodiversity Conservation
- Fisheries
- Watershed Management and Reservoir Sedimentation
- Climate Change
- Mitigation and Compensation
- Environmental Impact Assessments
- Environmental Management Plans
- Monitoring and Compliance

7

### SHD key topics

#### TM Hydropower and Economic Development

- Macroeconomic effects on a local, regional and national level
- Macroeconomic effects on env. services and water-related sectors
- Analysis and assessment tools
- Economics of compensation, mitigation, resettlement, and benefit sharing mechanisms
- Distribution of economic gains and losses between stakeholders
- Distribution of economic gains and losses between upstream and downstream areas

8

### SHD key topics

#### TM Comprehensive Options Assessment in HD

- Levels of Options
- Identification of Options
- Valuing Options
- Screening and Ranking Options
- Energy Alternatives
- Decision Making

9

### SHD key topics

#### TM Climate Change and HD

- Effects of hydropower contribute on climate change mitigation
- Use of hydropower for climate change adaptation
- Impacts of climate change on hydropower development
- Dealing with remaining uncertainties

10

### SHD key topics

#### TM Transboundary Cooperation and HD

- Benefits of 'cooperative governance'
- Legal frameworks in the Mekong River Basin
- The role of International Water Treaties
- The role of River Basin Organizations
- Transboundary compensation, cost and benefit sharing processes
- Dispute-resolution mechanisms

11

### Network Activities

**giz** German Technical Cooperation

- The network members, many of them being lecturers, also use the increased knowledge to improve their university courses
- TMs translate in to 5 native languages:
  - Cambodian
  - Chinese
  - Lao
  - Thai
  - Vietnamese

12

13

### Network Activities

**giz** German Technical Cooperation

- The NSHD-M members participate in trainings of trainers offered on the 6 key topics.
- Many network members have included the knowledge and training/teaching methodologies at their university classes.
- Many network members have independently conducted training to different stakeholders:
  - Government agencies
  - Civil society organizations
 (The Mekong region, National levels)
- 33 people from the total members are considered qualified trainers on SHD key topics

14

### Training activities for NSHD-M

**Hydropower dam in Hoa Binh, Vietnam**

15

### Training activities

TOTs for NSHD-M members and Regional training NGOs and Civil society

16

### Training Activities

Lectures from 5 universities and researchers from NAFRI in Laos visit to NT2, Laos PDR

PAFO and DAFO staffs from middle and southern Laos visited to Nam Ngouang Hydropower Dam, Lao PDR

17

### Training Activities

PAFO and DAFO staffs from northern Laos visited to Nam Lik (1+2) and Nam Ngum 2 Hydropower Dams, Lao PDR

18

### Training Activities

Fisheries students/NUOL visited to Nam Ngum 1 hydropower dam and , Lao PDR

Fisheries students/NUOL conducting the field study on river ecology and fisheries in Nam Song, Lao PDR

19

### NSHD-M aims to

- 12 trainings for NSHD-M (2013-2014)
- 4 trainings for the Mekong countries/regional level
- 12 trainings for national levels
  - Cambodia: 3
  - China: 1
  - Laos: 3
  - Vietnam: 5
- 350 participants from the Mekong countries
- 30% of participants are females

20

### Case Studies

N	Title	Authors	Institute
1	Transboundary impacts from Hydropower Developments on the Sesan River on the Downstream Communities (Cambodia)	Lor Rasmey Ham Kimkong	RUPP
2	Expected Impact and Management Plan of Lower Se San 2 Hydropower Project (Cambodia)	Mark Sithirith	Royal University of Phnom Penh
3	Avoiding Social Risks Caused by Resettlement of Xiaolangdi Multipurpose Dam Project in China (China)	Shi Guoqing Qingnian Yu	Hohai University
4	Compensation and Livelihood Restoration at Nam Theun 2 Hydropower Project (Laos)	Silinthone Sacklokhiam	NUOL: Faculty of Agriculture
5	Social Safeguard Planning in Xekhaman 1 and Nam Ngum 3 Dams in Lao PDR. (Laos)	Dandouane Khouangvichit	NUOL: Dept. History and Anthropology
6	Aquatic Biodiversity and Fisheries Management in Nam Theun 2 Hydropower (Laos)	Phousavanh Phouwin	NUOL: Faculty of Agriculture
7	Lessons Learned from the Lamtakong Hydropower Project (Thailand)	Liamlaem, Warunsak, Nitsoravut, Rachnarin	Thammasat University
8	Public Involvement in Environmental Impact Assessment Toward Sustainable Hydropower Development (Thailand)	Wanpen Wirojanagud, Chanya Apipatakul	Khon Kaen University
9	Good Practice and Lesson Learnt from Sninakarim Dam, Focus on Dam Safety and Disaster Prevention (Thailand)	Sayam Aroonsimorakot, Gunn Pasprayun	Mahidol University
10	Impact assessment of DaK Mi 4 hydropower plant in Quang Nam – Da Nang, Vietnam (Vietnam)	Xuan Quach Thi	Dised

21

22





THE FUTURE COOPERATION WITH ACIAR TO SUPPORT MEKONG FISHERIES

By Dr. Chris Barlow  
 Fisheries Program Manager, ACAIR

**Australian Centre for International Agricultural Research  
 ACIAR**

**Chris Barlow  
 Fisheries Program Manager**

- Country focus
- Mode of working
- Current Mekong work



www.aciar.gov.au


1

**ACIAR Fisheries Program –  
 Country Focus**

Focus on countries where fisheries are important for livelihoods and food security:

SE Asia –  
 Indonesia, East Timor, Philippines, Vietnam, Cambodia, Lao PDR, Myanmar


PNG and Pacific



2

**ACIAR Fisheries Program –  
 Project Modality**

- ACIAR funds research
- Approximately 25-30 projects
- Budget about \$8 million per year
- Different countries, different capacity
- Identifying projects - Emphasis on
  - Priorities of country partners
  - Applied through to "blue sky" research



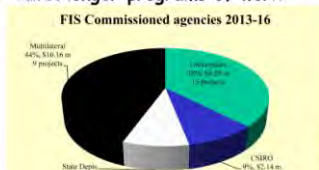

www.aciar.gov.au

3

**ACIAR Fisheries Program –  
 Project Modality**

- Commissioned agency plus national partners  
 Match Australian or international capacity with local agencies (usually government Fisheries Dept's)
- Generally 3-5 year projects (\$1-2 million/project, with that again as in-kind)
- Can be longer programs of work

FIS Commissioned agencies 2013-16

www.aciar.gov.au

4

**ACIAR Fisheries Program –  
 in Mekong region**

- Culture based fisheries, reservoirs in Cambodia and Lao (NACA, FiA, LARReC)






www.aciar.gov.au

5

**ACIAR Fisheries Program –  
 in Mekong region**

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries - mainly Cambodia (WorldFish, FiA, universities)

www.aciar.gov.au

6

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- **Fish passage technology (several projects, Lao based) (NSW Fisheries, NUoL, LARReC)**



7

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- Fish passage technology (several projects, Lao based)
- **Rice-fish culture in Mekong delta (UNSW, RIA2, Rice Institute)**



8

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- Fish passage technology (several projects, Lao based)
- Rice-fish culture in Mekong delta
- **Oyster production in northern Vietnam (NSW Fisheries, RIA1)**



9

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- Fish passage technology (several projects, Lao based)
- Rice-fish culture in Mekong delta
- Oyster production in northern Vietnam
- **Fish feed manufacture and fish diets, Vietnam (CSIRO, RIA1-2-3, NTU, feed millers)**



10

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- Fish passage technology (several projects, Lao based)
- Rice-fish culture in Mekong delta
- Oyster production in northern Vietnam
- Fish feed manufacture and fish diets, Vietnam
- **Grouper aquaculture, Philippines and Vietnam (USC, RIA1, SEAFDEC)**



11

## ACIAR Fisheries Program – in Mekong region

- Culture based fisheries, reservoirs in Cambodia and Lao
- Valuation of Mekong fisheries – mainly Cambodia
- Fish passage technology (several projects, Lao based)
- Rice-fish culture in Mekong delta
- Oyster production in northern Vietnam
- Fish feed manufacture and fish diets, Vietnam
- Grouper aquaculture, Philippines and Vietnam
- **Sea cucumbers, Philippines and Vietnam (WorldFish, RIA3)**
- **Aquaculture and river fisheries, Myanmar (WorldFish, Dept Fisheries)**



12

## ACIAR Fisheries Program – Summary comment

Funds international fisheries research

Aquaculture and capture fisheries

Country priorities

Partnerships

Longevity – we will not disappear



13

## ACIAR and this meeting

We will look for opportunities with new Inland Dep't

Need Indonesian Gov support – but can be regional work

Must be priority for research  
Needs to have impact – benefits  
ODA – Ag, Water and Fisheries  
Partnerships

ACIAR funding is competitive !



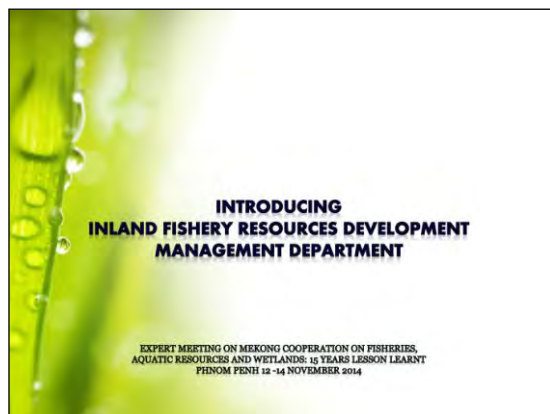
14



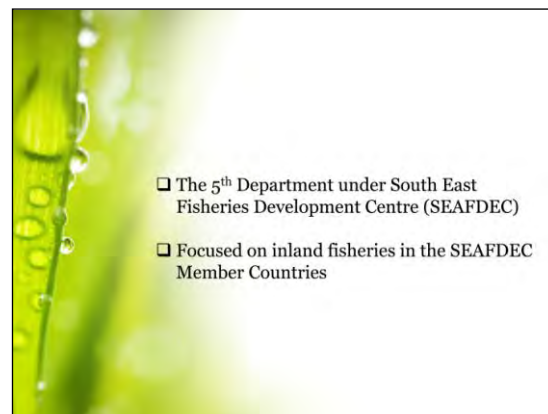
## THE FUNCTIONS AND RESPONSIBILITIES OF SEAFDEC/IFRDMD

By Mr. Budi Iskandar Prisantoso

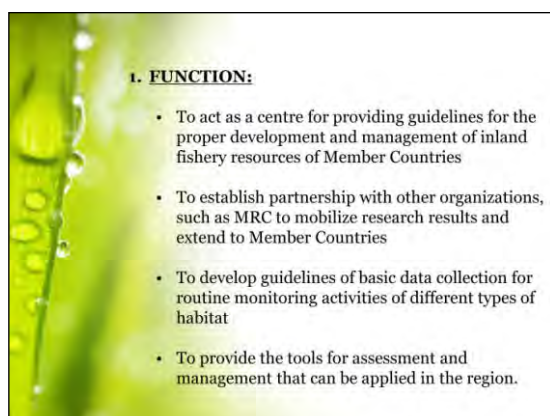
Chief, Inland Fisheries Resources Development and Management Department (SEAFDEC/IFRDMD)



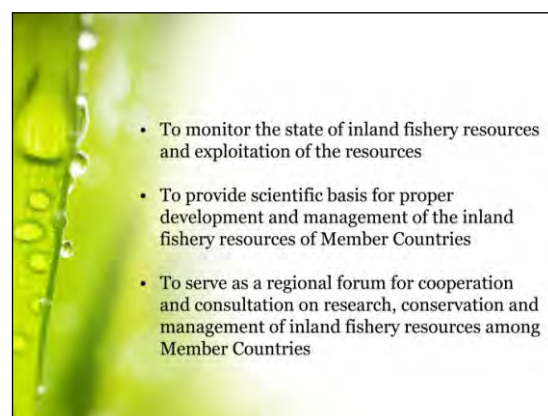
1



2



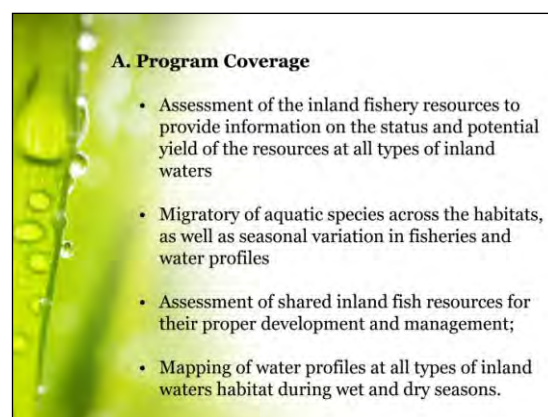
3



4



5



6



- Research on fishing gear and method aimed at improving management and conservation of the inland fishery resources;
- Monitoring of catches and analysis of catch effort data from commercial fishing gears;
- Fishery limnology to determine the relationship between physico-chemical parameters and the fishery resources;
- The linkages and impacts from other sectors to inland fisheries, fisheries ecosystem conservation caused by the high competitiveness and influence from non-fisheries sector.

7

- Protection of inland fishery resources, e.g. technologies and mitigating measures to ensure habitat inter-connectivity
- Culture Base Fisheries (CBF) in inland waters.
- Economic viability studies on fishing activities of Member Countries;

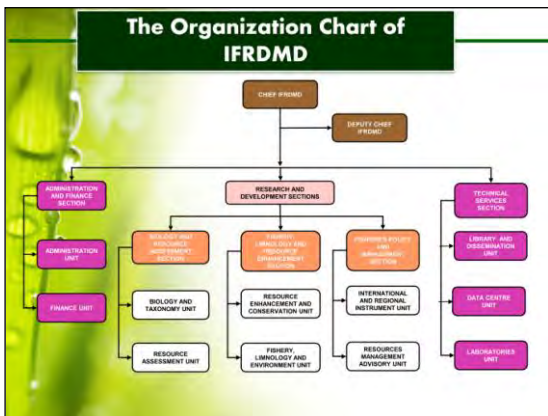
8

- B. Training Workshop Program**
- The Department will conduct training through:
- Training of researchers and fisheries managers especially from Member Countries;
  - On-the-job training for researchers and administrators of the Department; and
  - Seminars and workshops.

9

- C. Information Program**
- Dissemination and Information Exchange through:
- Publishing periodicals and reports;
  - Distributing information to Member Countries and other international agencies/organizations; and
  - Library services

10



11

## ADOPTED SUMMARY OF RECOMMENDATIONS

*Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands:  
20-year Lessons Learnt**General Recommendations*

- G-1 **Enhance regional cooperation on inland fisheries:** MRC, SEAFDEC and FAO/APFIC and relevant organizations should continue and strengthen their cooperation and dialogues, and provide inputs to relevant upcoming meetings in order to support sustainable development and management of inland capture fisheries in the LMB and Southeast Asia as a whole. In the process, support could be sought from available sources to ensure suitable participation in taking up the results, achievements and lessons learnt to policy makers and consider working with NGO's (WWF, IUCN and others) and the private sector.
- G-2 The **importance of inland fisheries should be promoted** to people and organizations working with other sectors. In the process, seek their support for the sustainable management of inland fisheries and facilitate communication to explore options to cooperate with a broad range of organizations and agencies. However, there is a need to strike a balance by preparing valuable and quality information to be conveyed to organizations and agencies not directly engaged in fisheries.
- G-3 MRC, SEAFDEC, FAO/APFIC and others should be pro-active in promoting the achievements generated and the experiences gained on the importance of Mekong fisheries to the people of the Mekong Basin. Various media should be mobilized through SEAFDEC, FAO/APFIC, MRC and other channels and available information should be used to advocate the importance of aquatic resources to the livelihoods around the Mekong. Partners should seek to gain increased recognition of the importance of fisheries especially among decision-makers inside and outside of the region. People engaged in fisheries should attend other meetings convened by other sectors to share information and drum up support to the inland fisheries sector not only with government agencies but also with regards to private sector enterprises.
- G-4 SEAFDEC should work with the MRC in support of the development MRC's **Mekong Basin-Wide Fisheries Management Strategy**. In following-up the Strategy, SEAFDEC should take steps to accommodate the uptake of the concepts emerging from the Strategy into the SEAFDEC program frameworks on inland fisheries management and development.
- G-5 SEAFDEC should extract the methodologies and tools that have been used for various studies in the LMB, in order that these tools could also be applied in other inland aquatic areas of Southeast Asia with similar conditions. In the process, consider the specificity of the Mekong and Mekong habitat types.
- G-6 As SEAFDEC has established a coordination unit for Ecosystems Approach to Fisheries Management (EAFM), MRC and SEAFDEC should work together to promote the application of EAFM concept in inland fisheries management. As needed, special modules should be developed to reflect the specificities of inland fisheries.

## ***Thematic Cluster Recommendations***

### **CLUSTER 1: Mekong Agreements**

- 1-7 Relevant agencies/organizations should consider (a) addressing trans-boundary management issues to support synchronized development and management of inland fishery resources among concerned countries; (b) organizing fora to share and exchange experiences, as well as among different agencies/organizations and development sectors to enhance planned activities, balance interest among relevant sectors, and avoid duplication of efforts; and (c) developing the platform for sharing of information among various partners.
- 1-8 Raise the profile of Mekong fisheries: Technical agencies/organizations should take active roles in generating, providing, and exchanging good quality and timely data and information in appropriate format, to support decision-making processes that may have impacts to inland fishery resources and habitats, and raise the public's awareness on the importance of inland capture fisheries.
- 1-9 MRC Fisheries Programme that focuses on management and sustainable development of fisheries in the LMB should work closely with concerned partners, *e.g.* SEAFDEC and FAO/APFIC, to ensure that issues on Mekong fisheries are appropriately addressed in the agenda of the ASEAN and relevant international fora. SEAFDEC should mobilize the initiatives and experiences of MRC on inland capture fisheries not only in the LMB but also in other Southeast Asian countries.
- 1-10 Partners to the MRC should support and enhance the role of MRC in advocating the sustainable management of inland fisheries in the Mekong and strengthen the cooperation with other agencies such as SEAFDEC, to be more active partners in taking the role in research and development in coordination with MRC and other concerned organizations.
- 1-11 In view of the perspective of the development of a new MRC Programme structure based on “core program” and with the likelihood of the Fisheries (and other sector) Programs disappearing as a separate entity, the roles and functions of SEAFDEC and other partners in assuming the roles of filling the vacuum and maintaining regional dialogues on the status and trends of fisheries, should be assessed to ensure a continued coverage of Mekong fisheries at appropriate (policy) levels.
- 1-12 Regional fisheries bodies such as SEAFDEC, APFIC and MRC/TAB should facilitate regional coordination and collaboration by playing the leading role in promoting high-level coordination among concerned countries for fisheries research and development on inland capture fisheries. Partners should continue to build upon the TAB and strengthen the mechanism of the MRC to improve communication in multiple directions on the status and importance of Mekong fisheries.

### **CLUSTER 2: Assessment of Mekong Productivity and (Fisheries) Production**

- 2-1 Concerned countries and agencies should consider adopting as appropriate, methodologies that have already been developed by relevant organizations, *i.e.* MRC, for monitoring fish catch (*e.g.* fishery status and trends, fish migration, identification of spawning grounds); and analyzing compiled data in order to come up with better picture of the fishery production of various inland aquatic ecosystems.
- 2-6 Relevant agencies/institutions involved in data collection should enhance coordination and collaboration to ensure the compatibility of data, and consider developing and integrating databases (*e.g.* existing databases of academes, national and regional agencies) to support compilation and analysis of data from various sources.
- 2-7 Efforts should be made by concerned countries and agencies to raise the awareness of all stakeholders on the significant contribution of rice field fisheries to nutritional and food requirements of local people in the LMB, and to seek high-level support to ensure the sustainability of rice field fisheries, *e.g.* securing the natural refuge ponds, and supporting collection of better data and statistics on rice field fisheries.
- 2-8 Researchers and technical experts have been communicating very well inside the fisheries sector and related academic networks. However, in general research results have mostly been discussed and shared among those engaged in fisheries related sectors and disciplines only but not really



shared outside the fishery-related groups. This is therefore the time to think of generating appropriate ways to communicate with other sectors. By reviewing the lessons learnt from different LMB countries and to promote awareness among the broader public, options could be built to raise the political will of policy makers to support fisheries management which is vital for the sustainable development in the Mekong region.

- 2-9 Concerned countries and agencies should ensure that the awareness of all stakeholders is raised on the fact that although aquaculture could provide fish supplies in response to increasing demand for fishery products in view of decreasing production from capture fisheries, aquaculture cannot replace inland capture fisheries as the latter provides contribution to livelihood and food security for people that have no assets and properties (*e.g.* land) and are dependent on harvesting the products of natural resources, while wild fish resources also fulfill important ecosystem services. Furthermore, there is a need to assess the amount of wild fish needed to support the feed requirements of aquaculture enterprises in order to get an adequate figure on the natural productivity of Mekong fisheries

### **CLUSTER 3: Valuation of Fisheries, Aquatic Resources and Wetlands in the Mekong River Basin**

- 3-8 To mitigate current underestimation of Mekong fisheries, concerned institutions/organizations should develop and apply appropriate/practical methodologies that support better understanding of the contribution of fisheries, aquatic resources and wetlands to national economies and societies. In addition to information on fish yield that provide understanding on the status and trends of inland fisheries, other socio-economic data should be compiled to assess the contribution of wetland resources to food security, livelihood and economic development.
- 3-9 Concerned institutions/organizations should carefully consider the specificity of inland capture fisheries in developing methodologies for data collection, *e.g.* seasonal variation, engagement of large number of fishers (including farmers, part-time and subsistence fishers), quantity that directly goes for domestic consumption, gear types and selectivity. In addition, the quantity and value of inland capture fishers that provide inputs to aquaculture should also be assessed.
- 3-10 Concerned institutions/organizations should develop methodologies that could be applied by countries to extrapolate data on fish yield and production, and come up with more reliable national statistics on inland capture fisheries; include fisheries questions for routine and non-routine data collection (*e.g.* census and baseline statistics assessment) to facilitate extrapolation of data for the national statistics figures.
- 3-11 Compilation of fisheries statistics should be improved to reflect the real situation of inland fisheries in the Mekong. Countries are encouraged to provide more accurate statistics on inland capture fisheries at detailed level (*e.g.* species group) to relevant regional organizations, *e.g.* MRC, SEAFDEC and FAO for regional compilation and analysis.
- 3-12 Relevant research agencies should continue to explore possible methodologies for tracking the movement of the Mekong giant catfish considered as a flagship species in the LMB, and to enhance future study on the species, as the currently available technologies, *e.g.* satellite tagging, are still not appropriate for monitoring this fish species that migrates for very long distance underwater.

- 3-13 In retrospect and to understand “why there is a low recognition of the value of Mekong fisheries,” efforts should be made while recapturing the experiences from 20 years (and more) of Mekong cooperation in fisheries and wetland management and to try to “look back” and assess the reasons behind the lack of attention being given to fisheries. The results could be used as basis to move forward with revised approaches in the promotion and awareness-raising strategy and in the process build upon the lessons learned with regard to the valuation of Mekong fisheries and wetland resources.
- 3-14 There should be a continuous process of evaluating achievements, outcomes and impacts of activities of relevance to Mekong fisheries in order to formulate a convincing information package that could enhance the understanding among policy makers and politicians on the values of Mekong fisheries, aquatic resources and wetlands and be able to get increased (financial) support from the governments in disseminating and implementing developed environmental friendly technologies and guidelines on sustainable aquatic resources management throughout the Mekong Region.

#### **CLUSTER 4: Social and Gender Aspects**

- 4-5 Concerned countries and agencies should be aware that co-management and limitations of the present open access to fisheries could be an appropriate approach for management of inland capture fisheries as it involves very large numbers of fishers and farmers in widely scattered areas. Since effective management by resource users requires supportive legal frameworks and technical supports (including for MCS activities) from responsible national/local authorities and development partners, research works should therefore be pursued in order to come up with information that could support formalization of science-based management measures.
- 4-6 Concerned countries and agencies should enhance the involvement of community leaders and representatives from various groups of stakeholders in related activities, *e.g.* formalizing local agreements, management and conservation activities, fisheries and aquatic resources data collection. As the key actors at village levels, these stakeholders could with their active support, contribute to the success of co-management. In addition, gender equity should be considered and involvement of women should be enhanced in developing activities related to fisheries and supplementary livelihoods.
- 4-7 Concerned countries and agencies should make sure that the capacity and knowledge of all stakeholders (women and men) are enhanced to enable them to increase their involvement in relevant management activities, and their skills should be improved to enable them to uptake various livelihood options. Appropriate fish marketing systems should be advocated and developed to improve returns to rural communities dependent on fishery resources and pave the way for alternative livelihood options. Collection of data on the local methods of harvesting fish and other aquatic products should also be enhanced.
- 4-8 Concerned countries and agencies should undertake initiatives to ensure self-sustainability in income generating activities and management functions by local communities with minimum external support, *e.g.* by generating management incentives (*e.g.* collection of membership/ fishing and licensing fees, income-generation by communities also in areas outside of the fishing sector).

#### **CLUSTER 5: Environmental Focus**

- 5-6 The fisheries and environmental sectors should come up with technical data/information, and transform these into good quality information in order to attract the attention of policy makers and support decision making to balance trade-offs between development projects and ecosystems conservation. In addition, appropriate strategies and approaches for attracting and convincing policy makers should be explored.

- 5-7 Concerned countries and agencies should undertake initiatives for evaluating the impacts of construction and operation of water development projects on inland aquatic species and habitats, and investigating the effectiveness of the different designs of fish passage, *i.e.* facilitate migration and survival of fish, benefits gained from fish passages, and the impacts of fish passage in restoring fish population. However, any misconceptions of infrastructure development in the Mekong River Basin should be avoided.
- 5-8 Concerned countries and agencies should ensure that information on the importance of inland aquatic ecosystems are made known to the public and mass media, to encourage the public in convincing decision makers to consider the concerns for informal economic benefits that rural communities (farmers, fishers and others) could gain from the ecosystems. Moreover, technical information from science-based studies should be translated into languages that could reach out and be understood by a broader target audience (public, policy makers, politicians) through the production of documentary video clips and other appropriate media that generate impacts and create awareness on the importance of inland capture fisheries and wetland/habitats conservation.
- 5-9 While measures and technologies have been developed to mitigate the impacts of construction and operation of water development projects on inland fisheries, concerned countries and agencies should consider adapting such mitigation measures, *e.g.* fish passage, to suit with the context of LMB, *e.g.* types of water barriers, fish species and their migratory requirements (upstream, downstream and lateral).
- 5-10 Concerned countries and agencies should consider developing the platform for facilitating discussion, coordination and development of joint projects between relevant sectors and communities to explore the measures that would mitigate the impacts of development projects including urbanization, and that fisheries should be considered in the planning of development projects; seeking support from decision makers to adopt technologies that are already available; and encouraging people from the fisheries sector to be involved in other sectors' discussion and fora to reflect the issues and concerns on the various aspects of fisheries. To facilitate participation in such dialogues, networks and collaborating mechanisms should be developed within the national institutional structures as well as with other Mekong countries.

**CLUSTER 6: Climate Variability and Climate Change**

- 6-4 Concerned countries and agencies should compile and collate information from relevant agencies to obtain clearer pictures on the climate variability, locally and in the Mekong Basin as a whole, together with assessments of the longer-term the impacts of climate change, and in the process, to investigate and analyze the possible impacts on fisheries, *e.g.* fish biology, hydrology profiles and the ecosystems.
- 6-5 Relevant agencies and organizations should support the efforts to exchange information and experiences on adaptation measures towards climate variability and the possible impacts of climate change, taking into consideration local knowledge on climate change adaptations.

Models should be considered in order to come up with predictions on the impacts of climate change on capture fisheries and aquaculture in the LMB. Thus, relevant agencies and organizations should come up with measures to enhance the resilience of people engaged in fisheries-related activities in response to possible climate variability and the impacts of climate change.





**CLOSING REMARKS**

*By Dr. Chumnarn Pongsri, SEAFDEC Secretary-General*

***Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands:  
20 years lessons learnt  
12-14 November 2014, Phnom Penh, Cambodia***

Your Excellencies, Distinguished Experts, Resource Persons from International and Regional Organizations, Representatives from the Embassy of Sweden, Denmark, US/USAID, Finland, Germany, My Colleagues from SEAFDEC,  
Ladies and Gentlemen, Good Afternoon!

First of all, on behalf of the organizers of the Experts Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20 years lessons learnt, please allow me to thank all of you especially our resource persons and renowned experts for sharing your experiences and the lessons learnt from the Mekong Cooperation during the last 20 years or so. Your cooperation and support during our deliberations, as well as your inter-active involvement led us to the successful compilation of the experiences and lessons learnt which indicate both successes and failures. Most of all, we have come up with significant recommendations to improve the project planning, implementation and management of activities towards a productive and sustained Mekong River.

Please allow me also to express our appreciation to all of you for your constructive comments and suggestions as well as inputs that blend well with the suggested coordinated steps forward, including the efforts that could strengthen the situation of people dependent on the Mekong resources. Last but not least, I would also wish to thank the officers of the Fisheries Administration of Cambodia, the speakers and facilitators for their all-out support during this three-day Meeting. Also, I wish to thank the Meeting secretariat for the excellent arrangements of our Meeting.

Without further ado, I now declare the Expert Meeting on Mekong Cooperation on Fisheries, Aquatic Resources and Wetlands: 20 years lessons learnt closed. For those who will be travelling back to their respective countries, we wish you a happy and successful trip. Thank you once again and good day!