

APFIC THIRD REGIONAL CONSULTATIVE FORUM MEETING

Balancing the needs of people and ecosystems in fisheries and aquaculture management in Asia and the Pacific region

Jeju Island, Republic of Korea,
1–4 September 2010



ASIA-PACIFIC FISHERY COMMISSION (APFIC)

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ISBN 978-92-5-106682-9

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PREPARATION OF THIS DOCUMENT

This is the final report of the Third APFIC Regional Consultative Forum Meeting, “Balancing the needs of people and ecosystems in fisheries and aquaculture management in Asia and the Pacific region” convened in Jeju Island, Republic of Korea. 1–4 September 2010.

Distribution:

Participants of the RCFM
Members of APFIC
FAO Fisheries and Aquaculture Department
FAO Regional Fishery Officers

FOREWORD

The participants of the third APFIC Regional Consultative Forum Meeting (RCFM), like those of the two which preceded it, aimed to strengthen the fisheries and aquaculture sectors in member countries through the transfer and exchange of information and experiences.

Each RCFM is organized around a theme or themes of critical importance to the fisheries and aquaculture sectors. This time the RCFM was organized around four themes:

- (i) Strengthening our understanding of the status and trends in fisheries and aquaculture in Asia and the Pacific region;
- (ii) using the ecosystem approach to the management of fisheries and aquaculture;
- (iii) improving livelihoods and increasing resilience in fishing and aquaculture communities; and
- (iv) regional policy challenges.

Clearly the themes are interrelated and spell out the linkages between the various themes. Making use of them was of paramount importance to the forum participants and their governments and institutions.

Forum participants came to the meeting to develop and reach consensus on ways of implementing policies and action plans designed to address the major issues for the fisheries and aquaculture sectors in the region. These issues include strengthening ecosystem-based fisheries resource management, responding to climate change, ensuring livelihoods and food security, particularly with reference to small-scale fishers, responding to the institutional demands of globalization in the form of increasing regulation of products destined for export markets, combating illegal, unregulated and unreported fishing, and gender equity.

The problems confronting the fisheries and aquaculture sectors in the region are many and varied but the concentrated and hard work of the participants was rewarded with many concrete actions/recommendations related to these problems which readers will find in this report. Hopefully readers of the report will feel that the problems facing the sectors are now better defined and better understood as are the means to solving them. There is considerable agreement about what needs to be done. What is now needed is the political will to take and facilitate action and the willing cooperation of all concerned.

Hiroyuki Konuma
Assistant Director-General and
Regional Representative for Asia and the Pacific

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ACRONYMS

APFIC	Asia-Pacific Fishery Commission
ASEAN	Association of South-East Asian Nations
ARFMM	ASEAN regional fisheries development and management mechanism
ATSEA	Arafura and Timor Seas Action Plan
BOBP-IGO	Bay of Bengal Programme Inter-Governmental Organisation
BOBLME	Bay of Bengal Large Marine Ecosystem Project
CBF	culture-based fisheries
CCAMLR	Commission for the Conservation of Antarctic Marine Living Resources
CCRF	Code of Conduct for Responsible Fisheries
CGIAR	Consultative Group on International Agriculture Research
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
COBSEA	Coordinating Body on the Seas of East Asia
COFI	FAO Committee on Fisheries
COFI-AQ	FAO COFI Sub-Committee on Aquaculture
CPUE	catch per unit effort
CTI	Coral Triangle Initiative
CTNI	Coral Triangle Network Initiative
CTNI	WWF Coral Triangle Network Initiative
DWFN	distant water fishing nations
EAF	ecosystem approach to fisheries
EBFM	ecologically based fisheries management
EEZEU	Exclusive Economic Zone European Union
ExCo	APFIC Executive Committee
FAO	Food and Agriculture Organization
FBA	fishery-based aquaculture
FIEL	Policy and Liaison Service of FAO Fisheries and Aquaculture Department
FMU	fisheries management unit
FRRP	fisheries resource restoration programme
GEF	Global Environment Facility
HACCP	Hazard Analysis and Critical Control Point
ICM	integrated coastal management
ICSF	International Collective in Support of Fishworkers
IMO	International Maritime Organization
INFOFISH	Intergovernmental Organization for Marketing Information and Technical Advisory Services for Fishery Products in the Asia and Pacific Region
IOTC	Indian Ocean Tuna Commission
IPOA	international plan(s) of action
IUU fishing	illegal, unregulated and unreported fishing
JTFED	juvenile and trash fish excluder device
LME	large marine ecosystem
LOA	letter of agreement
MFF	Mangroves For the Future initiative
MMAF	Ministry of Marine Affairs and Fisheries, Republic of Korea
MOU	memorandum of understanding
MRC	Mekong River Commission

MCS	monitoring, control and surveillance
MSC	Marine Stewardship Council
NACA	Network of Aquaculture Centres in Asia and Pacific
NPOA	national plan(s) of action
PEMSEA	Partnerships for the Environmental Management of the Seas of East Asia
RAP	Regional Office for Asia and the Pacific
RCFM	(APFIC) Regional Consultative Forum Meeting
RFB	regional fisheries body
RFMO	regional fisheries management organization
RPOA	regional plan(s) of action
RSAC	SEAFDEC Regional Scientific Advisory Committee
SAARC	South Asian Association for Regional Cooperation
SEAFDEC	Southeast Asian Fisheries Development Center
SIFFS	South Indian Federation of Fishermen Societies
TAC	total allowable catches
TAE	total allowable effort quotas
TCP	technical cooperation programme
TCDC	technical cooperation between developing countries
UNCLOS	United Nations Convention on the Law of the Sea
UNFSA	United Nations Fish Stocks Agreement
WCPFC	Western and Central Pacific Fisheries Commission
WorldFish	WorldFish Center
WTO	World Trade Organization
WWF	World Wildlife Fund

EXECUTIVE SUMMARY

The report of the third APFIC regional consultative forum meeting “Balancing the needs of people and ecosystems in fisheries and aquaculture management in the Asia-Pacific region”, Jeju Island, Republic of Korea, 1–4 September 2010. FAO Regional Office for Asia and the Pacific, Bangkok, RAP Publication 2010/13, 51 p.

1. The purpose of an Asia-Pacific Fishery Commission regional consultative forum meeting (APFIC RCFM) is to strengthen the role of APFIC as a coordinating body in transferring and exchanging information and experiences to assist APFIC member countries and the regional organizations to which they belong to address emerging issues in fisheries and aquaculture in the region. The RCFM precedes the main APFIC session and aims to provide members with a neutral forum to discuss issues and develop recommendations for the commission to consider and act on. This has involved forging better links with member country technical agencies, regional partner organizations and relevant non-governmental organizations across the region, many of which contributed to the third APFIC RCFM.

2. The third APFIC RCFM, “Balancing the needs of people and ecosystems in fisheries and aquaculture management in the Asia-Pacific region”, was held at the Ocean Suites Hotel in Jeju Island, Republic of Korea from 1 to 4 September 2010. The meeting was attended by 92 participants from 18 countries and representatives from ten regional partner organizations and projects. The meeting was hosted by the Government of the Republic of Korea together with the Food and Agriculture Organization of the United Nations (FAO) and Asia-Pacific Fishery Commission (APFIC). The RCFM also received additional support to the organization and participation from Yeosu 2012, the Bay of Bengal Large Marine Ecosystem Project and the Regional Fisheries Livelihoods Programme (See Appendix A – Participant list).

3. The third APFIC RCFM was held to precede the thirty-first session of APFIC and acted as a regional briefing on the activities of the Commission and its member countries as well as provided an opportunity to get an update on the work of various regional partner organizations that are relevant to the programme of work of the Commission. The APFIC RCFM also enabled new and emerging issues related to fisheries and aquaculture to be explored and discussed in an open forum.

4. The forum was requested to develop and agree on ways of implementing policies and action plans developed to address major issues for the region. Based on a review of the biennial status publication, reports of action plans of APFIC regional consultative workshops and presentations by member countries and regional organizations, the RCFM considered the major issues outlined in the agenda and developed a report and recommendations to inform the APFIC session.

5. The third RCFM was organized around four thematic sessions and a final session dedicated to developing RCFM summary recommendations for presentation to APFIC 31st session. The four themes are as follows:

- Strengthening our understanding of status and trends in fisheries and aquaculture in Asia and the Pacific region;

- using the ecosystem approach to the management of fisheries and aquaculture;
- improving livelihoods and increasing resilience in fishing and aquaculture communities; and
- regional policy challenges.

Status and potential of fisheries and aquaculture

- The APFIC review of the state of resources in the region indicates the need for action to address overfishing and overcapacity in many fisheries.
- Fishing down the food chain has occurred in many fisheries with fish stocks and fishing activities changing in response.
- A significant proportion (31 percent) of the catch from the region reported in national statistics is categorized as “not elsewhere included” (nei).
- There are many countries where fisheries stocks have not been assessed for considerable periods of time.
- Aquaculture supplied 57 percent of the world’s aquatic products in 2008 with the majority of production from the Asian region.
- Many countries are prioritizing aquaculture development as a major approach to sustainable supply of aquatic products without increasing fishing effort.
- There is a need to map current and potential sites for aquaculture because land and water resources are finite and will constrain aquaculture production increases unless land and water resources are used more efficiently and equitably.
- Food safety and quality for both international trade and the domestic markets must be addressed to ensure food safety, minimum product quality standards and nutritional food security. Training of farmers in better management practices is a starting point for this.
- Increasing use of low value/trash fish as feeds in aquaculture is a concern. R&D effort is needed to reduce the direct and indirect use of low value/trash fish as feeds and to find substitutes.
- Climate change is likely to impact aquaculture and fisheries operations in certain areas with impacts on aquaculture in certain areas likely to be significant. Mitigation and adaptation measures should therefore be considered.
- Low profit margins from aquaculture pose high risks to economic viability.

Actions/recommendations

- *A review of previous management efforts in the last two decades, disaggregated into inland and marine fisheries should be made to identify what has and has not been successful.*
- *Fisheries management should be done on an area basis and reflect the fact that stocks are multispecies.*
- *Improve information on the capture fishery fleet structure, vessel records and registers.*
- *Collect more reliable sex disaggregated data on fishery sector workers.*

- *Improved identification/categorization of net capture production would improve analysis of the state of resources.*
- *APFIC should broaden its focus beyond key regions like the Bay of Bengal, the South China Seas and the Gulf of Thailand, and improve liaison with stakeholders in other subregions e.g. the Sulu-Sulawesi Sea and the Arafura and Timor Sea. These areas are largely bounded by APFIC members and could be encouraged to contribute to joint reporting for these subregions.*
- *Provide training for key government staff on stock status and trends analysis.*
- *There is a need to further promote better management practices and access to certification for small-scale farmers.*
- *Improve supply chain mechanisms for aquatic products to ensure better prices to producers.*
- *Efforts should be made to increase the use of low value and trash fish for human consumption.*
- *Where aquaculture is promoted, every effort should be made to avoid increased fishing pressure on wild fish stocks caused by using trash/low value fish and fishmeal as feeds.*

Fisheries assessments including assessments of offshore resources in the APFIC region

- Assessments are an essential component of effective fishery governance and management.
- Policies are often founded with limited reference to underlying information on resource status.
- There is currently a lack of stock/fishery assessment capacity which is a constraint.
- Assessments are becoming a prerequisite for international trade and can inform public opinion on conservation issues related to fisheries as well as act as a deterrent to over capitalization of fishing operations.
- In addition to stock assessments that focus on the status of exploited resources, “fishery assessments” that include ecological, socio-economic, governance components, as well as possible external drivers that may affect the fishery are also required. This type of assessment is being advocated as part of implementing an ecosystem approaches to fisheries.
- The framework for an integrated assessment of small-scale fisheries, specifically developed for this subsector, also provides guidance on how to carry out fishery assessments.
- Traditional knowledge is recognized as very important, and needs to be combined with other sources of information. In high value fisheries, traditional knowledge should be combined with more formal assessments.
- In data-deficient situations, qualitative assessments, assessments based on traditional ecological knowledge (TEK) and/or on an anecdotal basis can be a good starting point, rather than taking no action on resource status.
- Tools and methodologies for conducting assessments within data-poor and capacity poor contexts are becoming available internationally, but as yet are not utilized in the APFIC region.

- With other organizations, FAO is developing a toolbox and indicators for EAF, guidelines on integrated assessments of small-scale fisheries and guidelines for the assessment of data-poor fisheries.
- Assessments should use an ecosystem approach framework.

Actions/recommendations

- *Policies directed at opening up new fisheries should be based on assessments showing that potential for such expansions exist. Where such information does not exist, fishery expansions should be conducted with extreme caution.*
- *There is a need to improve fisheries data collection systems including catch per unit effort (CPUE), and biological data on important species, as well as stock/fisheries assessments to inform both management and conservation approaches.*
- *Resources should be mobilized to improve stock/fishery assessment capacity to support management decision-making in the region.*
- *Investment in fisheries research should be increased and policy makers should be sensitized in relation to this need. However, the level of investment needs to be carefully assessed vis-à-vis factors such as the economic value of the fishery and the social context.*
- *Pre-assessment of fisheries is an important first step to identify the extent of management challenges and the needs to address them, before starting on a costly development of fisheries research/management. Each country should try to undertake a pre-fishery assessment process.*
- *Encourage or support area specific studies on:*
 - *The impact of marketing trends on local food security and women's labour in fisheries; and*
 - *the impact of coastal developments and pollution on the health of coastal populations and coastal ecosystems.*
- *Assessment techniques for data-poor situations are needed, but caution is required that these are not perceived as low cost solutions and used at the expense of more quantitative methods that are desirable and required for high value fisheries.*
- *Collate the range of national assessments throughout the region and make this more generally available at the regional level.*
- *AFPIC should encourage member governments to increase networking between countries so that information regarding fisheries/stock assessments is available to all. This information should be provided on a systematic basis.*

Using the ecosystem approach for the management of fisheries and aquaculture

- The ecosystem approach to fisheries and aquaculture has been demonstrated through a range of management measures and some pilot projects and management efforts. Examples of the ecosystem approach to fisheries and aquaculture in action include artificial reefs, marine protected areas (MPA), protection of species, marine refuge areas, seasonal and area closures, habitat restoration, restocking/enhancement, and fishery zoning.

- Furthermore, other initiatives have sought to balance environmental integrity (wellbeing) with the social needs (of fishers, farmers and other stakeholders) within improved governance frameworks.
- Evaluations of fisheries and aquaculture management initiatives are generally not performed or if undertaken are conducted poorly, which limits sharing of the positive and negative results achieved from such efforts.
- Countries in which clear EAF related policies have been successfully implemented have experienced improved dialogue with fishery sector stakeholders, improved compliance with fisheries management measures and, as a consequence, improvements in the fish stocks.
- An ecosystem approach to management is a strong tool for addressing both upstream and downstream issues in inland fisheries.
- A network for promoting EAF tools and learning (EAFNet) is also under development. PICES/ ICES may offer opportunities for exchange and capacity building.

Actions/recommendations

- *Include stronger incorporation of social dimensions in ecosystem based management in the Asian region.*
- *Subregional fisheries and ecosystem management initiatives that are being developed in the Bay of Bengal and South China Seas are a potential source of information and analyses that can be used by APFIC in its deliberations. APFIC should consider strengthening its relationships with such bodies.*
- *There is a need to strengthen fishery research institutions to provide the science needed to improve fishery management.*
- *Member countries should seek to collaborate on ecosystem approach activities where there is a common interest.*
- *Form multistakeholder networks to share information and address shared concerns. In some cases this will require development assistance.*
- *APFIC should facilitate harmonization of EAF.*
- *Countries should establish clear, national, science-based policies for the use of the EAF framework as the basis of their fishery management.*
- *Promotion of better stakeholder participation and the inclusion of women in fisheries management committees and frameworks will facilitate the implementation of realistic, practical management measures and accurately identify what information is needed for management purposes.*
- *Member countries to build on the recommendations of the APFIC Colombo workshop.*

Increasing resilience and improving fishery and aquaculture livelihoods

- It is often difficult for small-scale fishers to change livelihoods given that they depend on fishing for their daily food requirements and lack the capacity or options to make such changes. More government attention is required to address this.

- Although there are many livelihood related initiatives within fisheries and aquaculture projects in the region, they are often poorly integrated.
- Many livelihoods initiatives are formulated based more on central and local government production targets, rather than on sustainable livelihoods analyses.
- Many government policy and legislation revisions are undertaken reactively, have a short-term focus and only temporarily address problems, rather than address the key underlying issues. Longer-term visions and planning are required.
- Many short-term solutions such as subsidies for offshore vessel construction or motorization are likely to result in overfishing in both offshore and inshore waters.
- Many livelihoods initiatives are poorly evaluated and as a result lessons learned, both positive and negative, are lost.
- Many governments have prioritized aquaculture of high value predatory fish species targeted at export markets. Demand for low value/trash fish as either a direct feed or for indirect use in fishmeal can increase pressure on fish stocks.
- The vulnerability of many fishing communities is exacerbated by a lack of access to infrastructure and financial schemes relating to insurance, pensions, marketing and credit.

Actions/recommendations

- *Reinforce legal rights and increase access for fishers and farmers to open water and common property resources.*
- *The contribution of women to the functioning and development of fishing communities should be better recognized and the full potential contribution of women should be exploited.*
- *APFIC member countries should develop national livelihood strengthening and diversification strategies, based on livelihoods analyses conducted using a sustainable livelihood approaches (SLA) framework.*
- *SLA and comprehensive livelihood analyses linked to resource assessments should be the starting point before promoting alternative livelihoods.*
- *Livelihoods initiatives in fisheries and aquaculture should not be conducted in isolation, but should be integrated into broader livelihood programmes.*
- *Integrated approaches, involving a broad stakeholder base, that address improved management of resources at local levels should be undertaken in order to deliver increased livelihoods benefits (e.g. reducing conflicts while increasing income).*
- *Livelihoods initiatives should be assessed against a sustainable livelihoods framework in order to gather and disseminate both positive and negative lessons learned.*
- *Fisheries agencies should “think outside the box” and work across agencies to develop sustainable livelihoods which are independent of fishery resources.*
- *Train and support communities to develop recycling technologies, and to undertake regeneration and conservation of coastal ecosystems and habitats.*
- *Create employment avenues by state support for the further development of community level health, education, and child-care infrastructure.*

- *Added focus should be given to the culture of small indigenous fish species which can contribute to both the livelihoods and nutritional security of women and children in particular.*
- *Where closed seasons prevent poor fishers from fishing, “safety net” and alternative livelihood programmes should be supported.*
- *All APFIC member governments, partner and regional organizations are requested to share their livelihood development experiences as widely as possible so that lessons learned can be captured, beginning with sharing with FAO and the Regional Fisheries Livelihoods Programme (RFLP) so that they can be disseminated throughout the region.*
- *Access to financial schemes relating to insurance, pensions, marketing and credit should be widened in order to reduce vulnerability.*
- *The participation of women in fisheries-related decision-making processes as well as fish workers movements/community organizations should be facilitated and encouraged. In addition, consideration should be made concerning valorizing women’s contribution to fisheries-related activities.*
- *Consider provision of vocational training in alternative livelihoods for youth.*
- *Develop new feeds and feed formulas to reduce reliance on low value/trash fish as feeds and to address the issue of energy transfer during increased aquaculture production.*

Disaster and emergencies

- Numerous emergencies and disasters in the region have negatively impacted both coastal and inland fisheries and aquaculture.
- Recovery after disasters is quicker in communities with previously established social organizations (e.g. fisher associations and cooperative groups) than those without.
- There is a lack of coordinated approaches to rehabilitation and a serious lack of support to the rehabilitation process.
- Often aquaculture and fisheries are overlooked during rehabilitation of agricultural crops and livestock and other rural productions systems.

Actions/recommendations:

- *Noting the increasing frequency of natural disasters in part as a result of climate change, a comprehensive regional disaster management approach should be developed.*
- *Noting the disproportionate impact that natural disasters have on women and children, support specific training on disaster preparedness for women and children.*

Small-scale fisheries (SSF) – instruments, rights

- No definitive definition of SSF has been agreed because of the diversity of fishing fleets worldwide. A functional definition may be more appropriate than seeking to define SSFs based on physical “size”. The definition should recognize the rights of women, indigenous communities and traditional peoples.

- SSFs perform different roles to larger scale fisheries, providing food security and livelihoods for large numbers of often vulnerable people. However, there may be pressure for SSFs to withdraw in order to focus resources on more efficient vessels with greater economic leverage.
- It should be recognized that the SSF sector is constantly evolving with a changing age distribution and labour force and is not a static entity. The economics of fishing are not static and fisheries and aquaculture management must adapt to this.
- The formulation of a legal instrument for SSF will be discussed at a workshop in Bangkok from 6 to 8 October 2010. The SSF instrument will play a valuable role in formalizing support and recognition to the SSF sector.

Actions/recommendations

- *Gender should be included as an integral part of the SSF instrument.*
- *The SSF instrument should also consider the likely implications of climate change.*

Climate change

- Climate stress is already taking place and changes must be addressed. Climate change will cause significant disruption to the fisheries sector and the risks need to be understood. The impacts of climate change in the APFIC region are likely to be higher than global trends: the number of people affected will be disproportionately high; populations are more vulnerable; there is a lower capacity to respond; and sudden onset disasters (e.g. flooding) direct attention away from slower processes associated with climate change.
- Impacts of climate change will include changing distribution of stocks, declining catch values and profits, and higher operating costs for aquaculture. There will also be impacts on infrastructure. Aquaculture may be able to adapt more flexibly than fisheries to climate change, as long as it can cope with higher feeding requirements and costs incurred for disease and stock loss prevention.
- Climate change will compound the pressure on resources which already exist from over exploitation, habitat degradation and pollution. In turn, this will compound pressure on fishing communities/industry. In the APFIC region with its major river systems, the threats to freshwater flows in shared rivers may be of more immediate consequence than impacts on marine ecosystems.
- SSFs are likely to be heavily impacted in terms of safety at sea and disaster risk management, although the flexibility of the SSF sector may help it to adapt better to climate change.
- Adaptation and mitigation planning is currently not being undertaken in the fishery and aquaculture sector and it is vital that fisheries/aquaculture form an integral part of national climate change adaptation and mitigation plans (NAPAs).

Actions/recommendations

- *Prioritize a regional assessment of the likely effects of climate change on fisheries and aquaculture.*

- *It is essential that fisheries agencies fully engage with the development of climate change NAPAs. It appears that there is currently limited integration of the fishery sector into the NAPA process.*
- *Where NAPAs are not being developed, fisheries institutions should develop plans of action to address climate change.*
- *Countries, locations and sectors most at risk from climate change need priority support.*
- *There remains a strong need for communication of climate change effects and their implications for fisheries and aquaculture in a form that is understandable to policy makers.*
- *Prioritize addressing key gaps in natural and social science knowledge as well as policy gaps associated with fisheries adaptation. New arrangements will need to be developed for international fisheries management especially on migration or latitudinal shift in the distribution of fish stocks.*
- *Stakeholder involvement is critical when developing and implementing adaptation strategies.*
- *Development assistance will play an important role in assisting developing countries in their adaptation and mitigation efforts.*
- *Work on downscaling to improve the appreciation of the impacts of climate change at the local and regional level to ensure further buy-in.*
- *Develop micro-level risk profiling and strategies.*
- *More collaboration between international organizations such as PICES/ICES, OECD and APFIC should be encouraged to share climate change related scientific development and policy information.*

Meeting regulations and requirements for combating IUU fishing

- Although member countries want to combat IUU fishing, many countries will find it challenging to implement the regulations within the time frames set and will require support.
- Countries and regional organizations increasingly are taking actions to address IUU recommendations and regulations. This includes both international agreements such as port state measures and other regional initiatives like the regional plan of action (RPOA).
- Many of the APFIC countries, including Thailand and Viet Nam, supported by regional organizations are taking actions to adapt standards and capacities to comply with regulations like the European Union (EU) regulation 1005/2008. Specific regulations have been issued and action taken on fleet registry and identification and certification of market related actors, as well as catch certification schemes which allow exports of fish products to the EU.

Actions/recommendations

- *Provide intensive in-depth training at different levels for producers, traders officials and administrators, on issues relating to the above regulations and future regulations.*

- *Training should be provided for government staff to increase their capacity to deal with environmental and trade regulation.*
- *The effects of the above regulations on small-scale fishers should be communicated by APFIC to member countries.*
- *As recommended at the last APFIC session, member countries should continue to support and strengthen the implementation of the regional plan of action (RPOA) for combating IUU fishing, which nine member countries have signed up to.*
- *Related to the above issues, international and regional organizations including APFIC, FAO, SEAFDEC and the BOBP-IGO can play a key role in providing training and capacity development.*

OPENING OF THE MEETING

6. The participants of the third APFIC Regional Consultative Forum Meeting (RCFM) were welcomed by the Mayor of Jeju City, Mr Kim Byoung-Lib.

7. On behalf of Mr Hiroyuki Konuma, Assistant Director-General of the Food and Agriculture Organization of the United Nations, and on behalf of the FAO Fisheries Department, Mr Kevern Cochrane, Director of the Fisheries and Aquaculture Department, FAO, welcomed all participants to the third APFIC RCFM. Mr Cochrane commented that the APFIC RCFM is an opportunity for regional briefing on the activities of the Commission and its member countries as well as an opportunity to get an update on the work of various regional partner organizations that are relevant to the programme of work of the Commission. Introducing some of the work that would be covered during the RCFM, he noted how implementation of the ecosystem approach and sustaining livelihoods in fisheries and aquaculture communities offered both opportunities and challenges in the region. In thanking the Ministry for Food, Agriculture, Forestry and Fisheries and the Government of the Republic of Korea for hosting the third APFIC RCFM he emphasized the generous financial support which had made it possible for so many participants to attend from the APFIC member countries.

8. The opening speech was delivered by Mr Seung Chung, Vice-Minister of MIMAFF, Republic of Korea APFIC (Korea is chair country for the period 2008–2010), who noted that relations between the APFIC and Korea go back more than a decade to when Seoul hosted the 25th session of the Asia-Pacific Fishery Commission in October 1996. Mr Seung Chung observed that the region's capture fisheries and aquaculture production clearly show the importance of the region's fisheries and illustrates how fisheries products are one of the region's primary sources of dietary protein and remain a pillar of the region's food security. He noted that there is still room for improvement to accomplish sustainable fisheries and aquaculture, with some resources already overexploited and inadequate protection of ecosystems. He noted that the emerging challenges of climate change and the need to implement international agreements call for APFIC members to cooperate to chart a path to a better future for the region's fisheries and in this regard the RCFM is an opportunity to provide right balance between the needs of people and ecosystems. Mr Chung concluded that Asia and the Pacific region's voice is not influential enough on international fisheries matters and expressed his hope that the APFIC will serve as a bridge that connects the region's fisheries to the world, thereby contributing to the development of the fisheries of Asia and the Pacific region.

THEME 1: STRENGTHENING UNDERSTANDING OF STATUS AND TRENDS IN FISHERIES AND AQUACULTURE IN ASIA AND THE PACIFIC REGION

9. The first session of the RCFM was an introduction to the status of fisheries in two key ecoregions in Asia and the Pacific region and the issues related to improving status and trend reporting in fisheries. This session also included an introduction to the findings of the latest APFIC biennial review, *Status and Potential of Fisheries and Aquaculture 2010*.

Status and potential of fisheries in Asia and the Pacific region 2010

Simon Funge-Smith, APFIC Secretary

10. The review presented to the RCFM covered the broad spectrum of fisheries and aquaculture trends together with the related issues concerning reporting quality, management and sustainability and others. APFIC has moved towards a form of subregional reporting that takes various sources of fisheries related data and tries to present them in an integrated manner to illustrate the status of resources and fisheries. For this review, the coverage was for trends in the marine capture fisheries in the South China Sea and Gulf of Thailand subregion and the Bay of Bengal and Andaman Sea region.

11. Specifically, for capture fisheries the report covered general trends in marine capture fisheries in the APFIC region relating to species composition changes, overfishing effects, production trends and capacity in the fisheries. The review noted the continuing problem of poor reporting species composition of catches (the “not elsewhere included” (nei) category remains at 31 percent of total catch for the region). The interest in the region to develop the potential for offshore fisheries was also covered, noting that there are significant needs for improved knowledge of the state of the potential resources and also the lessons learned from a regional FAO/APFIC/SEAFDEC workshop on this issue.

12. The presentation also covered the issues of trends and data issues in inland capture fishery production in the Asian region noting that inland fisheries production trends are rather difficult to interpret and that any indication of increasing production in the region must be considered against the possibility that production in some fisheries may be declining.

Sustainable aquaculture development in Asia and the Pacific region – present status and trends in aquaculture development

Miao Weimin and Simon Funge-Smith, APFIC Secretariat

13. The growth trend of the aquaculture industry in the APFIC region has remained fast and steady over the past 15 years, which has enabled the region to make a very substantial contribution to the world aquaculture industry – 90 percent in terms of quantity and 79 percent in terms of value in 2008 with aquatic plants excluded. The contribution is even bigger when aquatic plants are included. There have been some interesting changes in a number of aspects of the industry in recent years.

14. The presentation gave a complete picture of the sector’s long-term trend but focused more on the recent trend while drawing a general picture of the present status of aquaculture in Asia and the Pacific region by looking at: its contribution to the global aquaculture industry, the top aquaculture producers in the region, the composition of aquaculture production in the region and the production of the most important species/species groups in the region.

15. The presentation also analyzed the major trends of aquaculture development in Asia and the Pacific region in the last two years by looking at the overall regional trend of production against the global trend, comparing the recent growth of major aquaculture producers in the region, the growth of production of major aquaculture groups in the region and the subregional trend of aquaculture production. One very encouraging finding is the production growth of other APFIC members has far exceeded that of China. This indicated a more balanced development of aquaculture in the region, which used to be dominated by the production of China. It is also

important to notice that the production of white-leg shrimp declined in 2008 after consecutive high growth and the production of tiger prawn significantly increased (22 percent) in 2008.

16. The presentation concluded by suggesting some possible directions for aquaculture development in the coming years in the region, such as the production of tilapia, catfish, tiger prawn, white-leg shrimp and marine finfish. Some key issues and constraints on the future of aquaculture in the region were also identified and discussed briefly and include:

- Resource limitations increasingly felt;
- environmental pressures;
- food safety and quality related to international trade and the domestic market;
- use of fresh trash/low value fish or fish meal for aquaculture;
- impacts of extreme climate events on aquaculture production;
- supply of quality seeds for aquaculture;
- minimal profit margin of major cultured species imposes high risk to the economic viability; and
- health problems and imprudent drug use.

Fisheries assessments in the APFIC region and the offshore resources

Gabriella Bianchi, FAO Fisheries Resources Service of FAO

17. During the past two years FAO, in close collaboration with the APFIC secretariat and SEAFDEC, has organized three workshops on resource assessments in the APFIC region. One assessment workshop focussed on offshore resources, and two on reviewing the status of fish stocks in the APFIC region. The usefulness of a suite of methodologies for data poor fisheries was also assessed. These initiatives demonstrate a renewed interest in fish stock assessment, an area of fisheries biology that has been out of fashion for some time. There has been a perception during the past decade that resource assessments are not useful in this region, or in general in a tropical fishery context. A number of arguments were presented in support of stock and fishery assessments:

- Although recognizing that sustainable governance and management require a number of conditions to be in place, such as clear and accepted objectives, functioning and effective institutional structures, clearly-defined and accepted access/use rights, stakeholder involvement, just to mention a few, resource assessments are also necessary for sustainability.
- Consumer concerns on the state of resources and the marine environment are putting pressure to introduce measures such as: traceability of the product, certification schemes and minimum standards in fisheries management. In this context, resource and fishery assessments are expected to become mandatory to enter international trade.
- As a response to the perceived poor state of the resources, and in the absence of reliable assessments, environmentalists are taking up the fisheries agenda, often on assumptions of resource depletions that are not fully justified. This may lead to drastic decisions being pushed onto the fisheries sector, with loss of income and livelihoods and thus more reliable assessments would be highly desirable.

18. Recognizing the limited availability of human and financial resources, particularly in developing countries, methodologies are being identified that can be useful in the context of data-poor and capacity-poor situations. These will complement existing assessment tools. It is important that the region improves its capacity and its assessments as a basis for improved fisheries management. It is recommended that actions are taken to:

- Provide opportunities for training at the regional/subregional levels; and
- develop case studies to carry out fishery and resource assessments, selecting both an industrial fishery context as well as a small-scale fishery context.

19. It was noted that opportunities for training and support can be found if the region considers this to be a priority.

THEME 2: USING THE ECOSYSTEM APPROACH TO MANAGEMENT IN FISHERIES AND AQUACULTURE

“Balancing the needs of people and ecosystems in fisheries and aquaculture management in the APFIC region”

Simon Funge-Smith on behalf of workshop host member Sri Lanka

20. The presentation summarized the findings and recommendations of the APFIC Regional Consultative Workshop on “Practical implementation of the Ecosystem Approach to Fisheries and Aquaculture in the APFIC region”, 18–22 May 2009 in Colombo, Sri Lanka. The workshop was hosted by the Ministry of Fisheries and Aquatic Resources, Government of Sri Lanka and received additional support for participation from the Bay of Bengal Large Marine Ecosystem Project (BOBLME).

21. The workshop brought together seventy-five participants from member countries across the Asian region together with representatives of regional fisheries, aquaculture and environmental intergovernmental and non-governmental organizations, alongside projects and other arrangements. The workshop enabled participants to familiarize themselves with ecosystem approaches to management and explore how these planning and management frameworks can be applied to the complex issues facing fisheries and aquaculture systems that are typical in the South Asian, Southeast Asian and East Asian regions. The workshop also developed recommendations for action directed at APFIC member countries and the regional partners of APFIC for individual or collective action.

22. Key observations of the workshop were that EAF/EAA is an important tool for management and that most APFIC members were already implementing EAF/EAA type activities to some degree, but often not within this framework. This would require a policy shift to recognize management overtly using an ecosystem approach. This should be accompanied by some policy reform as well as awareness raising and training of fisheries professionals. It was further noted that EAF/EAA tools can assist fisheries to adapt and become more resilient to other pressures such as disasters and climate change.

23. The RCFM noted the need for improved regional coordination and networking to share the lessons and tools for implementing ecosystem approaches for fisheries and aquaculture management. The RCFM was informed that FAO is planning a global information network on EAF/EAA and that this could link to regional level networks.

24. Recognizing the existence of traditional or established management bodies at the local level, it was commented that these institutions could be a good starting point for implementing ecosystem approaches, but that this might require a review of function and capacity building to enable them to implement or participate effectively.

Country reports – experiences with implementing the main parts of EAF

25. This session enabled APFIC member countries to present their progress and experience on implementing ecosystem approaches for the management of fisheries and aquaculture and to address environmental well-being, human well-being and governance.

Shift to an ecosystem approach to fisheries (EAF) in the Republic of Korea

Dohoon Kim, National Fisheries Research and Development Institute

26. The Korean government has traditionally managed the fishing industry and fish stock through technical measures such as closed season, closed area, mesh size regulation, etc. as well as input control based on a licensing system of fishing vessels and fisheries. In addition, a vessel buyback programme has been implemented since 1994, and the output control is also utilized by adopting a total allowable catch (TAC) policy since 1999. However, these single-species based management policies and measures could not prevent the decrease of fishery resources.

27. In order to increase fishery resources, a fish stock rebuilding plan based on the ecosystems approach has been implemented since 2006. As the institutional framework for the EAF, the Fishery Resources Management Act was framed in April 2009. The objective of the Act is to establish a comprehensive plan for fishery resources management, based on scientific research, assessment of the resources and consideration of ecosystems. In addition to this, to protect the ecosystem, preserve marine biodiversity, and use marine resources, the Marine Ecosystem Conservation and Management Act (MECMA) was also implemented in October 2006. Currently, the models for an EAF assessment are being developed. Although they are still in the early development stage, it is expected that the EAF assessment models can provide useful policy implications for fishery resources management.

Bringing community awareness into action in Indonesia

Hary Christijanto, Directorate-General of Capture Fisheries, Ministry of Marine Affairs and Fisheries

28. Indonesian tropical fisheries are characterized by the existence of a rich species diversity but relatively small volume. There are various levels of fishing in the country – subsistence, small-scale, and industrial scale – which create certain complexities in terms of management. The limited capacity of Indonesian fisheries management has led to limited assessments of fish stocks (biology, stock, inter-relation), and the lack of intra and cross sector coordination that may inhibit development.

29. Law No. 31/2004, which was partially revised by Law No. 45/2009, marked the incorporation of the ecosystem aspects of fisheries into fisheries management. Alongside this, there was a growing awareness of: the importance of interactions between fishery resources and their environment; the proven limited performance of current management approaches as witnessed by the critical state of some Indonesia's fisheries in pursuing fisheries resource sustainability; recognition of the cross sector objectives and values of fishery resources and

marine ecosystems within the context of national (pro-poor, pro-growth and pro-job) sustainable development; and recent advances in science, which highlight knowledge and uncertainties about the functional value of ecosystems to humans (i.e. the goods and services they are capable of providing).

The issuance of the Ministerial Decree on Indonesian Fisheries Management Areas is a milestone in the implementation of the EAF. The division of Indonesia's fisheries into eleven fishery management areas developed on the basis of an approach that integrated fisheries resources and the biophysical environment. To maintain the integrity, a Coordinating Forum for Fisheries Management was established. In 2009, a regional management plan for WPP-711 and WPP-718 was formulated (the WPP are fishing management areas known in Indonesian as *Wilayah Pengelolaan Perikanan*). The second milestone was made by the issuance of Government Regulation No. 60/2007 on Fish Resources Conservation that provided a solid base for the establishment of marine protected areas (MPAs). In 2009, MPAs occupied 13 529 068 ha of marine water and included 35 local MPAs, eight National Marine Parks, and various Marine Nature Reserves.

Ecosystem approach to support livelihoods of fishers: Bangladesh perspectives

M.S. Kibria, N.M. Humayun and M.S. Alam, Ministry of Fisheries and Livestock

30. Fisheries and aquaculture have been playing a very vital role in the national economy of Bangladesh contributing 3 percent to the Gross Domestic Product and 22.73 percent of the agricultural product. This sector accounts for 60 percent of the animal protein intake, about 4 percent of foreign exchange earnings, and provides livelihoods and employment opportunities to about 15 million people (over 10 percent of the total population). An annual growth rate of 5.4 percent is achieved despite various human interferences and environmental changes over the past years. With a view to harnessing the maximum potential from this sector, different programmes and projects are being implemented using both government revenue and development budgets vis-à-vis support from international agencies and donors. The majority of the components of the development initiatives deal with issues of habitat restoration, establishment of fish sanctuaries, capacity building, training and awareness building for resources users, intervention of different approaches for resource management such as community based fisheries management (CBFM), support to alternative income generating activities, food assistance under the safety net programme for fishers.

31. The relevant laws, ordinances, rules and regulations are instruments for the protection and conservation of declared sanctuaries for important fisheries, enforcement of Fish Conservation Acts and seasonal bans on the catching of larvae and juveniles of a few species of shrimp and fish from natural sources. In order to support livelihoods during the restricted period, the fishers are being provided with food grains and small grants and microcredit to engage in alternative income generating activities.

32. The intervention of the ecosystem approach to fisheries resource management impacts positively in enhancing production of hilsa fishery, a single fishery that contributes 12 to 13 percent of total fish production of Bangladesh, an incremental production of 0.59 million tonnes in the last six years from 2003 to 2008. The effects of climate change and the need for fishers to adapt to this is an emerging issue that is little understood and needs to be addressed with the support of the international community.

Ecosystem-based approaches: toward sustainable aquaculture in Thailand

Putth Songsangjinda, Coastal Fisheries Research Development Bureau, Department of Fisheries

33. Thailand is one of the region's major seafood producing countries with a coastline of about 2 880 km. The coastal ecosystem and marine area contributed 218.07 billion baht from goods and services, or 5 percent of Thailand's GDP in 2008. The fisheries sector's contribution was about 85.5 billion baht and that of the shrimp farming alone was about 50 billion baht (550 000 metric tonnes of shrimp produced with the involvement of 0.7 million people).

34. Thailand has developed a sustainable coastal zone management project following the advice of his majesty King Bhumibol of Thailand. The project is located in Kungkrabaen Bay (KKB), Chantaburi Province, Eastern Thailand. The KKB covers an area of 640 ha, and the shrimp farm and mangrove conservation areas cover about 116 and 191 ha, respectively. The overall goal of this project is to demonstrate the sustainability of coastal aquaculture (shrimp farming) together with the conservation of coastal ecosystems and the sustainable use of coastal resources. The ecosystem approach is used as a guiding principle of this project in order to mitigate the negative impacts of shrimp farming on the coastal ecosystems of the bay such as the mangrove forests and seagrass beds.

35. The shrimp farms are zoned in the area behind the conserved mangrove forest. The inlet of water has been separated from the outlet of the effluent from the shrimp ponds in order to reduce the spread of disease and improve the quality of the effluent from shrimp farms. Oyster culture, mangrove forest and seagrass beds in the bay are used as biological tools to reduce organic matter, enriched nutrients and suspended particles in the shrimp farming effluent before discharging it into the bay. Stock enhancement of coastal economically important species such as shrimp, fish and crab is conducted in the bay area in order to increase the seeding and productivity of these species for the local small-scale fishery in the bay and adjacent coastal area. At present this area has become a study area for many groups (both from within Thailand and abroad) interested in sustainable coastal zone management. The results after eight years of operation demonstrate that the reclamation of degraded mangrove forests and seagrass beds is possible, to the extent that they can contribute to fisheries and aquaculture production in the bay and to the creation of job opportunities and better livelihoods for local fishermen and local people.

Experiences in Japan with the ecosystem approach to fisheries and aquaculture

Junichiro Okamoto, Faculty of Fisheries Sciences, Hokkaido University

36. Japan has implemented about 100 fisheries related laws and regulations. According to such legal measures, the national and local governments have to conduct various policy related measures and relevant programmes. In terms of fisheries and resource management, the Fisheries Law is the main thrust of fisheries policy implementation. Apart from official resource management activities, there are many voluntary activities initiated by ordinary fishers designed to restore deteriorated coastal ecosystems. Activities associated with increasing awareness about coastal ecosystem functions that could affect the sustainability of fisheries have also been carried out. In appreciation of such voluntary activities, the government launched a programme in 2009 to support fishers' initiatives and also to publicize such initiatives to fellow fishers all over the country as well as the general public. Major activities supported by this programme are related to the monitoring of the environment, sowing of seaweeds seeds, planting of seagrass, the removal of pests and the ploughing up of mudflats and seagrass beds etc.

37. Aquaculture operations have the potential to cause the quality of the aquatic environment to deteriorate by excess feeding, excess stocking of aquatic animals and plants and excess fertilizing. The government encourages fisheries cooperative associations to develop their own Aquaculture Area Improvement Plans (AAIPs) in accordance with the Sustainable Aquaculture Production Assurance Law (1999). Ordinary AAIPs include periodic monitoring in aquaculture areas with the measurement of dissolved oxygen (DO) levels, total sulphide (TS) and benthos. In addition, AAIPs include various measures such as density control of aquaculture facilities and farm-raised animals in the area, change of feeds and practice of feeding etc. About 93 percent of total aquaculture production in Japan is now covered with 367 AAIPs in 22 Prefectures.

38. The keys to successful policy implementation can be summarized as follows:

- To ensure the long-term participation of local fishers in policy implementation, due attention should be paid to sustaining their livelihoods.
- Increased awareness about and ownership of activities based on the policy should be facilitated among the people concerned.
- Appropriate public support should be provided so as not to isolate the people.

The National Ocean and Atmospheric Administration's (NOAA) integrated ecosystem assessment (IEA)

Michael Abbey, NOAA, USA

39. Healthy and resilient coastal and marine ecosystems that provide resources to the United States are under increasing stress from competing economic, energy, recreational, and cultural uses. Integrated Ecosystem Assessments (IEAs) offer a tool to better manage these resources to achieve economic and societal objectives. IEAs provide a sound scientific basis for ecosystem-based approaches to management (EBM) through a formal synthesis and quantitative analysis of relevant natural and socio-economic factors to address specific objectives. The resulting analyses provide resource managers with information to make more cost-effective and informed management decisions.

40. IEA is a formal synthesis and quantitative analysis of information on relevant natural and socio-economic factors, in relation to specified ecosystem management objectives. It is an incremental approach in which integrated scientific understanding feeds into management choices and receives feedback from changing ecosystem objectives. This approach involves and informs citizens, stakeholders, scientists, resource managers and policy makers through formal processes that contribute to attaining the goals of EBM. IEAs, as we envision them, do not necessarily supplant single-sector management; instead, they inform the management of diverse, potentially conflicting ocean use sectors.

41. The IEAs are a coordinated effort across NOAA involving the National Marine Fisheries Service, the Office of Oceanic and Atmospheric Research, the National Ocean Service, and the National Environmental Satellite, Data, and Information Service. The primary objective of IEAs is to make comprehensive information available to inform management decisions. This is done by predicting the outcome of management choices through an iterative step-wise process that:

- assesses existing (baseline) ecosystem conditions;
- assesses activities or elements in an ecosystem that can stress the ecosystem;
- predicts the status of the ecosystem under stress if no management action is taken;

- evaluates status of the ecosystem under stress under different management scenarios; and
- evaluates the success of management actions in achieving the desired target conditions.

42. Providing scientific and management expertise for the development of IEAs is a clear role for NOAA. NOAA has initiated IEA development in the California Current, our first area of focus. This work will be leveraged to develop IEAs in the Gulf of Mexico, the Northeast Shelf and the rest of the nation's eight Large Marine Ecosystems and activities include:

- a scoping process to involve stakeholders in identifying management needs;
- a framework for data management;
- integration of ongoing ecosystem observing, modelling, forecasting and assessment data;
- indicators that integrate ecosystem components;
- ecosystem models for assessment of management alternatives; and
- IEA web-based decision support tools.

Experiences with implementing the main parts of the ecosystem approach to fisheries in Malaysia

Ahmad Adnan Nuruddin and Abdul Khalil Bin Abdul Karim, Department of Fisheries Malaysia

43. There are many issues affecting the capture fisheries industry of Malaysia. Some of the major issues include depleting fisheries resources and degradation of habitat which can be attributed to *inter alia* fishing overcapacity in coastal waters, the use of destructive fishing gear and habitat degradation. Previously, Malaysian fisheries management was based on the single-species approach, modelled on temperate fisheries management. Malaysia is now committed to employing the ecosystem approach to fisheries (EAF) in its fisheries management strategies. Malaysia, through the Department of Fisheries (DOFM), has already implemented various management measures and activities which are in line with EAF, but these were carried out separately. These measures and activities are being consolidated to conform with EAF.

44. Fisheries in Malaysia are regulated by the Fisheries Act 1985, which is in the process of being amended to include human, socio-economic and environment aspects, which will bring it more in line with EAF. A number of National Plans of Action (NPOA) are already in place and other plans are being formulated and developed. Management measures already being implemented include the establishment of fishing zones to cater to the different types of fisheries in order to prevent conflict between them. The entry of fishing effort into the marine capture fisheries industry is regulated and managed through licensing policies. To conserve and rehabilitate the fisheries resources and critical habitats, MPAs have been established. In recognition of the importance of marine parks, a new department, placed under the Natural Resource and Environment Ministry has been created to manage these parks. Conservation of endangered species (such as marine turtles) is given great importance. To further enhance conservation and rehabilitation measures, artificial reefs are being deployed throughout coastal waters and this activity will be intensified in the future. The need for information pertaining to capture fisheries is being addressed by commercial fisheries data collection as well as scientific data collection and analysis. Gear selectivity is also emphasised, with research being carried out to adopt, adapt and develop more resource and environment friendly fishing gears and devices.

45. To address the issue of fishing overcapacity, DOFM has embarked on a fishing vessel reduction programme, known as the Exit Plan, which currently is targeting trawlers less than 40 GRT. Continuous effort is also undertaken to combat IUU. In trying to revolutionize the industry, greater efforts are being undertaken to implement co-management approaches, particularly through the fisheries resource management community programme. The current licensing policy is also being reviewed to make it more efficient in managing fishing capacity. One of the more recent programmes aimed at monitoring and managing fishing effort is the implementation of a vessel monitoring system.

Sustainable fisheries development in China

Liu Liming, Bureau of Fisheries, Ministry of Agriculture

46. China's adherence to a strategy of sustainable fishery development has included a series of effective policies and systems to conserve fishery resources and improve the aquatic environment, and these have yielded ecological, economic and social benefits.

47. The government has imposed a summer fishing moratorium in the East China Sea and Yellow Sea since 1995. In 1999 and 2002, the moratorium was extended to the South China Sea and the Yangtze River, respectively. More than 140 000 fishing vessels and one million fishermen suspend their fishing operations during the moratorium period every year.

48. Great efforts have been made to carry out fishery resource enhancement. From 2006 to 2009, the government invested more than 1.3 billion RMB to release more than 80 billion fries and fingerlings in aquatic areas, including China's governing marine area and important inland aquatic areas.

49. One hundred and sixty national aquatic germplasm resource protection areas and nearly 200 aquatic wildlife reserves at all levels have been established to protect aquatic resources and their spawning and growing grounds. In addition, measures have also been carried out related to water pollution and ecological disaster prevention, construction works have paid compensation for damaging aquatic resources and the environment, ecological aquaculture has been developed, monitoring and investigation on fishery resources and the aquatic environment have been carried out, artificial reefs have been built, a fishing vessels management programme has been implemented and a programme to cut down the number of marine fishing vessels has been launched by helping fishermen to find jobs in other businesses, so as to protect fishery resources and the environment effectively.

Progress and experience on implementing the ecosystem approach to coastal aquaculture development in India

R. Paul Raj, Coastal Aquaculture Authority, Ministry of Agriculture

50. In India, the aquaculture sector has witnessed spectacular growth contributing to more than 50 percent of the total fisheries production of about 7 million tonnes. Most of the aquaculture production comes from the freshwater sector and the development of this sector is controlled by the state governments. Most of the freshwater farms are undrainable and family-owned farms. Recently, state governments have been registering these farms for the purpose of traceability of the produce. Some states have a specific policy framework and a limited regulatory framework in place.

51. The Government of India has drafted a model fisheries and aquaculture bill and circulated it among the constituent states for consideration. The culture of saline and brackish water species within two kilometres from the high tide line of seas, estuaries, backwaters and creeks along the 8 118 km coastline of India is within the regulatory purview of the Coastal Aquaculture Authority, which has been established under the Coastal Aquaculture Authority Act, 2005 (Act 24 of 2005).

52. Guidelines have been formulated to ensure that coastal aquaculture is not detrimental to the coastal environment and the guidelines are being implemented. The Coastal Aquaculture Authority, registers farms and hatcheries and ensures that agricultural lands, salt pan lands, mangroves, wetlands, forest lands, land for village common purposes, land meant for public use and national parks and sanctuaries are not converted to aquaculture farms. The purpose is to protect the livelihoods of coastal communities living in coastal areas.

53. The Authority has prescribed standards for wastewater discharged from farms, hatcheries and feed mills also, and these are being monitored to ensure they are operating within the prescribed standards. An effluent treatment system (ETS) is mandatory for farms larger than 5 ha, except for those traditional tide-dependent farms. In the case of SPF *Litopenaeus. vannamei* farms, ETS is mandatory irrespective of the farm size. Clusters of small farms are permitted to have common ETSs. EIA and EMMP are essential for farms above 40 ha. Carrying capacity is currently being worked out for areas with larger concentrations of farms. Awareness programmes are conducted in all the states to sensitize the farmers and government agencies to follow Best Management Practices in hatcheries and farms to minimize waste output.

MPA network establishment in Viet Nam

Nguyen Thi Trang Nhung, Directorate of Fisheries, MARD

54. Marine protected areas (MPA) are acknowledged as an effective ecosystem approach to fisheries in Viet Nam, therefore with the support of the international community an MPA network comprising 15 sites has been established in the country. The institutional framework for establishing an MPA network includes a Fisheries Law, and a master plan for the MPA network. Moreover, a variety of supporting activities has also been carried out, including capacity building, management training, budget provision, making an inventory of biodiversity and livelihoods support. The presentation also mentioned the opportunities, challenges and future directions for the MPA network in Viet Nam.

Ecosystem approach to fisheries – Australia

Andrew Townley, Department of Agriculture, Fisheries and Forestry

55. Ecologically sustainable development (ESD) is currently a key objective of Australia's national and state fisheries legislation. The Australian Government has taken strong measures to meet this objective. In November 2005, the government announced the \$220 million "Securing our Fishing Future" package that provided funding and direction for major fisheries reform. It should be noted that the outcome of the recent Australian election has not been finalized, and as a result the Australian Government is in caretaker mode, thus current policy may change after the election is completed.

56. The package aimed to deliver profitable and sustainable fisheries for Australia's future using an ecosystem based approach to fisheries management. This has included a robust

programme of fisheries research, assessment, management and compliance (harvest strategy policy, ESD research, by-catch management, ecological risk assessments, package to secure the future). The package provided for improved fisheries management by reducing effort through business exit assistance and implementing individually transferable quotas, harvest strategies for target stocks and ecological risk management plans that address broader environmental issues.

57. There are significant differences between fisheries and therefore the development of innovative and precautionary approaches particular to each fishery has been a key requirement. In general, the new approaches are based on sound scientific monitoring. However, precautionary catches are permitted in data poor fisheries under strict conditions.

58. More than 550 fishing concessions were bought out as part of the business exit assistance. This was approximately one third of the concessions managed by the Australian Government which were available to the package. Harvest strategies and ecological risk management plans have now been implemented in all but the very small fisheries. Catch levels and harvesting techniques are aligned with these guiding policies. There have been marked improvements in the net economic returns for most fisheries. The Australian Government is closely monitoring the condition of its fisheries.

Climatic changes and the impact on fisheries in Myanmar

Khin Maung Soe and Yin Yin Moe, Department of Fisheries

59. The late onset and early withdrawal of the monsoon with reduced rainfall have been significant in recent years in Myanmar and can be explained partly by fewer occurrences of cyclonic storms in the Bay of Bengal. Higher water temperatures and increases of evaporation rates in aquaculture ponds have resulted and have increased the risks of disease and the retarded growth of culture species following the deterioration of aquaculture pond water. Also, there are some reports of changes in the water current and in the coastal area in general associated with El-Nino events.

60. Fisheries in Myanmar have made an important contribution to food security in the country and have generated livelihoods and contributed an increasing share to the country's GDP. Recent landings have been increasing in all fisheries sectors. In 2008/2009 total landings reached 3.5 million tonnes, of which 22 percent comprised aquaculture products and 78 percent comprised inland and marine capture fisheries. In order to address the impacts of climatic changes, the Department of Fisheries has been educating the fishers and aquaculturists to undertake precautionary measures to reduce the risk of losses.

61. The uncertainty of the effects brought by global climatic changes has led Myanmar to collaborate with regional/international fisheries bodies and member countries to implement precautionary measures.

Regional initiatives promoting ecosystem-based management

62. The RCFM heard a series of short presentations from regional organizations and programmes that are promoting EAF/EAA in the APFIC region.

The Bay of Bengal Large Marine Ecosystem Project (BOBLME) – implementing an ecosystem approach to fisheries management

Chris O'Brien, Regional coordinator, BOBLME

63. Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand are collaborating through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project to better the lives of their coastal populations by improving regional management of the Bay of Bengal environment and in particular the important transboundary fisheries for hilsa, Indian mackerel, and sharks.

64. All Project activities can be ascribed to the three basic components of the EAF approach, namely ecological well-being, human well-being, and governance. Building on this, the Project will provide BOBLME countries with a working framework for implementing an ecosystem approach to the management of the three important regional fisheries resources.

65. The main mechanism for this will be a Regional Fisheries Management Advisory Committee (RFMAC) that will be formed in 2011. The RFMAC will receive the ecological, economic, social and governance information from the project and other sources; integrate the information in the context of the transboundary hilsa, Indian mackerel and sharks fisheries; then provide plain language, ecosystem-based advice, including management options, to each of the eight Project countries. At this stage, the committee would not be a decision-making body as the mandates for fisheries management reside in national instruments.

66. The creation of the RFMAC will also require the Project to develop formats and protocols for the transmission of information to the RFMAC and packaging of the advice that it provides.

67. The management advice and the information that underpins it will also be available to regional fisheries bodies such as APFIC. Furthermore, there will likely be opportunities for APFIC members from outside the Bay of Bengal region to collaborate in the work of the Project – in particular capacity building and training activities. The BOBLME Regional Coordinator informed the meeting that if this Forum and the APFIC were interested in forming closer ties with BOBLME and realizing such opportunities, he would be pleased to discuss how this might be achieved with the BOBLME Project Steering Committee.

68. It was noted that there could be close ties between APFIC and the proposed Bay of Bengal Regional Advisory Committee and that the advisory Committee could provide useful synthesized information on the resources covered by the committee as part of APFIC's function in reviewing and summarizing the status of resources within the region.

SEAFDEC programme on promoting refugia and ecosystem approaches

Pattaratjit Kaewnuratchadasorn and Magnus Torell, SEAFDEC

69. Declining fish and marine resources as a result of overcapacity, uncontrolled fisheries and deteriorating aquatic environmental quality, including degraded habitats, are increasingly cause for concern throughout the world and increasingly so in the ASEAN region. Aware of the increasing pressures and negative impacts on the aquatic environment and fisheries resources by fisheries and non-fisheries activities, fisheries managers/agencies have started to realize that fisheries cannot be managed in isolation. The ecosystems approach to fisheries management is being adopted gradually in the region and through SEAFDEC activities are being implemented in a way that emphasizes the need to integrate fisheries management and habitat management and

a basis for fisheries and environmental agencies to work together. The approach includes the restoration and maintenance of important habitats together with conservation measures for valuable fish stocks. These measures by ASEAN-SEAFDEC member countries themselves and in cooperation with SEAFDEC and others, have increasingly promoted the sustainable use of marine and coastal resources. Important elements include cross-sector cooperation and institutional and subregional coordination using the ecosystem approach as a tool for dialogue and coordination. Related SEAFDEC programmes (TD, MFRDMD and AQD) include resource enhancement and tagging programmes for important pelagic species.

70. SEAFDEC has over the years played an important role in regional fisheries research and in the development of systems relevant to sustainable fisheries and fishing practices. The more programmatic development of activities to enhance the adoption of ecosystem approaches to fisheries, particularly a focus on fishery and habitat linkages, was made by promoting the concept of fisheries refugia in collaboration with regional partners, e.g. UNEP/GEF/SCS Project. The aim was, and still is, to develop a regional system of fisheries refugia in the Southeast China Sea and the Gulf of Thailand. Proposals are in the pipeline to continue the collaborative work on the establishment and operation of a regional system of fisheries refugia in the South China Sea and Gulf of Thailand until 2015. The approach also gives priority to facilitating cooperation across boundaries and in subregions like the Gulf of Thailand.

71. Through the support from the Swedish International Development Agency (Sida), the concept of refugia and specifically the introduction of larger fisheries resources conservation areas and proper management measures are now also developed among the Andaman Sea countries. There is good cooperation with the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and this has facilitated the invitation of India to the first Andaman Sea Meeting (October 2009).

72. The experiences from the Gulf of Thailand and the Andaman Sea make it clear that to build up and ensure proper management it is important to develop coordination mechanisms for the integration and coordination of fisheries and habitat management. But this is not enough. Strong efforts need to be made to manage fishing capacity and to combat illegal and destructive fishing. This has been made obvious from the reports and inputs of SEAFDEC to the subregional meeting that indicates destructive fishing and encroachment by larger vessels into coastal habitats and coastal waters. Traditional fishermen complain about encroachment of big boats – including those from neighbouring countries. Few projects actually try to include the management of fishing capacity into programmes with an ecosystem approach. SEAFDEC is now actively trying to address that issue in both the Gulf of Thailand and the Andaman Sea by adding fishing capacity (including destructive and IUU fishing) to the integration of fisheries and habitat management.

73. For the Andaman Sea and the Gulf of Thailand, the challenges ahead include collaboration, not only among the fisheries agencies around the subregions, but also among and with other institutions responsible for the sustainability of fisheries resources; fishing capacity (registration and licenses); the management and restoration of habitats; monitoring, control and surveillance; as well as for the improvement of livelihoods of people in coastal areas and neighbouring provinces. Cooperation within countries is not enough. Frameworks need to be developed to facilitate and build up bilateral, subregional and regional cooperation among countries in the region.

74. In summary: without addressing fishing capacity (including destructive and illegal fishing) efforts to build up sustainability around the coordination of fisheries and habitat will face difficulties in the short, medium and long term. SEAFDEC is trying to address this by inviting, at the subregional, national and provincial level, people involved in and responsible for habitat/environment, fisheries and registration and licensing to bridge the institutional divide and create broader understanding among people responsible for the management of natural resources, environment and utilization (fishing effort).

Environmental trade filters and responsible fisheries: some policy issues

Rajdeep Mukherjee, Bay of Bengal Programme Inter-Governmental Organisation

75. Fisheries products are among the most-traded products globally. However, with the increasing volume of trade, there is an increasing concern about the impact of trade on the environment leading to standard specifications for exportable products. Against this backdrop, the member countries of the Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO) during the Sixth Meeting of the Governing Council of the BOBP-IGO in August 2010 suggested that the Organization institute a study on “the scope of fisheries management in the Bay of Bengal region”. The presentation previewed the study and the focused on South Asian region comprising Bangladesh, India, Maldives, Myanmar and Sri Lanka. Trade has positive impacts such as employment and foreign exchange earnings and negative impacts such as overexploitation and IUU fishing on fisheries resources and national food security. The environmental trade filters (ETFs) in this context are defined as a set of measures to reduce the negative impacts of trade.

76. The objective of the presentation was to discuss in the South Asian context: (i) how the fisheries managers are going to deal with ETFs, and (ii) are ETFs ensuring sustainability of fisheries resources in the region? Most countries in South Asia are lower to middle income countries with multispecies, multigear, decentralized landing fisheries. The fisheries management is a mix of formal and informal measures. These two factors are leading to two different sets of actions in response to ETFs. Although the government and its machineries (formal sector) are aligning themselves sufficiently well to the changing needs, the informal sector, especially the small and medium-scale fishers is lagging behind. The result is that the market is bifurcated into the domestic sector and the export-oriented sector. Furthermore, since the government has limited resources, most are invested in the export sector to maintain the comparative advantage. The export sector is also putting pressure on government for more support, in view of the newer ETFs, to build its capacity and thus is getting a major share of governmental resources. However, this bifurcated market is affecting the regions and moving towards ecosystem based goals which have been accepted by the countries as their long-term objectives. In this situation, there is a need to establish global standards for environmental parameters and introduce them in a phased manner after taking into account the capacity and complexity of fisheries in a particular country. The countries also need to unite to establish a global agenda for environmental standards.

An introduction to the PICES study group on the human dimensions

Mitsutaku Makino, PICES

77. The North Pacific Marine Science Organization (PICES) is an intergovernmental scientific organization established in 1992 to promote and coordinate marine research in the North Pacific and adjacent seas. Its member countries are Canada, Japan, People’s Republic of China, Republic of Korea, the Russian Federation and the United States of America. In 2009, the first social

scientific research programme under the PICES framework was organized, named the Study Group on Human Dimensions (SG-HD).

78. SG-HD is now reviewing how social sciences have been used or applied globally and regionally in ecosystem-based fisheries management (EBFM). Also, it is reviewing the social scientific tools and information available for EBFM in PICES member countries, and developing an inventory of practices for use of social economic information appropriate to the circumstances in each PICES member country. Our main focuses are how to define or set the goals, objectives, targets, etc. and how to judge or assess the performances of EBFM measures, etc. The results of SG-HD's work will be published as a PICES Scientific Report.

Partnerships for ecosystem-based management of small pelagic fisheries in the Sulu-Celebes Sea

Connie Chiang UNDP/GEF S-C Project

79. Since the early part of this decade, it was perceived that fisheries in the Sulu-Celebes Sea (the terms "Celebes" and "Sulawesi" Sea refer to the same body of water and the terms are used interchangeably) were being exploited unsustainably, and actions were needed to protect the resources on which livelihoods in the region depended. It is well known that there is high fishing effort by coastal, artisanal and commercial fishing industries, yet declining CPUE resulting in food insecurity is becoming an emerging issue with the decline of fish stocks. Lack of employment, poverty, and illegal migration to coastal villages are additional driving forces for high exploitation of the artisanal fishery which mainly consist of small pelagic and coral reef fishes.

80. Through the World Wildlife Fund for Nature's Marine Eco-Region Programme, the first step was taken towards working with various stakeholders to design scientific research and conservation plans, improve capacity and implement ecosystem-based management of fisheries and habitats in the Sulu-Sulawesi Marine Eco-region. From this beginning, partnerships among governments, NGOs, private sector, academia, and intergovernmental organizations were formed. The presentation described the various partnerships established in the Sulu-Sulawesi area and provided an example of how partnerships can be used in ecosystem-based management of fisheries.

Ecosystem approach in fisheries and aquaculture management – Wetlands Alliance

Tep Bunnarith and Tran Thi Phan, Wetlands Alliance

81. *Quang Nam, Viet Nam* – Thu Bon river basin in Central Viet Nam with its aquatic ecosystems of nypa and seagrass has diverse fisheries resources. Fishing has been the main livelihood of a large part of the population in the area for generations. The activities of these fishing communities are having more and more negative impacts on the aquatic resources, although, as yet they have failed to secure stable incomes for the local people. With the main objectives of building local capacity for sustainable management of wetlands and benefitting the poor, since 2008 the Wetlands Alliance (WA) funded by the Swedish International Development Agency (Sida) has supported the Department of Agriculture and Rural Development (DARD) in Quang Nam province to establish co-management and community-based models in capture fishing and aquaculture in the lower section of Thu Bon river basin. With technical support from WWF, one of the WA partners, Quang Nam DARD has cooperated with the local community to establish three co-management models in capture fishing and four community-based models in

aquaculture in the two districts of Hoi An and Duy Xuyen. After two years operation, the models have had certain achievements, giving positive signals for the success of this new approach in fisheries management in the area.

82. *Stung Treng, Cambodia* – This Ramsar site stretches 37 km² along the Mekong river in Stung Treng province and is very rich in fishery resources as a result of its rapid zones, flooded forest, deep pools, spawning grounds and habitats. The fishery resources play a central role in the livelihoods and food security of local communities. Since the co-management of fishery resources has been considered, research by the fishery resources community and the village has been adopted as an approach to fishery resources monitoring. It also plays a key role in addressing illegal fishing and formulating a joint management plan in the deep pools and conservation zone, and in improving ecosystems in the areas under community management. Currently this area is faced with the problem of overfishing, which is conducted by using explosives and other large scale fishing and fishing gears prohibited by the fishery law. The problem has been particularly difficult to resolve because of the limited number of fishery administration officers to manage the area. Conservation activities have been carried out by the local community with the cooperation of key stakeholders such as the local authority, the protection authority, and the fishery cantonment in the area.

Cases of ecosystem approach to aquaculture practices in the APFIC region

Miao Weimin and Simon Funge-Smith, APFIC Secretariat

83. Asia and the Pacific region has dominated the world aquaculture industry for a long time and has achieved steady and fast growth in the past decades. Along with this positive development, aquaculture related environmental and ecological problems have been observed in many countries. In order to address these environmental problems and safeguard future aquaculture development, some member countries have started recently to apply an ecosystem approach to aquaculture.

84. The presentation attempted to introduce some selected cases of EAA practices in the region and draw important lessons from the cases to share with the participants. Three cases of EAA practices were included in the presentation: shrimp farming in Kung Krabaen Bay in Thailand, aquaculture in Lake Taihu in China and cage culture in Taal Lake in the Philippines. All three cases have incorporated the three major components of EAA: ecosystem functions, intersectoral approach and human dimensions. All cases emphasized regulation of aquaculture activities, restoration of degraded environments, livelihood improvement of local communities and taking into account the interests of other sectors. Some important lessons were drawn from the cases, including:

- Current practices of EAA often started as efforts to address the environmental/ecological problems caused by poorly planned/regulated aquaculture development and other human activities.
- It is always more difficult to address the problems when they are already there than to prevent them (the cost to relocate fish pens in Lake Tai was 100 million USD).
- EAF/EAA cannot, on its own, solve the problems of aquatic ecosystems and should be incorporated into the general efforts of restoring aquatic ecosystems.
- Effective EAA requires strong political will and effective management capability and allocation of needed resources.

- Strong legal support is fundamental to effective implementation of EAA /EAF.
- The practice of EAA/EAF should encompass all three major components: the human dimension (livelihood of people); ecosystem functions and an intersectoral approach.
- Public awareness raising and participation of all stakeholders, particularly fishers and farmers, is vital for any successful practices of EAA.
- Technology and knowledge support are necessary.
- Assessment is required to refine the practices.

THEME 3: IMPROVING LIVELIHOODS AND INCREASING RESILIENCE IN FISHING AND AQUACULTURE COMMUNITIES

Strategies and recommendations for improving livelihoods in fisheries and aquaculture

Jessica C. Munoz, Bureau of Fisheries and Aquatic Resources, Philippines

85. A livelihood comprises the capabilities, assets (including both material and social resources) and activities required for a means of living. It is sustainable when it can cope with and recover from external stresses and shocks, while maintaining or enhancing its capabilities and assets and the natural resource base, both now and in the future.

86. APFIC is promoting the development of sustainable livelihoods within the region by approaches and practices that offer the greatest potential to improve livelihoods and build community resilience. The APFIC/FAO Regional Consultative Workshop in Manila in October 2009 produced best practice recommendations to support and improve the livelihoods of small-scale fishers and aquaculture households which will direct member governments on where to focus development effort. The recommendations produced are fully compliant with the objectives of the four-year, Spanish-funded Regional Fisheries Livelihoods Programme (RFLP), which will strengthen capacity among participating small-scale fishing communities and their supporting institutions, towards improved livelihoods and sustainable fisheries resource management. RFLP and APFIC will collaborate to guide FAO and APFIC member countries to develop sustainable fishery livelihood policies.

87. The need for a dedicated legal instrument for small-scale fishers has been identified to enable APFIC member countries to develop policies supporting sustainable small-scale fisheries. The process will be taken forward in an FAO/RFLP workshop during 5–8 October 2010.

88. Member countries need to develop specific policy that is supportive of coastal fisheries and particularly small-scale fishers and to invest more in fisheries management. Although appropriate fisheries management processes take time, the investment yields positive economic returns. Coastal communities are inhabited by diverse stakeholders necessitating flexible approaches to sustainable livelihood diversification. Interventions should not contribute to resource decline and should meet the aspirations of stakeholders. The multicomponent approach of the RFLP combines ecosystem and livelihoods approaches and will enable understanding and thereafter address the key issues of coastal fishers.

Aquaculture development and its contribution to livelihoods in the APFIC region

Miao Weimin and Simon Funge-Smith, APFIC Secretariat

89. The aquaculture industry in Asia and the Pacific region has maintained an average annual growth rate of 7.7 percent over the past 15 years. This is 1.1 percent faster than the rest of the world. In 2008, APFIC members contributed 88.7 percent to world aquaculture production (quantity) and 78.7 percent to world aquaculture products value. While supplying the region and the world with quality aquatic products, it contributed significantly to the livelihoods of the rural population in the region.

90. The presentation elaborated the contribution of aquaculture development to livelihoods in the APFIC region, focusing on employment, income generation, diversification of employment, improvement of women's status, the provision of new livelihood options where other traditional agricultural activities have become impossible and the contribution to local social well-being. Meanwhile, direct and indirect, current and potential, negative impacts of aquaculture development were also discussed.

91. The presentation analyzed the major features/attributes and socio-economic factors that contributed to the successful development of aquaculture in the APFIC region. It also iterated how to achieve successful aquaculture development in a country. The presentation also identified important features of aquaculture systems/technologies that may lead to the success or failure of adopting livelihood options.

92. The presentation analyzed some key constraints that may prevent more effective aquaculture development and suggested the efforts to be made to enable aquaculture to contribute more successfully to livelihoods in the region. Successful practices in some countries in promoting the contribution of aquaculture to livelihoods were briefly introduced.

Country reports – experiences with implementing the main parts of EAF

93. APFIC member countries presented their progress and experience in supporting livelihoods in fisheries or aquaculture.

Efforts for improving livelihoods and strengthening resilience in the Republic of Korea

Jung-Sam Lee, Korea Maritime Institute

94. Fishing communities are vulnerable because of their dependence on shrinking and unstable fisheries resources. Therefore, a vicious circle of shrinking resources and livelihood degradation prevailed in Korean fisheries. In order to break out of the vicious circle, Korea has implemented various measures such as resource enhancement through coastal ranching and fry releasing, responsible and sustainable utilization of resources through forming self regulated communities, livelihood diversification through fishing community experience tours and direct financial supports for fishers with financial problems.

95. The coastal ranching programme is a responsible production system which creates fish habitats artificially, releases fry and catches them in a sustainable way. Korea has created 12 coastal ranching sites so far in order to increase fishers' incomes and strengthen the resilience of fishing communities.

96. Co-management has emerged as one of the most suitable frameworks for establishing a sustainable fisheries management system. To achieve responsible resource use and sustainability, Korea has organized self regulated fishing communities (communities carrying out co-management activities) since 2001. The self regulated fishing communities regulate their own fishing efforts in terms of size/age limit, supply limit, reporting illegal fishing, seasonal closure, fishing ground cleaning, etc.

97. Korea has also implemented a fishing community experience tour programme since 2001 to reduce fishing pressure and diversify the income sources of fishers. In addition, the Korean government provides direct financial support for fishers to alleviate financial problems and improve their livelihoods.

Livelihood and the implementation of fisheries management in Myanmar

Khin Maung Soe and Yin Yin Moe, Department of Fisheries

98. Overall fisheries landings in Myanmar have been increasing with landings in 2008/2009 reaching 3.5 million tonnes. It is estimated that three million people directly earn their living and about 15 million people are likely to benefit from fisheries and associated activities. In terms of food security, fisheries provide almost 70 percent of total animal protein intake in Myanmar and per capita fish consumption in 2008 reached 43 kg. Fishing is one of the most important economic sectors in the country and has a high share in the country's GDP. Capture fisheries in Myanmar is composed of marine fisheries (coastal small-scale fishery and offshore commercial fishery) and inland fisheries. Currently, the contribution from marine fisheries, inland fisheries and aquaculture to overall production is about 53 percent, 25 percent and 22 percent, respectively.

99. To control fishing pressure, a fishing boat licensing system has been implemented for both of inland and marine fisheries. The number of non-powered boats and powered-boats for small-scale fisheries is restricted within the range of 16 000 and 14 000, whereas the number of commercial offshore fishing vessels is limited to approximately 2 000. Fishing sites and fishing areas in inland fisheries have been established according to legislation and laws relating to the marine fisheries, inland fisheries and aquaculture. Fisheries laws have been enacted and MCS activities have been enhanced to prevent and eliminate IUU fishing in all fisheries. Proper handling, value adding of traditional preservation processing and possibilities to shorten the market chain are being initiated and disseminated to get more benefits for the resources users as well as to ensure that the resources are used effectively. The important role of research and development in the establishment of fisheries policies and on setting a fisheries management schedule were highlighted.

Establishment of dry season fish refuge ponds in Cambodia

Pich Sereywath, Em Puthy and Ing Try, Fisheries Administration (FiA)

100. Rice-field fisheries are part of the livelihood strategy of households in Cambodia. Community fish refuge ponds (CFR) in the dry season is one option to sustain and increase fisheries productivity in flooded rice fields as they provide a sanctuary for fish reproduction during the dry season. Since the late 1990s, AIT and FiA and other organizations have developed CFR with a wide range of success. In order to promote this approach, FiA are exploring further collaboration with its development partners for CFR establishment. To date, various NGOs, JICA, FAO, DFID/DANIDA and other stakeholders are supporting this in Cambodia.

101. The CFR approach has strong government support as it is recognized as an effective model to enable support to rice-field fisheries resources and household livelihoods in the fish deficit rural areas. CFR is providing clear advantages in terms of food and nutrition to all levels of people, particularly the landless and functionally landless families in poor communities.

Production trends and impacts in Amparawewa and Ranawa Reservoirs – a case study from Sri Lanka

K.B.C. Pushpalatha, National Aquaculture Development Authority of Sri Lanka

102. Sri Lanka is blessed with a large number of irrigation reservoirs exceeding 12 000 in number and the total extent of reservoirs is about 170 000 ha. These reservoirs were mainly built for irrigation and are very diverse in size, age, hydrology and catchment features, but their secondary use is for inland fisheries. Inland fisheries in Sri Lanka are characterized by the use of non-mechanized outrigger canoes and gill nets. Under the Aquatic Resource Development and Quality Improvement Project (ARDQIP) of the Ministry of Fisheries and Aquatic Resources of Sri Lanka, culture-based fisheries (CBF) have been introduced in minor perennial reservoirs in the dry zone of Sri Lanka to improve the food security and income status of the country's rural communities. The results of introducing CBF in two minor perennial reservoirs, namely Ranawa (60 ha) in Anuradhapura district and Amparawewa (240 ha) in Ampara district were presented.

103. After the introduction of culture based fisheries, the average annual total fish production of Ranawa reservoir increased to 27 tonnes from 12 tonnes and was within the range of 22 to 33 tonnes, which is an increase of 121 percent. In Amparawewa, after the introduction of culture-based fisheries the annual fish production increased to 97 tonnes from 4 tonnes and was within the range of 40 to 162 tonnes, which is an increase of 2 404 percent.

104. Average fish yield per annum prior to the introduction of culture-based fisheries was 202 kg/ha and 16 kg/ha in Ranawa and Amparawewa, respectively. The main contributors to the fish yield in both the reservoirs was Nile Tilapia (*Oreochromis niloticus*) and Catla (*Catla catla*). The introduction of culture-based fisheries has contributed significantly to increasing fish production, increasing the incomes of fishers and strengthening the rural economy. Possible reasons for these production trends were discussed.

Progress and experience in supporting livelihoods in fisheries and aquaculture in Sri Lanka

R.S.A. Rathsar Bandara, Department of Fisheries and Aquatic Resources, Sri Lanka

105. Sri Lanka's fishery sector accounts for 1.7 percent of GDP. Marine and inland fisheries production in 2009 amounted to 293 170 tonnes and 46 560 tonnes respectively. The fisheries management is the sole responsibility of the Department of Fisheries. The main objectives of the Fisheries and Aquatic Resources Act are the management, conservation, regulation and development of the fisheries and aquatic resources in Sri Lanka. A total of 92 869 members of the fishery population have been aggregated into 561 fisheries cooperative societies. Sri Lanka has 610 species of coastal fish, comprising 90 species of oceanic pelagic fish, 60 species of sharks and about 215 demersal fin fishes and shellfish species.

106. Current livelihood issues in Sri Lanka are fisher conflicts, declining of some fish species, lack of alternative livelihoods, rapid increase of the coastal fleet, post harvest losses, bad handling, lack of sophisticated technology, lack of safety at sea, poor financial management. The Department of Fisheries has carried out a number of measures to mitigate the above issues. These

include the introduction of co-management mechanisms, safety at sea policies, new legislation on improved quality of fishery products, market chains through CBOs, diversified income opportunities, microfinance services and the issuance of fisheries operational licenses.

Supporting livelihoods in fisheries: an Indian experience

Ajay Srivastava, Department of Animal Husbandry, Dairying and Fisheries

107. By livelihood is meant a set of economic activities that result in gainful employment that can be sustained over a period of time. Livelihood issues are an area of concern in India and have been accorded a lot of attention by the policy-makers in recent times because fisheries in India is largely an activity that falls into the unorganized sector.

108. Indian fisheries is dominated by capture fishery with little value addition, which means limited impact on the creation of further employment opportunities. There are also instances of displacement among coastal fishery communities mainly because of declarations of marine protected areas, sanctuaries and marine bioreserves. Severe events such as tsunami and climate change have adversely affected marine ecosystems leading to depletion of indigenous fishery resources near the coastline. All such factors have led to near saturation of existing employment opportunities in the Indian fishery sector.

109. Keeping all this in view, the Government of India has targeted livelihood issues through the overall developmental policies for the fisheries sector, aiming for a trickle-down effect on the generation of employment in the fisheries sector. The policy of the Government is mainly manifested in the Comprehensive Marine Policy that was announced in 2004.

110. The government has recently brought out “The Unorganized Workers Social Security Act” that monitors the progress of welfare schemes, including those meant for the unorganized fishermen. The government has also set up the National Fisheries Development Board (NFDB) to work towards a blue revolution in the country by launching a coordinated strategy with a focus on increasing fish production to over 10 million metric tonnes, doubling exports and generating additional direct employment of 3.5 million.

111. The government has also launched several centrally sponsored schemes for the development of inland fisheries and aquaculture and to take care of the welfare of fishermen. These schemes provide assistance to farmers for construction of ponds, inputs, capacity building, safeguards against accidents and exigencies and to protect livelihood during the fishing ban season.

Microfinance for improving livelihoods of small-scale fishers of the South Indian Coast

S. Ephrem, Chief Executive, South Indian Federation of Fishermen Societies (SIFFS)

112. The South Indian Federation of Fishermen Societies (SIFFS) is one the largest cooperative organizations of small-scale artisanal fishermen. With over 1 000 small boats and an active fishermen workforce of over 50 000, organized in 160 village societies selling fish worth US\$210 million annually, it is also India’s only microfinance institution (MFI) dedicated to fisheries. The SIFFS microfinance intervention is intimately linked to its village society model and federal structure.

113. In this model, institutional credit is primarily used to break the nexus between informal credit systems and fish marketing that leads to depression of beach level prices for fish. Bank

credit is used to “release” fishermen from “middlemen” on the beach who give advances for equipment purchase/consumption to fishermen and then “bond” them to sell fish exclusively through them for a commission or to sell it to them at a lower than market price. The fishermen that are released from debt are organized into local village societies that undertake marketing, provide regular credit and promote savings.

114. The success of this model has led to its gradual spread over 1 000 kilometres of coastline. The economies of scale achieved with such a network has also enabled SIFFS and its district federations to take control over many of the fishing inputs like boats, motors, fuel, etc. SIFFS has also provided access to new technologies in craft and propulsion and enabled a large part of the artisanal fishery to upgrade itself and improve its access to fish resources that was adversely affected by the introduction of mechanised trawlers. In microfinance itself, the scale achieved has helped SIFFS to get into life insurance, pension funds and equipment insurance in collaboration with insurance companies. SIFFS has also extended its microfinance services to fisherwomen, organized into their own self-help groups, societies and federations. About 8 000 fisherwomen involved in fish vending and other forms of self employment benefit from these services.

Empowering small-scale fisheries in Indonesia

Heriyanto Marwoto, Directorate of Fisheries Business Development, Directorate General of Capture Fisheries, Ministry of Marine Affairs and Fisheries of the Republic of Indonesia

115. In 2009, the number of fishermen in Indonesia was approximately 2.78 million with small-scale fisheries businesses accounting for 98 percent of this number. Small-scale businesses are generally identified by their use of fishing boats less than 30 GT, of which 69 percent comprised outboard motorized and non-motorized. It is widely known that most small-scale fishers have limited assets, limited or lack of access to technology, related business information, capital, as well as proper management assistance resulting in subsistence or low incomes. On the basis of understanding the small-scale fisheries situation along with past experience on improving livelihoods of small-scale fishers, a series of programmes was introduced to develop and empower the Fisher Group for Business, also locally known as *Kelompok Usaha Bersama (KUB)*, supported by management and technical assistance, business diversification assistance, and promoting business partnerships, capital assistance in the form of land ownership certification for fishers, strengthening credit schemes applicable to small-scale fisheries, and providing alternative financial support.

116. By the end of 2009, approximately 4 370 KUBs were formed, 1 500 land ownership certificates were distributed and among those receiving these certificates 35 percent used them as credit collateral, and eight pawnshops were operated in eight different fishing ports to provide an alternative form of financial support that has channelled about USD\$3.8 million of capital. A major challenge in the future is to empower the small-scale fisher group for business as 95 percent of the KUBs were not financially feasible and bankable. Complementary to the above programmes, the government also introduced fisher insurance and fisher identity cards. Fisher insurance was introduced as part of a safety at work plan, but will be enlarged to include labour insurance to cover difficult fishing periods. By 2009, 6 500 fishers were participating in the fisher insurance programme. Fisher identity cards were introduced in early 2009 with only 2 500 participants but by 2011 the fisher identity cards will target 1.3 million fishers. Through these interventions, fishers’ incomes were recorded to increase to approximately US\$185 for fishing vessel owners, whereas fishing vessel crew earned approximately US\$63 per month.

117. Future steps are to strengthen the KUBs to be financially feasible and bankable, to enlarge them and form them into fisheries cooperatives, to develop price stabilization (determination of a minimum price for fish, establish a buffer product system and provide an appropriate auction system); and to carry out small-scale fishing vessel registration.

Supporting livelihoods in the fisheries sector in Nepal

Kishore Kumar Upadhyaya and Rajendra Kumar, Directorate of Fisheries Development, Department of Agriculture Development

118. Nepal is a land locked country with a total area of 147 181 km² with inland freshwater resources covering approximately 8.1 million hectares. These include torrential rivers, lakes, man-made reservoirs, ponds, swamps and irrigated paddy fields scattered throughout the country. In terms of fisheries resources, 187 species of fish are reported; other aquatic resources such as snails, crabs and prawns have not been surveyed. Aquaculture is composed of seven to nine varieties of indigenous and exotic carp species for warm water aquaculture promotion and recently rainbow trout was introduced to the cold water mountain terraces, which are not useful for other agricultural activities.

119. National total fish production of fish is estimated to be 49 730 metric tonnes and aquaculture and capture fisheries contribute 52 percent and 48 percent respectively (FDD 2009/10). Approximately 35 000 families are involved in aquaculture and 115 000 families depend on traditional capture fisheries for their livelihood (fisheries and aquaculture contribute more than 2.5 percent to the agricultural GDP and less than 1 percent to the national GDP. The Government of Nepal has given priority to the fisheries sector and focuses on increasing fish production and productivity as the per capita availability is less than 2kg/person in the context of a growing population (more than 2.5 percent annual growth and a total population of 28 million) and a substantial amount of fisheries products are imported from neighbouring countries.

120. Approximately 23 780 metric tonnes are produced from warm water aquaculture ponds with a productivity of 3.5 tonnes/ha from 6 700 ha. Similarly, 2 231 tonnes/ha are produced from cold water aquaculture, rice-fish culture, reservoir lakes and marshy land. Total national income from the fisheries sector is 7 256 million Nepalese Rupees. Approximately 462 000 individuals from 11 500 families are engaged in capture fisheries. Landholdings of fishers involved in capture fisheries ranges from landless to 0.2 ha and earnings from fishing are not enough to constitute a livelihood. Other government activities conducted in capture fisheries are limnological, biological, socio-economic and awareness programmes. Biodiversity conservation, hatchery construction, breed and restocking of indigenous species are carried out in a few river systems. From the government side, subsidies also provided in the form of fish seed and equipment. The challenges from habitat destruction, chemical pollution, introduction of exotic species, overfishing and illegal fishing are the major threats to conservation and mitigation measures are necessary. Environmental impact assessment (EIA), legislative arrangements, group mobilization, open water stocking, and a group approach are carried out in Nepal. The government has a “Mission Fish”, the one village one product programme and several awareness and training programmes to increase fish production and combat import substitution and to promote environment-friendly use of available resources.

Pakistan – Status report on support to livelihoods in fisheries and aquaculture

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121. Fisheries play an important role in the economy of Pakistan. The marine fisheries sector is the main component of the fisheries economy contributing about 70 percent in terms of landings and more than 90 percent in terms of exports. Fishing is the most important economic activity in the villages and towns along the coast of Pakistan. In most of the coastal villages and settlements it is the sole source of livelihood. The fisheries sector has developed substantially since the creation of Pakistan when almost the entire fleet was sail driven and the major mode of processing allowed only the production of low quality salted dried products for the peninsular Indian market. Now the situation has completely changed as almost the entire fleet has been motorized or mechanized and freezing has become the main mode for processing.

122. The fish production of Pakistan, which was estimated to be about 32 000 tonnes in 1947, has increased to a level of about 400 000 tonnes in 2010. The Pakistan seafood industry is export oriented and mainly governed by the pressure of the exporter. At the time of partition, only dried salted products were exported from Pakistan but now high value frozen seafood products are exported to about 60 countries. There is no doubt about the potential for increasing seafood exports, however, post harvest losses seem to be a main constraint in the development of the country's fisheries sector. Unprecedented increases in export earnings during the last three years, despite a ban on the import of seafood from Pakistan into the European Union, indicates the adaptability of the seafood processing and export industry in Pakistan and its capacity to diversify.

123. Production of seafood of Pakistan is increasing steadily since its creation in 1947. A quantum jump in production was seen in 1969, when shrimp farming became an important activity and seafood freezing plants were established. Another major increase was noticed in 1981, when a programme for motorization of the fishing fleet was started and deep sea fishing was introduced. In 1993, fish production from the marine sector reached a maxima when about 0.5 million tonnes of seafood was produced. Since then, the production from the marine sector has been fluctuating at about 0.4 million tonnes.

124. The Government of Pakistan is taking a number of steps to promote the fisheries sector, especially to improve the livelihoods of the coastal communities. A new fisheries policy was approved by the government which was prepared in consultation with coastal communities. The policy envisages increased production, an enhanced role for fisheries in the national economy and efforts to address livelihood issues. The government is empowering fishermen by making available better fishing gears, infrastructure facilities, means of communication and cool chain improvement. A programme for improvement of fishing boats has been started mainly aiming to reduce post harvest losses, thus increasing the incomes of fishers.

Improving livelihoods and increasing resilience in fishing and aquaculture communities – the Philippine experience and current interventions

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125. Fisheries is an important economic sector of the country and contributes approximately 5 percent to the country's gross domestic product, bringing in more than 400 million dollars revenue earnings from exports of fish and fishery products. As of 2002, more than 1.6 million

Filipinos are directly engaged in fisheries and aquaculture. Production has steadily increased over the past decade growing at a rate of 6 percent annually. The country is also consistently among the top ten fish producing countries in the world, both from capture fisheries and aquaculture. The country is the world's third largest producer of seaweeds contributing more than 10 percent to world seaweeds production.

126. Despite these successes, the fisheries industry also faces various issues and concerns that adversely impact livelihoods and the overall wellbeing of the fisherfolk. Most notably are concerns related to the stringent requirements being imposed by importing countries on fish and fishery products entering their markets, as well as the issue of climate change and its impact on fisheries and aquaculture productivity and subsequently on the incomes of the fisherfolk.

127. To help fishing communities cope with these harsh conditions, the Philippine government, through the Bureau of Fisheries and Aquatic Resources (BFAR), has implemented projects/programmes and activities over the years to help them comply with the requirements of the major world markets, and to adapt to the negative effects of climate change. These interventions are also aimed at providing supplementary incomes to fisherfolk and their families.

128. Vital to all these is strong collaboration with local government units, other relevant government agencies, non-government organizations, financial and donor agencies, and most importantly, a strong organization of stakeholders and their communities. The Philippines, through the enactment of the Fisheries Code of 1998 (RA 8550), put much emphasis on empowering the fisherfolk by creating the Fisheries and Aquatic Resources Management Council (FARMC) at the local and national levels. This council is involved in planning, policy and decision-making, and monitoring of fisheries related government programmes. This initiative ensures that the interests of the fisherfolk and their organizations are covered and appropriately considered in the policy/decision process and in programme/project identification and implementation.

The need for a dedicated global instrument for small-scale fisheries

Simon Funge-Smith, Secretary, Asia-Pacific Fishery Commission

129. Small-scale fisheries make a significant contribution to poverty alleviation and sustainable development globally. They are important to the wellbeing of rural/fishing communities. They are part of humankind's heritage and often play an important role in the conservation of culture and traditions. Small-scale fisheries contribute over half of the world's marine and inland fish catch, nearly all of which is used for direct human consumption. They employ over 90 percent of the world's more than 35 million capture fishers and support another approximately 90 million people employed in jobs associated with fish processing, distribution and marketing. At least half of those people employed in small-scale fisheries are women.

130. The contributions and importance of small-scale fisheries is slowly being recognized at international and national level, but the Fourth Global Conference on Small-Scale Fisheries in Bangkok, Thailand, 13–17 October 2008 noted that “...*small-scale fisheries have yet to fully realize their potential to significantly contribute to sustainable development and the attaining of the UN millennium development goals (MDGs).*”

131. The FAO Code of Conduct for Responsible Fisheries (CCRF) is a global normative document outlining the basic principles and considerations for the conduct of responsible fisheries and aquaculture. It contains articles with technical scope covering responsible fisheries

management as well as specific articles covering the relationship of the CCRF with other international instruments (e.g. UN Convention on the Law of the Sea, UN Fish Stock Agreement, other international laws to which states are parties, the Rio Declaration and Agenda 21 (UNCED)). The CCRF also contains a specific article regarding the special requirements of developing countries which emphasizes that the capacity of developing countries to implement the code should be taken in to account and notes the need for financial and technical support/cooperation.

132. The CCRF does cover small-scale fisheries but because of its nature as an “international instrument” the CCRF may appear to focus more on high seas fisheries and transboundary resources, resource sustainability issues relating to the management of commercial larger scale fisheries, the international trade in fishery products and stocks rather than mixed fisheries. A closer look at the CCRF shows that many articles do note the need for specific consideration to be given to small-scale fisheries, artisanal fisheries, subsistence communities (local, fishing, coastal, rural) and the needs of developing countries. There are also recommendations in the CCRF that relate to interactions between aquaculture development and small-scale fisheries, or the communities dependent on them.

133. Regarding the need for a specific instrument in small-scale fisheries there are issues relating to sustainable development that have specific importance for small-scale fisheries. In particular, small-scale fisheries and their communities often have insecure rights to land and fishery resources and have inadequate or absent health and educational services or social safety nets. These communities are vulnerable to natural disasters and climate change and are often excluded from wider development processes. This is often because of weak organizational structures and inadequate representation and/or participation in decision-making.

134. There are currently no specific FAO technical guidelines for the management of small-scale fisheries, since the issues tend to be included in other technical guidelines as provisos or calls for specific consideration. This raises the question as to the need for a specific instrument for small-scale fisheries. Such an instrument may be of increasing importance given the proliferation of international instruments and initiatives associated with globalization and the shifting emphasis towards more ecosystem based forms of management. All of these may need to be interpreted in the context of SSF to avoid undue or inequitable impact on the small-scale fisheries sector. Examples are: the Port State Measures Agreement, the Global Vessel Record, ILO Work in Fishing Convention 2007, the EU Regulation 1005/2008 on catch certification and the application of the ecosystem approach to fisheries.

135. In terms of the nature of a global agreement on how to support and develop small-scale fisheries, there are a number of options and some examples are:

- An international plan of action (IPOA);
- additional guidance to the CCRF on managing small-scale fisheries;
- a global convention/agreement; and
- a dedicated international programme of work.

THEME 4: REGIONAL POLICY CHALLENGES

The implications of climate change for capture fisheries and aquaculture in Asia and the Pacific region

Rudi Hermes, Bay of Bengal Large Marine Ecosystem Project, BOBLME PCU

136. The presentation covered the findings of the APFIC review of climate change impacts on fisheries and aquaculture and the implications for the APFIC region. Three of the ten key messages formulated by the “Partnership Climate, Fisheries and Aquaculture” (PACFA) were presented to introduce fundamental insights: (i) The huge dependency on aquatic ecosystems for food security, trade and employment – the importance of the fisheries and aquaculture sector cannot be overstated; (ii) climate change will cause unprecedented disruptions to aquatic and coastal systems – we must understand the risks for everyone to act wisely; and (iii) climate stress is here: oceanic dead zones, acidification, disturbed freshwater processes, falling groundwater levels, pressure on aquatic stocks – we must address these changes.

137. Negative impacts are expected on the capture fisheries already under stress by overexploitation, coastal habitat degradation and pollution, the productivity and viability of aquaculture operations, and on related sectors, namely agriculture, land and water management, coastal development.

138. The presentation then examined seven major drivers, leading to direct or biophysical climate change effects on the fisheries sector: changes in sea surface temperature (SST); rising sea level; changes in precipitation and water availability (river system hydrology); higher inland water temperatures; increased frequency or intensity of severe weather events; changes in the El-Nino-Southern Oscillation (ENSO); and ocean acidification. Separately or synergistically, these drivers will affect abundance and distribution of fish stocks and lead to higher operation costs and fewer opportunities for aquaculture. Examples for latitudinal distribution shift, water quality and availability, and impacts on fish reproduction, growth and physiology were provided, and impacts likely to affect the APFIC region in particular were highlighted.

139. Although in the short-term, non-climate related drivers have larger impacts, the implications for the fisheries sector in the APFIC region also mean that currently poor fisheries and ecosystem management practices undermine the health of fisheries systems and reduce resilience to climate change related impacts. Latitudinal shifts in productivity present more challenges than opportunities, and a general poleward shift in catch potential will disadvantage tropical countries.

140. Good governance and cross-sectoral governance, characterized by participatory and transparent processes and based on best practices, are essential if states are to cope with climate change. The adoption of the ecosystem approach to fisheries (EAF) or the large marine ecosystem approach was suggested and the presentation offered some possible actions for adaptation and mitigation. Among these was the need to ensure that the fisheries sector is clearly incorporated into mainstream climate change strategies, including national adaptation plans of action (NAPA) and disaster risk management (DRM) strategies.

Key messages of the recent OECD workshop on “The economics of adapting fisheries to climate change”, Busan, Korea 10–11 June 2010

Carl-Christian Schmidt, Head of Fisheries Policies Division, OECD

141. Scientific findings, including the 2007 Intergovernmental Panel on Climate Change report, indicate that climate change is becoming more evident. Climate change will impact fisheries and aquaculture in various ways. For capture fisheries, climate change will change productivity and distribution through variations in recruitment, growth rates and mortality rates as well as in changing migratory patterns for some stocks. From an economic point of view the changes will result in emerging losers and winners.

142. These expected changes require adaptability and flexibility of fisheries and aquaculture policies. However, there is a great deal of uncertainty associated with the economic impacts of climate change on fisheries and aquaculture, both with respect to when and how much. Therefore, fisheries policy makers need to develop strategies and decision models to adapt to climate change under uncertainty, taking into account social and economic consequences. More specifically, a number of questions have to be answered: What policy options are available? How should decisions be made? When should actions be taken?

143. Against this backdrop, the OECD Committee for Fisheries hosted an international workshop under the theme: “The Economics of Adapting Fisheries to Climate Change”. The key objective of the Workshop was to address the challenges and provide insights to policy makers. The workshop took place during 10–11 June 2010 in Busan, Korea.

144. The workshop reviewed the current state of affairs with respect to fisheries management and governance practices and the impacts of climate change on ocean warming, acidification, altered productivity, food webs and habitats. The workshop underscored the need for improved management, and improved understanding of the vulnerability of fisheries to climate change and a better understanding and analysis of the benefits and costs of adaptation. Key actions proposed include strengthening the global governance system, a broader use of rights-based management systems, ecosystem protection, industry transformation, ending perverse subsidies, and a focus on demand for sustainably-caught seafood. With respect to the aquaculture industry, the workshop noted that aquaculture is better placed to adapt in comparison to wild capture fisheries. Workshop participants identified sustainable aquaculture production and integrated marine management as the two adaptation strategies required to develop a comprehensive fisheries policy response to climate change.

PICES/ICES review of impacts of climate change on fish and shellfish

Suam Kim, North Pacific Marine Science Organization (PICES)

145. PICES and ICES formed a Joint Working Group on “Forecasting Climate Change Impacts on Fish and Shellfish (WG-FCCIFS)” in 2009. The major activities of the WG are to organize international symposia, to present the results of symposia at other groups, and to develop guidelines for future research in climate change and fisheries. As a first mission, PICES/ICES Working Group, with the involvement of FAO, convened an international symposium on “Climate change effects on fish and fisheries: forecasting impacts, assessing ecosystem responses and evaluating management strategies” during April 26–29, 2010 in Sendai, Japan. The key findings from the symposium are summarized below:

- Long-term ocean monitoring programmes are needed to track and understand ecosystem change and climate change as they occur.
- Networks of shelf-seas ecosystem models have already been developed within several of the world's LMEs and provide a basis for examining structural uncertainty within shelf sea ecosystem models.
- Three sources of uncertainty in Global Ocean Models (GOMs) are under investigation: (1) Parameter uncertainty; (2) structural uncertainty; (3) scenario uncertainty. Parameter uncertainty is being addressed to some degree with sensitivity tests, structural uncertainty is being explored via comparison of different coupled physical-biological models, and scenario uncertainty, which deals with greenhouse gas emissions and economics, could be addressed via using ensemble model sets.
- There are five approaches to predicting the effects of climate change on fish and fisheries: (a) Conceptual predictions; (b) inferences from laboratory studies; (c) statistical downscaling from GOM at the regional scale; (d) dynamic downscaling to regional ocean models; (e) whole earth system models. Each has strengths and weaknesses.
- Fisheries oceanography and laboratory studies are critical to integrating biological and oceanographic models, evaluating species environmental tolerances and adaptation, and to tracking species responses to long-term ecosystem and climate change as it occurs.
- Models that couple marine social and economic responses are needed to evaluate management strategies, however few examples exist.
- Issues of food security and marine conservation may require new approaches to satisfy the growing demand for marine resources.
- Two-way communication is needed with scientists and stakeholders to develop meaningful scenarios on human responses to the impact of ecosystem and climate change.

146. This presentation summarized the outputs from the symposium, and tried to link those outputs to Asian fisheries and aquaculture in APFIC member countries.

Recasting the net: Defining a gender agenda for sustaining life and livelihood in fishing communities

Nalini Nayak, International Collective in Support of Fishworkers (ICSF)

147. The presentation shared the findings of a workshop organized by the ICSF in July 2010 on developing an agenda for sustaining small-scale fisheries and women's indispensable role and place in achieving this. It explained the shift in the discourse on gender, based on a review of the literature:

- From political economy to political ecology;
- from opposition to women's oppression to an individual-centric gender empowerment agenda;
- an increasing emphasis on a human rights framework which obscures both community and women's rights; and
- a growing dependence on donor aid for both social action and research given that donor aid is increasingly aligning itself with the imperatives of globalization.

148. The presentation shared the aspirations of the workshop participants that included participants from different parts of the world representing coastal communities, fishworker organizations, academics and NGOs, who hoped that the living ecosystems would be conserved and that the rights to these resources would be allocated to the people who depended on them for a livelihood. They hoped that women would be involved in planning for fisheries development and that they could live in communities with social infrastructure and free from violence.

149. It also highlighted how this agenda can be taken up at the household level and by fishworker organizations, and highlighted the role of the state and international organizations in moving this agenda forward. It suggested that this agenda should inform the discussion regarding a Standard for Small Scale Fisheries, which will hopefully be taken up in the forthcoming COFI as demanded by its member countries.

Experiences from the region on the implementation of the EU Council regulation No. 1005/2008

Implementation of measures to combat IUU fishing in Southeast Asia

Pattaratjit Kaewnuratchadasorn and Magnus Torell (SEAFDEC)

150. There is a growing concern among ASEAN-SEAFDEC member states on the need to combat illegal and IUU fisheries in the Southeast Asian region. In 2009, the globally binding agreement on “port state measures to prevent, deter, eliminate illegal, unreported and unregulated fishing” was adopted by FAO member countries. With a similar purpose, the European Commission developed the EC regulation No. 1005/2008 establishing a European Community system to prevent, deter and eliminate IUU fishing, effective since 1 January 2010. Some basic requirements are common to both of the instruments established to combat IUU fisheries such as: vessel registration procedures and licenses to fish, catch documentation/log book, conservation and management measures, port inspection routines, transshipment, etc. To be able to improve the management, to combat IUU fishing, the countries need to recognize the key elements that need to be in place to live up to the new requirements.

151. In the Southeast Asian region, statements by SEAFDEC member countries during the SEAFDEC Council Meeting in Luang Prabang in April 2010 were very straightforward in terms of indicating that combating IUU fishing is one of the key priorities for the region. SEAFDEC has provided platforms for discussion among member countries and facilitated the exchange of information among countries on their progress and the obstacles they face in improving management of fishing capacity. The initiatives include opportunities for member countries to strengthen their existing national ambitions and efforts to promote sustainable fisheries management and to combat IUU fishing.

Effort of Viet Nam in meeting the EU regulations on catch certification

Nguyen Thi Trang Nhung (MARD, Viet Nam)

152. Viet Nam’s presentation informed the RCFM that with respect to regulation No. 1005/2008 of the European Commission, Viet Nam made timely responses right after the regulation came to effect on 1 January 2010 in order to meet the EU’s requirements and secure the export of fisheries products to the European market. The presentation covered Viet Nam’s experience, initial achievements and the challenges the country faced in meeting the EU regulation on catch certification. Detailed guidelines from the central government to the local level, close cooperation among the European Commission, fisheries associations and relevant agencies, and broad campaigns of training and mass media campaigns were the main factors associated with the effective implementation of EU regulations on catch certificates.

Catch certification scheme of Thailand for combating IUU fishing to comply with EU regulation No. 1005/2008

Pirochana Saikliang, Department of Fisheries, Thailand

153. Thailand is one of the major fish exporting countries exporting to world markets, particularly the EU market. The Council of the European Union adopted the EC regulation No. 1005/2008 on 28 September 2008 establishing a system to prevent, deter and eliminate IUU fishing, which became effective on 1 January 2010. The regulation requires countries that wish to export marine capture products to the EU, including via transshipments, to get the necessary documents such as vessel registration, licenses to fish, catch documentation, etc. and present them, if required, at ports in the port state. As needed, the documents should be validated/certified by relevant authorities in the state of first landing. Thailand has been actively complying with this regulation in order to continue the flow of fish product to the EU market.

154. The Department of Fisheries (DOF) acts as the Competent Authority as required by the regulation. DOF has developed catch certificate schemes for Thai fishing vessels that operate in Thai waters and that fly the Thai flag and operate in international waters, as follows: i) Catch certificate for vessels 20 GT and over; and ii) simplified catch certificate for vessels less than 20 GT. DOF has distributed catch documentation to the owners of fishing vessels that are involved with the export of fishery products to the EU. These fishers have to report or declare their fishing activities after landing. Thailand has modified and made some adjustment regarding documentation and certification of fishery products for export to the EU, for example with respect to total exported weight. Some fish species have also been excluded from Annex I. Thailand is also in the process of requesting that fishing operations without a fishing vessel be exempted from providing a catch certificate.

155. The presentation noted the need to strengthen capacity and systems for catch certification and documentation and traceability in capture fisheries and aquaculture and to addressing the challenges of implementing these with small-scale fisheries.

RCFM SUMMARY AND RECOMMENDATIONS FOR REPORTING TO APFIC

156. The participants at the APFIC RCFM were presented with the consolidated conclusions and recommendations for action that were drawn from the forum meeting. These were commented on and amended and subsequently endorsed by the forum. The consolidated conclusions and recommendations of the RCFM will be forwarded to the 31st Session of APFIC (6–8 September 2010) for consideration by the Commission.

CLOSING OF THE RCFM

157. In closing, the APFIC secretary thanked the hosts, the Ministry of Food, Agriculture Fisheries and Forestry, Republic of Korea, for their generous support and excellent facilitation of the third APFIC RCFM.

158. The Secretary also thanked the chairperson, Mr Suam Kim for his efforts that contributed to the successful outcome of the forum. He also thanked all the participants from APFIC member countries and other organizations for their active participation.

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AGENDA



APFIC 3rd Regional Consultative Forum
Jeju Island, Republic of Korea, 1–4 September 2010

“Balancing the needs of people and ecosystems in fisheries and aquaculture management in the Asia-Pacific”

31 AUGUST 2010

14.00-18.00 Pre-Registration at Oceanic Suites Hotel

DAY 1: 1 SEPTEMBER 2010

08.00-09.00 Registration at Oceanic Suites Hotel – RCFM venue

09.00-09.40 Opening Ceremony (separate detailed programme)

Welcome address by Mr Byoung-lib, Mayor of Jeju

Address by Mr Kevern Cochrane, Director, FAO Fisheries Department

Opening speech by Mr Seung Chung, Vice-Minister, Ministry for Food, Agriculture, Forestry and Fisheries (MFAFF)

Theme 1: Strengthening understanding of status and trends in fisheries and aquaculture in Asia and the Pacific region

09.40-10.15 Status and potential of fisheries in Asia and the Pacific region 2010

Secretary, APFIC FAO Regional Office for Asia and the Pacific [alternatively, Senior officer, FAO Department of Fisheries]

Status and trends in fisheries of the region with particular focus on Bay of Bengal and South China Sea

10.15-10.25 Group Photo

10.25-10.50 Morning Tea/coffee

10.50-11.00 Presentation of the forum arrangements

Presentation by the APFIC Chair Country Republic of Korea

11.00-11.30 Fisheries assessments in the APFIC region and the offshore resources

Gabriella Bianchi, FAO Fisheries Resources Service of FAO

Covers the findings and conclusions of three FAO/SEAFDEC/APFIC collaborative workshops on improving resource assessments, policy of offshore fisheries in the APFIC region in South China Sea and Bay of Bengal

11.30-12.00 Discussion

Recommendations: Need for capacity building in resource assessments, ways to improve status and trend reporting

12.00-14.00 Lunch

Theme 2: Using the ecosystem approach to management in fisheries and aquaculture

- 14.00-14.30** **“Balancing the needs of people and ecosystems in fisheries and aquaculture management in the APFIC region”**
Presented by workshop-hosting member country representative [Sri Lanka]
Covers the background to ecosystem approaches to management and the recommendations of the APFIC Regional consultative workshop on the ecosystem approach in fisheries and aquaculture.
- 14.30-15.30** **Country experiences with implementing the main parts of EAF**
5 Brief (10-12 minutes) presentations from APFIC Members
Presentations would cover how member countries are using EAF approaches to address Environmental well being; Human well-being; Governance; How it is being implemented
- 15.30-15.45** **Afternoon tea/coffee**
- 15.45-17.00** **Country experiences with implementing the main parts of EAF (continued)**
6 Brief (10-12 minutes) presentations from APFIC Members
- 17.00-17.30** *Available for over-run*
- 19.00-20.30** **Welcome dinner hosted by the Vice-Minister, Mr Seung Chung, MIFAFF**

DAY 2: 2 SEPTEMBER 2010

- 09.00-10.00** **Regional initiatives promoting Ecosystem-based management**
Short presentations from Regional Organizations and programmes that are promoting EAF/EAA in the APFIC region
The Bay of Bengal Large Marine Ecosystem Project
Prepared by BOBLME, presented by an BOBLME/APFIC member
SEAFDEC programme on promoting refugia and ecosystem approaches
Ms Pattaratjit Kaewnuratchadasorn, SEAFDEC
BOBP-IGO – issues in fisheries management
Rajdeep Mukherjee, BOBP-IGO
Human dimensions in the ecosystem approach
Dr Mitsutaku Makino, PICES
- 10.00-10.45** **Regional initiatives promoting Ecosystem-based management (continued)**
UNDP/GEF Project: Sulu-Celebes Sea Sustainable Fisheries Management
Connie Chiang, Project Manager
Wetlands Alliance – Freshwater systems.
Tep Bunnarith & Tran Thi Phan
Aquaculture models/Country experience with Ecosystem Approach to Aquaculture
Country case study(ies) – coordinated by Miao Weimin
- 10.45-11.00** **Morning tea/coffee**

Theme 3: Improving livelihoods and increasing resilience in fishing and aquaculture communities

- 11.00-11.30** **Strategies and recommendations for improving livelihoods in fisheries and aquaculture**
Presenter (Jessica Munoz) RFLP, Philippines

11.30-11.50	Regional review aquaculture livelihoods <i>Presenter (TBI)</i>
11.50-12.45	Country experiences with supporting livelihoods in fisheries or aquaculture <i>6 Brief (10–12 minutes) presentations from APFIC Members</i>
12.45-14.00	Lunch
14.00-15.30	Country experiences with supporting livelihoods in fisheries or aquaculture <i>8 Brief (10–12 minutes) presentations from APFIC Members</i>
15.30-15.45	Afternoon Tea/coffee
15.45-16.15	The need for a dedicated global instrument for small-scale fisheries <i>APFIC secretariat presentation</i>
16.15-17.00	Discussion <i>Collation and presentation of summary recommendations of Day 1 and Day 2</i>
17.00-17.30	Presentation ExPo 2012 Yeosu “The Living Ocean and Coast”, the Blue Economy Initiative

DAY 3: 3 SEPTEMBER 2010

Theme 4: Regional Policy Challenges

09.00-09.30	The implications of climate change in capture fisheries and aquaculture in Asia and the Pacific region <i>Rudi Hermes, CTA, BOBLME</i> <i>Short review of climate change impacts on fisheries and aquaculture and implications for the APFIC Region.</i>
09.30-09.50	Key messages of the recent OECD workshop on “The Economics of Adapting Fisheries to Climate Change” <i>Carl-Christian Schmidt, Head of Fisheries Policies Division, OECD</i>
09.50-10.10	PICES/ICES review of impacts of climate change on fish and shellfish <i>Suam Kim, PICES</i>
10.10-10.30	Sustainable aquaculture development in the Asia-Pacific – present status and trends in aquaculture development <i>Miao Weimin, APFIC Secretariat</i>
10.30-10.45	Morning Tea/coffee
10.45-11.15	“Recasting the net: Defining a gender agenda for sustaining life and livelihood in fishing communities” <i>Nalini Nayak, ICSF</i>
11.15-11.45	Implementation of the EU regulation <i>Country case studies/experiences (SEAFDEC, Viet Nam, Thailand country case studies)</i> <i>How to strengthen capacity and systems for catch certification and documentation</i> <i>Traceability in capture fisheries and aquaculture – addressing the challenges of implementing with small-scale fisheries</i>

11.45-12.30 *Available for over-run*

12.30-14.30 **Lunch hosted by ExPo 2010 Yeosu**

Theme 5: RCFM Summary Recommendations

14.30-15.30 **Final Plenary discussion**
Discussion of the summary recommendations

15.30-15.45 **Afternoon Tea/coffee**

15.45-16.15 **Plenary endorsement of the recommendations of the Third APFIC RCFM**
Summary recommendations to be forwarded to APFIC Session

16.15-16.45 **Closing ceremony – joint closing remarks**
APFIC Secretariat (*APFIC Secretary*)
Host Country Republic of Korea (*Representative of MIFAFF*)

17.50 **Depart 17.50**

18.30-20.00 **Closing dinner hosted by FAO**

DAY 4: SATURDAY, 4 SEPTEMBER 2010

08.00-14.00 **Field Trip 1**

08.00-19.00 **Field Trip 1 + 2**

Two field trip options around Jeju Island for participants non-returning-details to be provided at the RCFM

OPENING REMARKS

by
Mr. Kevern Cochrane, Director, FAO Fisheries Department,
on behalf of the Assistant Director-General, FAO Regional Office
for Asia and the Pacific

On behalf of Mr. Hiroyuki Konuma, Assistant Director-General of the Food and Agriculture Organization of the United Nations Regional Office for Asia and the Pacific, and on behalf of the FAO Fisheries and Aquaculture Department, I welcome you all to the third APFIC Regional Consultative Forum Meeting, to be held here in Jeju Island, over the next three days.

The APFIC Regional consultative forum meeting is titled “Balancing the needs of people and ecosystems in fisheries and aquaculture management in the Asia-Pacific” and is intended to act as a regional briefing on the activities of the Commission and her member countries as well as provided an opportunity to get an update on the work of various regional partner organizations that are relevant to the programme of work of the Commission.

The APFIC Regional Consultative Forum meeting also enables new and emerging issues related to fisheries and aquaculture to be explored and discussed in open forum.

Over the past biennium, the Asia-Pacific Fishery Commission has been focusing on two related themes. The first of these is raising awareness and promoting practical implementation of the ecosystem approach to fisheries and aquaculture and we have requested member country participants and regional organization partners to describe various successful experiences that they have had in this regard. You will also hear of the recommendations and outcomes of the APFIC regional consultative workshop on practical application of the ecosystem approach.

The second theme for this biennium of APFIC’s work is “Improving livelihoods and increasing resilience in fishing and aquaculture communities”. Again you will be hearing how member countries have been addressing this and hearing how future action could support and sustain coastal communities.

We will also be introducing two new areas of work for the consideration of APFIC. These relate to the need for improving the assessment and trend reporting in fisheries and the review of anticipated or known climate related effects on fisheries and aquaculture. Both of these areas of work relate to the uncertainties that face the future of fisheries and aquaculture adaptation and management. Whilst we must acknowledge that our ability to foresee what will happen in five, ten or fifty years from now is limited, we must also recognize that even the most basic forecasting must be based on the best information we have available and our best efforts at understanding the ecosystems we rely on at the present. In many cases this is highly constrained by poor information, serious gaps in the data systems we have for collecting and analyzing this. Wise application of precautionary and adaptive management will be the key to success.

This Regional Consultative Forum Meeting precedes the main APFIC Session and aims to provide Members with a neutral forum to discuss issues and develop recommendations for the Commission to consider and act on. This has involved forging better links with regional partner organizations and relevant non-governmental organizations across the region. It is very encouraging to see many of our partners participating here today. Thank you for your support.

We would like to stress that this is your forum. This forum meeting is not intended to be a seminar where participants take a passive role and simply listen to a number of speakers. As part of your contribution to

the Consultative Forum Meeting, you will also be asked to reflect on the recommendations and actions presented to the forum and your feedback and advice is both welcomed and necessary to inform and balance the debate.

The summary recommendations of the third regional consultative forum will be presented in a plenary session for your review and endorsement on the final day of the forum meeting. These recommendations will be summarized from the three days proceedings and offer an opportunity for the forum to provide a summary set of conclusions which will be presented to the 31st Session of the Asia-Pacific Fishery Commission, which will be convened immediately after the third RCFM.

Before I conclude my remarks, I would like to take this opportunity to thank the Member countries, Regional Organization partners and everyone who has enthusiastically contributed to convening this Regional Consultative Forum Meeting and the work of APFIC during this biennium.

On behalf of the APFIC secretariat and FAO, I would like to sincerely thank the Government of the Republic of Korea for kindly hosting this event and for their generous financial support, which has made it possible for us to convene this forum meeting with so many participants from the APFIC member countries. Special thanks are due to the Chair of APFIC and the staff of the Ministry for Food, Agriculture, Forestry and Fisheries, Republic of Korea, who have been responsible for much of the meeting organization.

Lastly, but not least, I thank you, the participants for your presence and participation, and urge you to focus your energy over the next three days to help APFIC continue to perform its function as a regional advisory body in fisheries and aquaculture that is owned by its member countries and supports the sector in the region.

Thank you.

OPENING SPEECH

by
Mr Seung Chung, Vice-Minister, Ministry for Food,
Agriculture, Forestry and Fisheries
Republic of Korea (MIFAFF)

I am Seung Chung, the Vice-Minister for Food, Agriculture, Forestry and Fisheries of Korea. Before starting my remarks, I would like to extend my gratitude to all the participants for coming over a long distance to visit Korea. I whole-heartedly welcome all of you to Jeju island, one of Korea's most favoured holiday spots.

The Relations between the APFIC and Korea go back more than a decade. Seoul hosted the 25th session of Asia-Pacific Fishery Commission in October 1996, and chaired the 72th Executive Committee meeting last year. And now we are hosting the third Regional Consultative Forum and Thirty-first session of Asia-Pacific Fishery Commission after Indonesia. I appreciate all the members for giving Korea this honorable opportunity.

Distinguished guests, ladies and gentlemen, As a share of the world's total fisheries production, the capture fisheries production of the Asia-Pacific region takes up more than half, and that of aquaculture fisheries accounts for nearly 90 percent. These figures clearly show that the region's fisheries have now taken the centre stage. Also, fisheries products are the region's primary sources of dietary protein and one of the main pillars of the region's food security. Therefore, the importance of fisheries will only grow in the future.

However, there is still a room for improvement to accomplish sustainable fisheries. For instance, the Asia-Pacific region's fishing communities are highly dependent on fisheries resources, some of which have already been overexploited. Worse yet, protecting the ecosystem is not gaining enough attention as it should be and many of us in the region are not fully guarded against climate change and are not properly implementing international agreements. Thus, the APFIC members should join hands together to chart a path to a better future for the region's fisheries.

In this regard, I think the main agendas of the third Consultative Forum, 'the application of ecosystem-based approach' and 'Improving livelihoods and increasing resilience in fishing and aquaculture communities' are very timely and appropriate.

Korea, for its part, has been making efforts in various ways to deal with such problems as resource reduction, overcapacity, high dependency on resources and negative impacts of climate change.

Thanks to these efforts, visible results are now being produced. During the meeting, case studies in reference to Korea's efforts and experiences will be presented, so I would like to ask for your interest and attention. Also, I hope that during this Consultative Forum, all the delegates and experts can pool their wisdom together and come up with excellent ideas and recommendations that will help strike the right balance between the needs of people and ecosystems. As we all know, the Asia-Pacific region's voice is not influential enough on international fisheries matters. Therefore, I expect that the APFIC will serve as a bridge that connects the region's fisheries to the world, thereby contributing to the development of fisheries of the Asia-Pacific region.

Before closing my remarks, I would like to ask for your interest and attention to the 30th FAO Regional Conference for Asia and the Pacific taking place in Gyeongju in Korea from September 27th. I hope Korea's hosting these meetings will further strengthen the ties between the APFIC and the FAO Regional Conference.

I wish all of you a great time here in Korea. Thank you.



APFIC would like to gratefully acknowledge the following organizations for their generous support in convening the Third Regional Consultative Forum Meeting:



Ministry for Food, Agriculture, Forestry and Fisheries (MIFFAF)
Republic of Korea



Yeosu Korea Expo 2012
Republic of Korea



Regional Fisheries Livelihood Programme (RFLP)



Bay of Bengal Large Marine Ecosystem (BOBLME)



Food and Agriculture Organization of the United Nations (FAO)

