Food and Agriculture Organization of the United Nations

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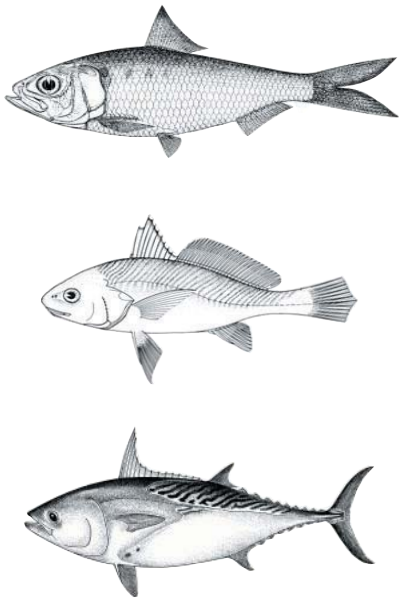
# ASIA-PACIFIC FISHERY COMMISSION (APFIC)

## FIFTH REGIONAL CONSULTATIVE FORUM MEETING

## Responsible management of fisheries and aquaculture in the Asia-Pacific

**Hyderabad, India, 19–21 June 2014**



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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
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This is the final report of the Fifth Regional Consultative Forum Meeting, *Responsible management of fisheries and aquaculture in the Asia-Pacific*, convened in Hyderabad, India, 19–21 June 2014.

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- Bay of Bengal Programme Inter-Governmental Organisation (BOBP-IGO)
- Network of Aquaculture Centres in Asia-Pacific (NACA)
- Southeast Asian Fisheries Development Center (SEAFDEC) Sweden Program
- United Nations Environment Programme (UNEP)
- WorldFish

- Arafura and Timor Seas Ecosystem Action (ATSEA) Program
- Bay of Bengal Large Marine Ecosystem (BOBLME) Project
- FAO-GFF-SEAFDEC Strategies for Trawl Fisheries Bycatch Management (REBYC II)
- USAID Maximizing Agricultural Revenue through Knowledge, Enterprise Development, and Trade Project (MARKET)

- Bureau of Fisheries and Aquatic Resources (Sulu-Celebes)
- Central Institute of Brackishwater Aquaculture (CIBA)
- Central Institute of Fisheries Education (CIFE)
- Central Institute of Freshwater Aquaculture (CIFA)
- Central Marine Fisheries Research Institute (CMFRI)
- Yellow Sea Fisheries Research Institute

- International Collective in Support of Fishworkers (ICSF)
- International Fishmeal and Fish Oil Organisation (IFFO)
- Fair Trade USA
- Marine Change
- Partnership in Environmental Management for the Seas of East Asia (PEMSEA)
- Sustainable Fisheries Partnership (SFP)
- World Wide Fund for Nature (WWF)

- Anmol Feeds Pvt Ltd
- Charoen Pokphand Foods PCL (CPF)
- Fish Vet Group Asia Limited
- Godrej Agrovet Ltd
- Thai Feed Mill Association
- U.S. Soybean Export Council (USSEC)

**Distribution:**

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

# FOREWORD

The Fifth Regional Consultative Forum Meeting of the Asia-Pacific Fishery Commission (Fifth RCFM) "Responsible management of fisheries and aquaculture in the Asia-Pacific" was hosted by the Government of India and convened in Hyderabad, India, 19–21 June 2014. The event was attended by 85 participants from some 17 APFIC member governments, various international and regional organizations/partners and the private sector.

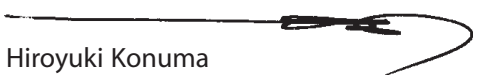
The Fifth RCFM provides a platform for the government of APFIC Members, international and regional fisheries/aquaculture organizations and economic bodies and the private sector to discuss pressing and emerging issues relating to the development and management of fisheries and aquaculture in Asia and the Pacific. Unlike previous RCFMs, the Fifth RCFM had parallel fisheries and aquaculture sessions in addition to the general sessions and was notable for the participation of the private sector.

The "fisheries and environment" parallel session "Lessons learned and future directions of the marine environmental and fisheries initiatives in the Asia region" was aimed at improving coordination between ongoing and pipeline programmes concerned with marine ecosystems, capture fisheries and the marine environment in the region. This session built on previous networking activities that took place in 2013 and is a contribution to the Global Environment Facility-International Waters learning process. It drew together best practice lessons, identified gaps and needs, and made recommendations on actions and areas for future cooperation. The partnership between the Bay of Bengal Large Marine Ecosystem (BOBLME) Project and the Asia-Pacific Fishery Commission (APFIC), in convening this session, combines their respective competences. BOBLME is a regional, large marine ecosystem project whilst the Asia-Pacific Fishery Commission has regional convening ability together with regional policy and advisory functions. The main advantage of this regional approach is that it goes beyond global coordination activities, which typically involve only project managers by also involving a selection of national project coordinators and country representatives.

The "aquaculture" session "Promoting sustainable intensification of aquaculture for food and nutritional security in the Asia-Pacific region" focused on promoting sustainable intensification of aquaculture (SIA) in the region. Intensification of aquaculture has been the main factor in the rapid increase in production in the APFIC region over the past two decades and has made significant contributions to both food security and rural livelihoods in the region. For many years the region has contributed over 90 percent of world aquaculture production, supplying nearly 50 percent of the food fish for the world population. Sharing the experiences and progress in different areas relating to sustainable aquaculture intensification, the session identified gaps and recommended policy strategies to promote SIA. In particular it focused on the roles and areas for cooperation and coordination between governmental, research, non-governmental and the private sector.

The consolidated recommendations of the Fifth RCFM adopted in plenary session were subsequently presented to the Thirty-third Session of APFIC which was convened immediately after the Fifth RCFM. The Thirty-third APFIC Session endorsed these recommendations as a guide to work priorities for FAO, country governments and international and regional organizations related to fisheries and aquaculture.

The effectiveness of the process of linking diverse regional stakeholders in this dialogue is demonstrated by the consensus achieved on the practical priorities for action. The follow-up processes which spin off from this event are also an indicator of impact and I am certain that the Regional Consultation Forum Meeting of the Asia-Pacific Fishery Commission will continue to play a valuable role in facilitating regional priority setting.



Hiroyuki Konuma
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FAO Regional Office for Asia and the Pacific

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## ACRONYMS

| | |
|---|---|
| AAS | Aquatic Agricultural Systems |
| APFIC | Asia-Pacific Fishery Commission |
| ASEAN | Association of Southeast Asian Nations |
| ATSEA | Arafura and Timor Seas Ecosystem Action |
| BOBP-IGO | Bay of Bengal Programme Inter-Governmental Organisation |
| BOBLME | Bay of Bengal Large Marine Ecosystem |
| CAP | Comprehensive Action Plan |
| CCRF | Code of Conduct for Responsible Fisheries |
| CGIAR | Consultative Group on International Agricultural Research |
| COBSEA | Coordinating Body on the Seas of East Asia |
| COFI | FAO Committee on Fisheries |
| COFI-AQ | FAO COFI Sub-Committee on Aquaculture |
| CSO | Civil Society Organization |
| CTI-CFF | Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security |
| EAA | Ecosystem Approach to Aquaculture |
| EAFM | Ecosystem Approach to Fisheries Management |
| EC | European Commission |
| EEZ | Exclusive Economic Zone |
| FAO | Food and Agriculture Organization of the United Nations |
| FIMSUL | Fisheries Management for Sustainable Livelihood |
| FIP/AIP | Fishery and Aquaculture Improvement Projects/Programme |
| FMP | Fisheries Management Plan |
| GDP | Gross Domestic Product |
| GEF | Global Environment Facility |
| IBAMO | Iligan Bay Alliance of Misamis Occidental |
| ICM | Integrated Coastal Management |
| ICSF | International Collective in Support of Fishworkers |
| IFFO | International Fishmeal and Fish Oil Organization |
| IGO | Inter-Governmental Organization |
| IUU fishing | Illegal, unreported and unregulated fishing |
| KM | Knowledge Management |
| LGU | Local Government Unit |
| LME | Large Marine Ecosystem |
| MRC | Mekong River Commission |
| MCS | Monitoring, Control and Surveillance |
| MMPA | Marine Managed and Protected Area |
| MSC | Marine Stewardship Council |
| NACA | Network of Aquaculture Centres in Asia-Pacific |
| NAP | National Action Plan |
| NAPA | National Adaptation Programmes of Action |
| NBSAP | National Biodiversity Strategy and Action Plan |
| NGO | Non-Governmental Organization |
| NPOA | National Plan of Action |
| PEMSEA | Partnerships in Environmental Management for the Seas of East Asia |
| PPP | Public-private partnership |
| PRA | Participatory Resource Assessment |
| RAP | Regional Office for Asia and the Pacific |
| REBYC | Strategies for Trawl Fisheries Bycatch Management |
| RCFM | Regional Consultative Forum Meeting |

| | |
|---|---|
| RFB | Regional Fishery Body |
| RPOA | Regional Plan of Action |
| RRA | Rapid Resource Assessment |
| RSCAP | Regional Seas Conventions and Actions Plans |
| SACEP | South Asia Cooperative Environment Programme |
| SAP | Strategic Action Programme |
| SAARC | South Asian Association for Regional Cooperation |
| SDS-SEA | Sustainable Development Strategy for the Seas of East Asia |
| SEAFDEC | Southeast Asian Fisheries Development Center |
| SME | Small and Medium-size Enterprises |
| SSF | Small-scale Fisheries |
| SSME | Sulu-Sulawesi Sea Marine Eco-region |
| TDA | Transboundary Diagnostic Analysis |
| VMS | Vessel Monitoring System |
| WorldFish | WorldFish Center |
| WWF | World Wide Fund |

## OPENING

The Fifth Regional Consultative Forum Meeting of the Asia-Pacific Fishery Commission (Fifth RCFM) "Responsible management of fisheries and aquaculture in the Asia-Pacific" was convened in Hyderabad, India, 19–21 June 2014, hosted by the Government of India.

Mr M.V. Rao, Chief Executive, Indian National Fisheries Development Board, welcomed the participants to Hyderabad and underlined the importance of fisheries and aquaculture in India and in the Asia-Pacific region.

The welcome remarks from Mr Raja Sekhar Vundru, Joint Secretary (Fisheries), Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture, India, underlined the need to produce more food for an increasing population. With fisheries and aquaculture playing a crucial role in this aspect and through "Blue Growth", it will be possible to sustainably increase the availability of seafood. The role of smallholders in both fisheries and aquaculture is important in terms of overall production and in terms of socio-economics in many rural and coastal areas in Asia-Pacific region and they also act as important employers. The changes in climatic conditions continue to be a challenge for fisheries and aquaculture, due to the unpredictability in climate patterns and changes in migration behaviour.

## STRUCTURE OF THE FIFTH RCFM

The Regional Consultative Forum Meeting (RCFM) of the Asia-Pacific Fishery Commission (APFIC) is an important platform for the government of APFIC Members, international and regional fisheries/aquaculture organizations and economic bodies and the private sector to discuss pressing and emerging issues relating to the development and management of fisheries and aquaculture in Asia and the Pacific. The RCFM is a biennial event organized by AFPIC Secretariat (FAORAP) and the Fifth RCFM was hosted by India. The event was attended by 85 participants from some 17 APFIC member governments, various international and regional organizations/partners and the private sector. Unlike previous RCFM's, the Fifth RCFM had parallel fisheries and aquaculture sessions in addition to the general sessions and was notable for the participation of the private sector.

The "fisheries and environment" parallel session was aimed at improving coordination between ongoing and pipeline projects of the Global Environment Facility (GEF) and GEF/-International Waters (IW) programmes concerned with marine ecosystems, capture fisheries and the marine environment in the region. This session built on previous networking activities that took place in 2013 and will also contribute to the GEF/IW learning process. It drew together best practice lessons, identified gaps and needs, and made recommendations on actions and areas for future cooperation.

The "aquaculture" session focused on promoting sustainable intensification of aquaculture (SIA) in the region. It shared the experiences and progress in different areas relating to sustainable aquaculture intensification; it identified gaps and recommended policy strategies to promote SIA. In particular it focused on the roles and areas for cooperation and coordination between governmental, research, non-governmental and the private sector.

The recommendations of the Fifth RCFM were presented to the Thirty-third Session of APFIC (Thirty-third APFIC Session), which was held immediately afterwards. The Thirty-third APFIC Session endorsed the recommendations as a guide to work priorities for FAO, country governments and international and regional organizations related to fisheries and aquaculture.

# PLENARY SESSION

## BLUE GROWTH FOR THE FUTURE RESPONSIBLE MANAGEMENT OF FISHERIES AND AQUACULTURE IN ASIA-PACIFIC

*Doris Soto, Fisheries and Aquaculture Department, FAO, Rome*

The keynote address underlined the importance of the Fifth RCFM as an important forum and platform that enables APFIC governments and other stakeholders to nurse partnership and exchange ideas among countries and among fisheries and aquaculture organizations in the Asia-Pacific region.

At the recently conducted FAO Committee on Fisheries (COFI), it was recommended that more support should be provided to the development and expansion of smallholder aquaculture in the future as a generator for development in rural and coastal areas should be continued. Currently fisheries and aquaculture support livelihoods for 10–12 percent of the world's population with almost 60 million people engaged in the primary sector. There are about 15 percent women employed in the primary sector, and up to 90 percent of employees in the processing industry are women.

Inland fisheries provide commerce, employment, nutrition and recreation for people particular in the developing world. However, inland fisheries are often not managed well and undervalued. FAO have recently developed a guideline for small-scale fisheries (SSF) through a thorough consultative process and the guidelines are now at the stage of implementation.

There is increasing international commitment to coordinate global efforts to combat IUU fishing, especially through limiting the trade in IUU products. FAO is active in combating IUU and illegal fishing, safety at sea, bycatch management and discard reduction. For example have FAO strengthened its global capacity development programme on port state measures and 10 members have become Party to the Agreement. The voluntary guidelines for flag state performance to prevent, deter and eliminate IUU fishing was concluded in 2013. Fish remains among the most traded food commodities worldwide, worth almost US$130 billion in 2012 and pointing to an increase for 2013. The demand for fish is driven by population and income growth. It is estimated that the per capita consumption.

Global Blue Growth is a new initiative based around FAO principles and the FAO code of conduct for responsible fisheries. Global Blue Growth is a global coordinated action to enhance implementation of the code on the ground in such way that we enhance a sustainable contribution and conservation of living renewable resources in the marine and fresh water ecosystems as well as adjacent coastal and inland ecosystems, to food and nutrition security and poverty alleviation. This can be achieved through:

- sustainable growth of capture fisheries and aquaculture
- other or "novel" ecosystem services contributing to livelihoods and development, and
- trade/markets/post-harvest improvements and social support mechanisms

## REGIONAL OVERVIEW OF FISHERIES IN ASIA AND THE PACIFIC 2014

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

Asian fishery production from all marine waters has continued to increase (reaching 48.9 million tonnes in 2012), which is about 61 percent of total global production. Global marine capture fisheries (79.7 million tonnes in 2012) are not increasing and decreased over the previous year (mainly due to low production from the Peruvian anchoveta fishery).

The statistics reported by some countries indicate continuous increases in production that do not reflect normal year by year variations in fishery production. In such cases, this steadily increasing reported production seems unlikely to be correct when matched against survey and other fishery assessment data. The risk is that continuous overreporting can lead to serious errors over successive years, especially if the fishery is not actually increasing (e.g. by annually reporting an 8 percent increase in production for a fishery that is not actually increasing, will result in a 100 percent error over the course of ten years, the annual increase may seem minor, but the aggregated effect is considerable).

This problem is most severe when there is no actual data collection from the fishery upon which to base an estimate for the report. This situation is by no means uncommon in local offices where there is no routine data collection or monitoring or where only part of the fishery is monitored and the reporting officer must give an estimate of other sources of production.

**SUMMARY OF FISHERIES PRODUCTION BY SUBREGION**

The APFIC regional overview focuses on three fishery subregions which lie within the heart of the APFIC area. These three subregions are largely EEZ waters of the APFIC membership in Asia with relatively little high sea. These subregions are:

- South China Sea
- Bay of Bengal
- The Sulu Sea, Sulawesi Sea, Indonesian territorial seas, Arafura-Timor Sea

Deriving fish catches for subregions within FAO statistical areas is often a challenge and typically requires access to statistical data at the subnational level. There is relatively little high sea area in the APFIC subregions covered by the Regional overview and the APFIC Members do not, typically, grant foreign fishing access to their waters (although neighbouring countries may fish in their waters, legally or illegally). This means that catches from long-distance fishing nations and nations outside of the region are less important in deriving these subregional estimates.

Unreported catch and the catch of IUU fishing is a far greater issue in getting real estimates of the production from the subregion. In some cases there is systematic overreporting of marine catch, which may also be responsible for driving catch figures continuously upwards as is seen in the reported catch (e.g. Bay of Bengal).

The total marine fishery catch for the Eastern Indian Ocean and Western Indian Ocean by the countries of the Asian region was 18 555 716 tonnes in 2012. This total represents 21.3 percent of the total global marine fish catch of 79 719 854 tonnes (excluding plants).

The estimated total marine catch of the three subregions is 16 984 728 tonnes and accounts for 91 percent of the FAO regional total. This nine percent difference is probably due to use of some non-FAO national statistics and exclusion of the catches of the eastern Philippines and underestimates of the Indonesian catch in its territorial seas.

The Bay of Bengal marine fishery catch is estimated[1] as 7 268 091 tonnes which is approximately 9.1 percent of global marine fishery catch, excluding seaweeds.

The South China Sea marine fishery catch is estimated at 5 356 939 tonnes[2], representing 6.7 percent of total global marine catch (excluding seaweeds). The Indonesian territorial seas, Sulu Sea, and

[1] Based on 2012 FAO FishstatJ data for the eight BOB countries' landings in the Eastern Indian Ocean.

[2] Estimated from the Western Indian Ocean catches of Thailand, Viet Nam, China, Cambodia, Brunei Darussalam and Singapore. The FMA 711 catch for Indonesia (2008) is added, together with the 2012 BAS data for Philippines regions adjoining the South China Sea (Ilocos, Central Luzon, Mimaropa and Batangas, Cavite and Qezon).

Arafura and Timor Sea marine fishery catch is estimated at 4 358 698 tonnes[3] representing 5.5 percent of total global marine catch. This catch is largely the catches of Indonesia and the Philippines. The catches of Timor-Leste and Australia comprise less than 20 000 tonnes of the total.

**USING CATCH RECONSTRUCTION TO INVESTIGATE REPORTED CATCHES**

The challenge of unreported fishing as well as overreported fishing can be illustrated by the recent catch reconstruction for the Bay of Bengal[4]. The catch reconstructions indicate that the total catch of the Bay of Bengal may be substantially higher than that reported to FAO, primarily due to unreported catches from commercial fisheries, underestimation of artisanal catches and the catches lost to IUU fishing. There are also some adjustments made for overreporting. The total catch for BOB reconstructed by is 10 700 000 tonnes. Overall, the total catches increased from 1950 to the mid-1990s, after which reconstructed catches flattened off. This is in contrast to reported landings, which suggest a continuous increase in landings during the 2000s. This reconstructed catch also indicates that there may be as much as 47 percent unreported catch in the subregion.

**BAY OF BENGAL SUBREGION**

On the eastern side of the Bay of Bengal heavy fishing pressure has seen substantial declines in fish stocks with many of the species groups considered to be overfished (APFIC overview 2012). The detailed reports are blurred by the lack of detail of Myanmar's reports (principally 2.4 million tonnes of "Marine fish nei"). Overall there is 3.2 million tonnes of unidentified fish (~50 percent of total catch). In most countries this unidentified catch is low value catch that is landed for use in fishmeal and feeds or is the estimated catch from artisanal fisheries. Improved reporting is needed, as there is an important distinction which needs to be made regarding the value for food security and livelihood versus other uses such as fishmeal and use in feeds of this "unidentified" fish fraction.

Looking at the species details reported, the fishery is dominated (~35 percent) by small pelagic (Indian mackerels, Indian scad, anchovies) species. Higher value demersal species comprise 19 percent of catch and crustaceans (mainly shrimp/prawns) contribute 14 percent. Large pelagic species (tunas, neritic tunas, seerfish) are 14 percent of the catch (much of this is contributed by the southern part of the Bay of Bengal.

Small demersal species that are now principally used for surimi comprise 7 percent of total catch, although recent trawl surveys in Myanmar indicate these species dominate this trawl catch and much of the unidentified part of the catch also may also comprise this group. Jellyfish, cephalopods and sharks/rays along with other minor invertebrate species provide the other 9 percent of the identified catch.

The UBC catch reconstruction indicates that the large-scale industrial sector has increasingly dominated total catches, accounting for 41 percent of total historical catches, but that there is an indication of a levelling off or even slight decline in industrial catches in recent years. Small-scale and small-commercial catches seem to be increasing.

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[3] Estimates for Philippines are from the 2012 BAS data for regions in the Sulu and Sulawesi Sea areas (Western Visaya, Central Visaya, Zamboanga Peninsular, Northen Mindanao, Davao, Soccskargen, ARMM and Masbate. (http://countrystat.bas.gov.ph, fisheries statistics query, accessed 2014); the Indonesian catches of Timor Arafura, Banda Sea and Sulu-Sulawesi Sea (2011, reported in the APFIC regional overview 2012).

[4] "Reconstructed total fisheries catches for the countries of the Bay of Bengal Large Marine Ecosystem: 1950-2010, Report to the Bay of Bengal Large Marine Ecosystem Project" (www.boblme.org) prepared by: Dirk Zeller, Danielle Knip, Kyrstn Zylich and Daniel Pauly, Sea Around Us Project, Fisheries Centre University of British Columbia.

## SOUTH CHINA SEA

The catch composition of the northern part of the South China Sea is dominated by large pelagic species, neritic tunas (it is almost impossible to separate the catch of South China Sea area from that off the east coast of the Philippines and this leads to higher values for the larger tuna/pelagic species). Small pelagic species are caught throughout the subregion.

In the southern shelf areas, small demersal species are a more significant catch and these are often destined for surimi and processing (Natuna Sea area). A significant part of the catch is directed for fish meal (see section on fishmeal) and for direct feeding to marine fish aquaculture cages. In Thailand alone 353 000 tonnes of low value/trash fish are caught. This is principally the unidentified marine fish nei component which comprises 38 percent of the total catch.

## SULU SULAWESI, ARAFURA AND TIMOR, INDONESIAN TERRITORIAL SEAS

The marine fishery catch of the Indonesian territorial seas, Sulu Sea, and Arafura and Timor Sea marine fishery catch is estimated as 4 358 698 tonnes. This catch is largely comprised by the catches of Indonesia (~69 percent) and the Philippines (~30 percent). The catches of Timor-Leste and Australia comprise less than 1 percent of the total (20 000 tonnes). The total catch of the Arafura Sea was estimated at around 793 000 tonnes[5].

The 2012 APFIC Regional overview indicates that the demersal species groups (including crustaceans) are overfished. The status of small pelagic and large pelagic fisheries is less severe, but these are also moderately or fully fished, indicating that there is little scope for increase in catches. A 2010 Indonesian Stock Assessment report classified many of the fisheries of the Arafura and Timor Seas fisheries as fully exploited or over exploited[6].

The subregion is also highly vulnerable to IUU fishing, which has been historically difficult to control due to its relative remoteness. In the early 2000's it was estimated that 85 percent of vessels (~7 000) over 50 gross tonnes were operating without a licence[7]. Recent estimates (2011) suggest that IUU fishing in Timor-Leste is widespread and that loss of income is approximately US$36 million per year.[8] Estimates of the IUU fishing the Sulu-Sulawesi Sea indicate that up to 33 percent of the catch is IUU[9].

## IUU FISHING IN THE REGION

IUU fishing remains a pervasive global problem, but it remains a challenge to derive adequate regional estimates. This is important because the nature of IUU fishing varies around the world and will require different strategies to combat IUU fishing according to the context.

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[5] Stacey, N. (editor), S. Nurhakim, D. Nugroho, H. Soselisa, B. Resosudarmo, O. Kalis, J. Monteiro, J. Prescott, J. Martin, & J. Karam (2011). Socio-economic Profile of the Arafura and Timor Seas. Report prepared for the Transboundary Diagnostic component of the Arafura and Timor Seas Ecosystem Action (ATSEA) Program, Jakarta, 135 ps.

[6] Anon. 2010, Komisi Nasional Pengkajian Stok Sumberdaya Ikan Tahun 2010. Jakarta: Kementerian Kelautan dan Perikanan Badan Litbang Kelautan dan Perikanan. Pusat Penelitian Pengelolaan Perikanan dan Konservasi Sumberdaya Ikan. Cited in ATSEA (2012). Transboundary Diagnostic Analysis for the Arafura and Timor Seas Region. 111 ppp.

[7] Resosudarmo, BP, Napitupulu, L & Campbell, D 2009, Illegal Fishing in the Arafura Sea. In: Resosudarmo, B. P. & Jotzo, F. (eds.) Working With Nature against Poverty Development Resources and the Environment in eastern Indonesia. Singapore: Institute for Southeast Asian Studies, pp 178-200.

[8] Bateman and Bergin (2011) cited in Arafura and Timor Seas Ecosystem Action Program (2012). Strategic Action Programme for the Arafura and Timor Seas Region. Report prepared for the Arafura and Timor Seas Ecosystem Action (ATSEA) Program.

[9] M. Palma & M. Tsamenyi (2008) Case Study on the Impacts of Illegal, Unreported and Unregulated (IUU) Fishing in the Sulawesi Sea. APEC.

A 2009 report estimating global IUU[10], indicates that the illegal trade in fish could account for 11 million to 25 million tonnes of seafood. This was derived estimation of IUU based on source studies, which use a number of different methods to estimate the level of illegal fishing, including surveillance data, trade data, stock assessments based on fishery-independent (survey) data and expert opinion. The losses from the Eastern Indian Ocean and Western Central Pacific (FAO Statistical areas 57 and 711) ranged between 1 253 762 and 2 700 177 tonnes (average 2000–2003).

Other studies of subregions or the semi-enclosed seas indicate potentially higher figures for IUU. A study of unreported Indonesian fishery catch reveals approximately 1.5 million tonnes per year for the Arafura-Timor Sea alone. Much of this catch is illegal[11]. The financial loss from IUU fishing in the Sulawesi Sea has been conservatively estimated at about a third of the total annual value of marine fisheries in the Sulawesi Sea (total catch 1 190 000 tonnes worth US$715 million in 2003). The value of the illegal catch does not include social and environmental costs.[9] This value probably represents less than one third of the total catch.

The three subregions covered by the APFIC regional overview have an important characteristic, not found in other regions where there are large open oceans. The majority of the area is contained within domestic waters, territorial seas and EEZ areas of the countries which border the three subregions. This lack of high sea area means that combatting IUU fishing is a strongly national issue.

There are reports of IUU fishing by vessels of other countries encroaching into the EEZ of the countries. In almost all cases, the member countries of APFIC do not allow foreign flagged vessels to fish in their EEZ waters. A notable exception to this is Myanmar which has until recently had an access agreement with Thailand. India has allowed a number of Letter of Permit Vessels to fish in the EEZ. The closure of EEZ waters to foreign flagged fishing vessels has resulted in a number of other arrangements coming into play. Probably the most common example is that of joint ventures or front companies based within the country where the vessels are operating. The fishing vessels in these cases may be domestic, or perhaps more commonly, reflagged vessels from the country which has partners in the joint venture. This means so–called beneficial ownership may still reside outside the country where the vessels are fishing. The reflagging of vessels seems relatively widespread and does raise a question about the de-registration process. Almost all the member countries in the region cite weaknesses in the registration and licensing of their domestic fleets as a constraint to effective capacity management, It may be also considered that this extends to some extent to the ability to check where vessels are deregistered before reflagging.

Importantly, the reflagging of vessels to fish under joint venture arrangements or as local registered companies with beneficial ownership outside the country, challenges the effectiveness of Port State Controls, as these are generally focused on foreign vessels. In the case of dual flagged vessels, these vessels may also avoid detection under a Port Inspection Scheme if the focus is only on foreign vessels, because these vessels enter port under a national flag.

The IUU catch that is taken from the different subregions also varies. Around coral seas the species may be high value products with niche markets in other parts of Asia (e.g. live reef fish, coral, ornamental shells, giant clam, sea turtles, sea cucumber etc.), IUU products of longlining include shark fins as well as unreported or illegally transhipped tuna and other species. Trawl fisheries and purse seiners in the region may illegally access neighbouring waters or illegally transship fish onto carrier vessels and return this to the country of beneficial ownership of the fleet.

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[10] Agnew DJ, Pearce J, Pramod G, Peatman T, Watson R, et al. (2009) Estimating the Worldwide Extent of Illegal Fishing. PLoS ONE 4(2): e4570. doi:10.1371/ journal.pone.0004570.

[11] G.A. Wagey, S. Nurhakim, V.P.H. Nikijuluw, Badrudin, T.J. Pitcher (2009). A Study of Illegal, Unreported and Unregulated (IUU) Fishing in the Arafura Sea, Indonesia.

Other IUU activities include vessels operating under access agreements carrying the same markings and illegal landings of fish in ports of neighbouring countries in contravention of national laws. Alongside the illegal operations are commercial servicing operations that may support the illegal activities of fishing vessels. At sea bunkering, resupplying, provision of spare parts and crew repatriation services are increasingly available, enabling vessels to remain at sea for longer periods.

The close linkage between vessel registration, capacity management and combatting IUU fishing emphasizes that this is an area where there is a need for improvement, and also potential from more effective regional cooperation. An updated review of IUU fishing in the APFIC region would contribute to improved regional understanding of the issues and also support regional initiatives such as the Regional Plan of Action to combat IUU fishing (RPOA).

**FISHING LABOUR, MIGRATION**

Over the past 15 years there has been a transformation in the mobility of fishing labour. This has been driven by rising labour prices and enabled by the great ease of movement of migrant labour between countries of the region. Now Thai and Indonesia flagged fishing vessels have crew that come from Myanmar, Lao PDR and Cambodia. Taiwanese vessels may have crews from the Philippines and Indonesia. In the Maldives, fishing crews are being sourced from Bangladesh. This shift to the use of foreign labour has revealed both labour trafficking and illegal labour procurement practices. This has also shown that labour legislation and controls overfishing vessels are very weak when operating far from shore or in the waters of neighbouring countries. This is a flag state responsibility, but is complicated if the beneficial ownership is in another country.

The ability of vessels to remain at sea transhipping and refuelling, often in remote locations means that crews may not have the chance to return to shore for long periods and in some documented cases this has been effectively forced labour or slavery. The issue of straying of small scale fishing vessels into the EEZ of neighbouring countries is another problem that is variously tolerated or not around the region. Increasing maritime security concerns has seen tougher measures against straying fishers and they may end up spending long periods in confinement before eventual repatriation.

**MCS AND VMS – AN INCREASING TREND IN THE REGION?**

Electronic monitoring systems (e.g. VMS) are still in relatively limited use across the region considering the number of fishing vessels. They are becoming a requirement in some fisheries for larger vessels as countries start to take a greater interest in the monitoring fishing vessels activity and particularly because these systems offer additional benefits such as ease of location in an emergency. In the latter case, the interest is from the private sector to install for their own corporate benefit.

For smaller fishing vessels and artisanal fishers, some countries are exploring low cost, low range systems to assist with navigation as well as having options for recording observations of IUU fishing and raising the alarm when a vessel is in distress. The costs of both the VMS/VPS service and the equipment is now reaching appoint where it is a financially viable option for many fishing vessels, however, until member countries establish their own systems for monitoring and communication, these systems will not contribute to monitoring of IUU fishing.

**WHAT TO DO ABOUT FISHING VESSEL OVERCAPACITY?**

One of the greatest drivers of overfishing and IUU fishing is overcapacity in the fishing fleet and onshore processing industry. Investments in processing capacity based on rapid growth of the fisheries of the region took place through the 1980s to late 1990's. Initially driven by capture fishery products, this soon diversified into aquaculture products for export as well. With the decline in quality of the marine catch, the processing sector also re-equipped to develop surimi and other processed products from lower grade food fish.

From individual countries there are some signs that fish vessel numbers in some fisheries art declining and this presumably driven by lack of economic viability. The fishing sector has for a long time, been the beneficiary of fuel subsidies in many countries, in some cases these were temporary events (to buffer against fuel price spikes), elsewhere they are long-running support schemes.. There are other subsidies such as support to construction of new vessels (low cost loans), fisheries insurance schemes (a social security system in case of injury or death), fishery compensation schemes (to compensate for loss of fishing days during closed seasons).

The impact on fishing is that economic factors which might limit vessel numbers do not come into play until well after the real economic viability of the fishery is exceeded. Alongside subsidies, has been a technology shift that has allowed fisheries to utilize species (e.g. lizardfish, threadfin bream) that were previously only locally consumed and not part of a regional or international market chain (e.g. shifting to species that must be processed to surimi before marketing). Aquaculture development is another technology shift that has driven demand for fishmeal and this enabled fisheries that produce low value/low quality fish to land their catch and still obtain a return (although this seems to be generally around a breakeven point). The use of foreign labour, often paid lower rates than domestic labour has been another mechanism whereby fishing operations have been able to trim operational costs and remain viable even when catch quality and quantity has deteriorated. These systems have not been systematically reported, but have a strong influence on the ability of a fishery to reform, particularly if the goal is reduction of fishing capacity.

**ASIAN FISHMEAL – WHERE IS IT COMING FROM?**

At the same time as fish processing capacity was increasing, fish meal plants have also been increasing capacity to supply the regional demand for fishmeal, primarily for aquaculture. The Asian production of fishmeal is difficult to estimate. In the 2012 Regional overview APFIC estimated production in the South China Sea area at 641 000 tonnes, produced principally by Thailand (505 000). Bay of Bengal production is low at around 30 000 tonnes.

The raw material for fish meal is derived from several sources: fresh fish (higher quality fishmeal and also to prevent price drop when catches are unusually high); degraded fish that has been stored on board ("trash fish"); frames and trimmings from fish processing (canning, surimi, freezing). The Thai fishmeal producers claim that up to 65 percent of the fishmeal is derived from the processing wastes of canning and surimi and other seafood processing.

The use of processing wastes to produce fishmeal appears to be substantially higher in the Asian region than elsewhere, where targeted reduction fisheries are a more important source of raw material for fishmeal. There are increasing signs that pelagic fisheries elsewhere in the region will become targeted for fishmeal, particularly as there is an increase in the use of compound aquaculture feeds. The fishmeal inclusion levels in many aquaculture finfish feeds are now relatively low (especially in feeds for freshwater species). The exception is marine finfish, which are remain a small percentage of the regional production, but even at current production levels the requirement for fishmeal will be in the order of millions of tonnes. Shrimp aquaculture feeds continue to decrease fishmeal inclusion levels, but the volume of production of shrimp means that this is still the principal aquaculture use of fishmeal in the region. Declining quality fish from marine fisheries and the increasing demand for marine carnivorous fish driven by economic growth of the region is likely to make this an expansion sector, and thus demand for fishmeal in this area is likely to rise.

**ASIAN INLAND FISHERIES ARE A MAJOR SOURCE OF INLAND FISHERY PRODUCTS**

Fish produced from inland fisheries are a major source of food and food security throughout the region. These inland fisheries are often overlooked in national statistics and in considerations of food security, yet they are present throughout the large river floodplains, deltas and rice farming areas of the region.

The large irrigation tanks and reservoirs of the region also provide considerable quantities of fish in some countries. Inland fish consumption is not confined to these areas, as even in mountainous areas, fish are still a prized food in many cultures.

Eleven APFIC member countries in the region produce 65.5 percent of global fish catch from inland fisheries. The national percentage production do not reveal the locations precisely of the inland fishery production and suggest that it may be nationwide. In fact, in land fisheries production is often focused in specific areas. In these areas it is highly linked to increased rates of fish consumption and this may be seen to some extent by looking at the subnational details of fish consumption (see next section).

**INLAND FISHERIES TRENDS**

Asian inland fisheries production shows a continuous strong increase, rising 50 percent over the past decade (compared with 21 percent in the rest of the world's inland fisheries. There are a number of notable increases in inland fisheries production amongst some Asian countries. In some instances production increases of over 50 percent more than the previous year have been reported during the past decade (this is rather unlikely even in the highly variable inland fisheries). In another case, consistent annual increases of 10–15 percent are reported which has led to a massive increase over the decade.

Most countries report increasing production from inland fisheries, Japan and Viet Nam being notable exceptions (reporting decreases of 47 and 10 percent respectively over the decade). Very large decadal increases are reported by Myanmar (389 percent), Sri Lanka (170 percent). In cases where very large changes in production have been reported, some form of validation might be helpful, especially in cases where the inland fishery production is not based on catch collection data but on estimates.

The quality of reporting of inland fishery species is rather poor, with 74 percent of the catch reported as "miscellaneous freshwater fish". This prevents any real trend analysis and highlights the need for some more targeted work to try to improve the detail of the inland fishery catch throughout the region. The tropical inland fisheries of the region are renowned for their biodiversity and almost all species are consumed in some form or another. Without improving information on inland catches, the real value and importance of inland fisheries remains hidden and more importantly, greatly undervalued.

## STATUS AND TRENDS OF AQUACULTURE IN THE SUBREGIONS OF ASIA AND THE PACIFIC 2014

*Weimin Miao, Aquaculture Officer, FAO Regional Office for Asia and the Pacific*

The Asia-Pacific region accounts for 91.1 percent of global production of products from aquaculture and have an annual growth of 6.9–9.0 percent from 2008 to 2012. In this biennium (2010–2012) there have increased of 9.0 percent.

There is an equal split between marine and fresh aquaculture environments accounting for around 47 percent of production each, with the remaining 6 percent of products farmed in brackish environments. The production in Asia-Pacific is large and there are currently 189 species reported in aquaculture, with 34 species produced in volumes larger than 100 000 tonnes. There is a large amount of seaweed produced in the region which amounts to about 23 percent. The Asia-Pacific region is the leading region in terms of aquaculture production. In 2012, the region produced 58.5 million tonnes of aquaculture products (excluding aquatic plants), which accounts for 89 percent of the global aquaculture production of 66.7 million tonnes.

In South Asia the production of freshwater and diadromous fish species strongly dominate the production with 90.18 percent from this group. Although only contribution 2.41 percent of total

production by volume in South Asia it is interesting to note the increase in marine fish production from 2010 to 2012 by 160.29 percent.

Aquaculture production in Southeast Asia is highly diversified with a high number of species cultured in a high in fresh, brackish and marine environments. Pangasius (*Pangasius sp*.) and Nile tilapia (*Oreochromis niloticus*) are the two dominant species with whiteleg shrimp (*Penaeus vannamei*), milk fish (*Chanos chanos*) and giant tiger prawn (*P. monodon*) as the next three most popular species produced.

The People's Republic of China, is by far that country in the world that has the largest and most diverse aquaculture production. The total volume and value of aquaculture in China in 2012 was estimated to 41 459 361 tonnes with a value of US$67.5 billion. The growth since 2010 has been 11.9 percent, and over a ten year period (2002–2012) was 69.4 percent. The group of species most important to China is freshwater and diadromous finfish species, especially the Chinese carps. These carps are mainly for domestic consumption and are of crucial importance in both rural and urban areas of China to supply a good and fairly cheap source of protein for the Chinese people. The top five provinces producing fresh water aquaculture produce 85.5 percent of China's total freshwater aquaculture production, and the top five marine/brackish water aquaculture provinces produce 54.64 percent of the total marine/brackish production in China. There are likely several other countries in the Asia-Pacific region, where there are huge differences and diversification at the national level.

The subregion other Asia had an annual aquaculture production (excluding aquatic plants) of 1 188 952 tonnes at a value of US$5.7 billion in 2012, equal to less than 5 percent of the total global aquaculture production. Compared to other subregions in Asia-Pacific, the increase over the last decade has not been high. In fact the production has been quite stable. There has been a slight decline from 2010 to 2012 at about 6 percent in terms of volume and a slight increase in terms of value at 4.3 percent total over the last two years.

Oceania's total aquaculture production amounted to 186 759 tonnes worth US$1.2 billion in 2012. There have been a slight decrease in production from 2010 to 2012 at – 0.53 percent in volume, and over the last ten years (2002–2012) there have been an average yearly growth of 4.43 percent. Oceania's production is dominated by the production of high value mollusks (Mussels) and freshwater and diadromous fish (Salmon).

The development trends in the Asia-Pacific region indicate that there is an intensification of aquaculture. The reasons for the intensification are a step towards a more mature industry not only focused on household demand or local trade, but becoming regional and international traded products. There are both opportunities and challenges in intensification. Farmers can potentially get a better income without using more land area, but there is also the risk from a larger investment needed in the more intensive systems. There is also often more fluctuation in internationally traded products compared to locally traded products.

Aquaculture production is often highly concentrated within a country. This diversity is often lost in the national reporting figures. Aquaculture development in these favourable areas sometimes exceeds the ability to regulate and manage in many countries. There is often a lack of planning and regulation is often behind the development. There is a lack of relevant tools for effective planning and management.

There is a trend that continuing growth will develop at different paces by countries, but with a general intensification with high input and high output farming units. There will likely be an increase in interregional trade, and increased issues surrounding transboundary issues (e.g. animal health issues, trade issues). The big question is how to have a sustainable development and intensification within the Asia-Pacific region.

## PLENARY DISCUSSION

It was noted from the floor that there was a fundamental importance for aquaculture and fisheries in food security. There have been serious challenges within production of shrimp in some of the Asia-Pacific countries with the Acute Hepatopancreatic Necrosis Syndrome (AHPNS), but it was not reflected in a regional decline. There was an increase in some countries and a decline in other countries that somehow leveled out production.

In the discussion, it was stated that it is of crucial importance to make sure smallholders, both within fisheries and aquaculture, are included in future development and sustainable intensification of the sector. Increased efficiency in the sector should also be a focus and part of the intensification discussion. Poverty reduction can be achieved through both aquaculture and fisheries. However, there are some concerns that the distribution of added value is not equal along the value chain. Often the farmers and the fisher folk are receiving less benefit than further up the value chain. It was also noted that there should be a focus on value-adding instead of increase in volume only. The future of seafood was also discussed. As there is an increase in income there might be a shift towards higher value species from lower value species.

There is currently quite some attention and work being carried out on labour dimensions of fisheries, but less on labour conditions within the aquaculture subsector. FAO has completed a study on labour conditions in aquaculture, which would be available soon. The gender aspect of increasing women involvement in small-scale fisheries and aquaculture was mentioned as an important area.

The floor noted that food safety in fisheries products from both aquaculture and fisheries was very important when talking about intensification and it was stated that food safety is not only for exported commodities but very much a national local issues as well.

Finally there was a discussion about the challenges for government in planning and management of resources both within fisheries and aquaculture. There is a need for more public-private partnerships (PPPs) and comanagement to address some of the challenges that is present in the sector.

# FISHERIES SESSION

# LESSONS LEARNED AND FUTURE DIRECTIONS OF THE MARINE ENVIRONMENTAL AND FISHERIES INITIATIVES IN THE ASIA REGION

This session was a regional knowledge sharing meeting of GEF and GEF/IW supported projects and programmes in the Asian region. It built on previous networking activities which took place in 2013 and will also contribute to the GEF International Waters learning process.

It was intended that the meeting would enable greater coordination between ongoing and pipeline line GEF and GEF/IW marine ecosystems, capture fisheries and marine environmental projects in the region. This regional knowledge sharing meeting was foreseen as an ongoing process rather than one off event.

The partnership between BOBLME and the Asia-Pacific Fishery Commission combines their respective competences. BOBLME, funded under GEF/IW, is a regional, large marine ecosystem project whilst the Asia-Pacific Fishery Commission has regional convening ability together with regional policy and advisory functions. The main advantage of this regional approach is that it goes beyond global coordination activities, which typically involve only project managers by also involving a selection of national project coordinators and country representatives.

## IMPROVING THE MANAGEMENT OF TRAWL FISHERIES

*Rick Gregory & Isara Chanrachkij, REBYC-II CTI Project, Regional Facilitation Unit, SEAFDEC/Training Department*

The first REBYC project, "Reducing and Managing Bycatch" (2002–2008) focused on the reduction of environmental impacts from tropical shrimp trawling by introducing bycatch reduction technologies and changing management techniques. It concluded that gear modification solutions alone tended not to be adopted by trawl fisher operators and needed to be supported by appropriate legal and economic incentive frameworks. It also required a deeper understanding of, and close cooperation, with a range of stakeholders to improve trawl fisheries management.

The current "Strategies for Trawl Fisheries Bycatch Management (REBYC II CTI) Project (2012–2015) is hosted by the SEAFDEC Training Department in Thailand and involves national and international organizations from Thailand, Viet Nam, Philippines, Indonesia and Papua New Guinea. A key output from the project is the development and implementation of trawl fisheries management plans that incorporate *Ecosystem Approach to Fisheries Management* (EAFM) principles and are consistent with national and regional planning frameworks. Where planning information gaps exist, the project is helping its partners generate data to support the development of these plans.

The project also focuses on capacity building at a range of levels: improving the awareness and knowledge of the private sector, technical officers/extension workers and other stakeholders, on trawl fishery sustainability issues and opportunities for collaborative management.

A number of key lessons have already emerged through the implementation of the project. These include:

- the need for close coordination with the private sector
- the need to understand perception differences between official agencies and the private sector
- the need to understand the likely winners and losers resulting from improved trawl fisheries management planning.

Allowing participating countries to prioritize their activities based on the peculiarities of their individual trawl fisheries, is regarded as a strength of the current project approach. Opportunities would seem to exist for the project to achieve greater impact through the current international pressures for improved trawl fisheries management in the region.

## INTRODUCING "ESSENTIAL EAFM" – DEVELOPING CAPACITY IN THE ECOSYSTEM APPROACH TO FISHERIES MANAGEMENT (EAFM)

*Rudolf Hermes, CTA, Bay of Bengal Large Marine Ecosystem Project*

Ineffective fisheries management over the past 30 years has caused a decline in many fisheries of the Asia-Pacific region. This is particularly true of complex, multispecies, multigear fisheries. This decline 'underlines the need for more effective and equitable management that takes into account a wider range of important aspects of the fisheries. The ecosystem approach offers a practical and effective means to manage fisheries more holistically, representing a move away from single species fisheries management. EAFM focuses on systems and decision-making processes that balance environmental, human and social well-being within improved governance frameworks, and has been widely endorsed at global summits and through international conventions.

Uptake of EAFM has been slow, and in response to the expressed need to develop capacity, this "Essential EAFM" training course has been designed by a consortium of partners enabled by donor support. It is a comprehensive five-day course designed to provide basic knowledge on the EAFM, with a focus on the development of professional planning, analytical and interpersonal skills. These skills are needed for better structured and more informed fisheries management. "Essential EAFM" will equip participants with practical skills to develop effective fisheries management plans that work in complex local situations, emphasizing the development of 'people skills'. Essential EAFM targets mid-level managers and staff from fisheries, environment, economic development and planning departments. A complete set of Essential EAFM course materials has been developed and is available free of charge on the websites of the three major course development partners[12].

After a pilot training course in June 2013 in Sabah, Malaysia, course materials have been finalized. Several regional and national training sessions, conducted by SEAFDEC training department in Malaysia and the Philippines, have been held since late 2013. More than 150 participants and approximately 20 trainers undergoing training of trainers have attended. It is expected that partnerships will be formed with capacity development institutions in countries throughout the region to act as training providers. This will result in an increased pool of trainers and the development of community of practice, and ultimately, to wider implementation of EAFM.

## FISHERY GOVERNANCE AND IUU FISHING IN THE ATSEA REGION

*Tonny Wagey, Regional Project Manager, Arafura and Timor Seas Ecosystem Action (ATSEA) Programme*

The warm tropical Arafura and Timor Seas (ATS) region links the Indian and Pacific Oceans and plays an important role in global ocean circulation. At the regional scale, the ecosystems of both seas play important economic and ecological roles in the four littoral nations bordering the Arafura and Timor Sea: Indonesia, Timor-Leste, Australia, and Papua New Guinea. It is extremely rich in living and non-living marine resources, including major fisheries and oil and gas reserves. ATS waters have strong regional connectivity and a high productivity that sustains both small and large-scale fisheries. These include several high value, shared, transboundary fish stocks that provide livelihoods for millions of people in the region. Despite this, the ATS region faces significant challenges from lack of information and

[12] www.boblme.org/eafm; www.pifsc.noaa.gov/cred/eafm_training.php; www.apfic.org/training/eafmtraining.html

ecosystem-level understanding and also, from major transboundary threats and management issues in the region. The ATS region is adjacent to the Coral Triangle which is considered to house the world's highest marine biodiversity. These seas contain the most pristine and some of the most highly threatened coastal and marine ecosystems in the world, underscoring the urgent need for transboundary management.

**FISHERIES MANAGEMENT PLAN (FMP) OF THE ARAFURA SEA – AREA 718**

The fishery management region of the area 718 (FMP-718) covers the Aru Sea, Arafuru Sea and the Eastern part of the Timor Sea, and is considered one of major regions for shrimp and fish catch in Indonesia. Fleet and catch distributions were presented showing the fishing grounds and production of the fish and shrimp trawls. The shrimp and demersal fish have long been the main target of fishers in the Arafura Sea by both legal and illegal fishing fleets. The Minister of Marine Affairs and Fisheries of the Republic of Indonesia launched the FMP-718 in February 2014 with the following objectives:

1. Fish resources and their habitats to be managed in a sustainable manner
2. To increase economic benefits by guaranteeing job opportunities and decreasing poverty
3. To increase the active participation and compliance of stakeholders, thereby eradicating Illegal, Unreported and Unregulated (IUU) Fishing.

To support the effectiveness of these objectives, it is argued that strong support from the stakeholders at both central and local levels should be secured. Public consultation processes should be done productively, enabling all related parties to accept and implement all the adopted action plans in a consistent and responsible manner. The implementation of FMP-718 will rely on the establishment of an implementation unit in the region, supported by scientific, technical and compliance committees.

**ILLEGAL, UNREPORTED AND UNREGULATED FISHING (IUU) IN THE ARAFURA SEA**

Fisheries resources in the Arafura Sea have been intensively exploited by industrial scale fishing fleets. Fish trawls, shrimp trawls, and bottom long lines make up to 70 percent of the total fishing gears. IUU fishing violations in the Arafura Sea have been monitored and controlled through measures such as Vessel Monitoring System (VMS) installment and routine patrolling by Navies and Marine Police. There needs to be significant improvement of these methods as there is still a high percentage of IUU fishing occurring. Results from an IUU fishing study in this area were also presented. The highest level of illegal catch (average 35 percent) occurs in the fish net fishery, where fish are directly transferred (transshipped) from the capture fishing vessel to a foreign carrier vessel and then directly shipped to the carrier vessel's country of origin. Annual losses of IUU activities in the Arafura Sea between 2001 and 2005 were estimated to be around 1.25 million tonnes.

**ARAFURA AND TIMOR SEAS ECOSYSTEM ACTION (ATSEA) PROGRAM**

ATSEA is a 4 year (2010–2014) GEF/UNDP program which involves three littoral countries, Indonesia, Timor-Leste and Australia. The objectives are to ensure integrated, cooperative, sustainable, ecosystem-based management and use of living coastal and marine resources of the ATS. This will be achieved through the formulation, intergovernmental adoption and initial implementation of a Regional Strategic Action Programme (SAP). In relation to the objectives the following outputs were achieved:

- A Transboundary Diagnostic Analysis (TDA) of ATS
- The initial implementation of SAP components through targeted demonstration projects
- A strengthened regional cooperation mechanism as well as its sustainable self-financing

The SAP responds to the findings of the Transboundary Diagnostic Analysis (TDA) in the following five environmental quality objectives:

- Recovering and sustaining fisheries
- Restoring degraded habitats for the sustainable provision of ecosystem services
- Reducing land-based and marine sources of pollution
- Protecting key marine species
- Adaptation to the impacts of climate change

A regional mechanism has been developed to ensure coordination and capacity building as well as promoting sustainable and integrated management of the ATS region. The Government of Indonesia is committed to providing a secretariat office in Bali to facilitate this. During the ATSEA Ministerial Meeting in May 2014, the ATSEA SAP, including its regional mechanism was endorsed by Ministers of the three governments, Australia, Indonesia and Timor-Leste.

In summary:

- Arafura and Timor Seas fisheries provide an opportunity for regional cooperation – e.g. transboundary stock management, reduction of IUU fishing and Oceanography
- FMP-718 and ATSEA SAP are complementary to each other and have strong government ownership – need to work with local governments; other initiatives are invited to take advantage the ATSEA Regional Secretariat office
- IUU fishing remains one of the most damaging problems in the Arafura Sea – a strong political will is required and with the forthcoming new government in Indonesia this could provide a good opportunity
- Strengthening of surveillance and law enforcement capacity is required – joint surveillance, VMS training, increased numbers of Fisheries Surveillance Officers and Fisheries Surveillance-Technical Implementation Units are also needed
- Local communities must be considered as key players – up to now they have been outside of the processes when they could be supporting sustainable action plans such as community surveillance

## IMPLEMENTING THE ECOSYSTEM APPROACH TO FISHERIES IN THE BAY OF BENGAL LARGE MARINE ECOSYSTEM (BOBLME) PROJECT

*Rudolf Hermes, CTA, Bay of Bengal Large Marine Ecosystem Project*

The eight countries surrounding the Bay of Bengal (Bangladesh, India, Indonesia, Malaysia, Maldives, Myanmar, Sri Lanka and Thailand) have committed themselves to work together through the Bay of Bengal Large Marine Ecosystem (BOBLME) Project to better the lives of the coastal populations through improved regional management of the Bay of Bengal environment and its fisheries. The BOBLME Project is principally supported by the Global Environment Facility (GEF), the Norwegian Agency for Development Cooperation (NORAD), the Swedish International Development Cooperation Agency (SIDA), the Food and Agriculture Organization of the United Nations (FAO), the National Oceanic and Atmospheric Administration of the USA (NOAA), and the World Bank. The BOBLME Project started in April 2009 and is in its sixth year. FAO is the executing agency.

There are ten major areas of work concerning conservation and management of the environment and marine resources. The project has to deliver two major outputs:

- The Transboundary Diagnostic Analysis (TDA) – a report on the major transboundary issues and their causes (completed in 2012)

– The Strategic Action Programme (SAP) – a comprehensive plan for addressing the major transboundary issues and their causes

Expected outcomes of the project are:

– Improved governance of fisheries and the environment
– More effective regional cooperation
– An enhanced knowledge base
– Capacity development
– Implementation of the Ecosystem Approach to Fisheries Management (EAFM)

Examples of how the EAF is applied are presented from the following five thematic areas:

– The TDA-SAP process, which covers the three main components of the EAF (ecological and social well-being as well as governance)
– The development of a dedicated EAFM training course package, addressing a major capacity gap in the region, and support for training implementation
– Advisories for hilsa, shad and Indian mackerel management, which encompass ecological, social and governance information
– Work in pilot areas in transboundary critical habitats such as the Gulf of Mannar and the Myeik Archipelago, where the guiding principles of the EAF are used and capacity is developed in conducting ecological assessments and socio-economic monitoring (SocMon), along with institutional strengthening
– A major ecosystem characterization initiative for the Bay of Bengal which is currently undertaken by BOBLME with partners

## COASTAL FISHERIES GOVERNANCE, SAFETY AT SEA AND CO-MANAGEMENT IN THE WESTERN BAY OF BENGAL

*Yugraj Singh Yadava & Rajdeep Mukherjee, Bay of Bengal Programme Inter-Governmental Organisation*

The Bay of Bengal Programme (BOBP) is an Inter-Governmental Organisation (IGO) that works in the western Bay of Bengal comprising the Exclusive Economic Zones (EEZ) of Bangladesh, India, Maldives and Sri Lanka and corresponding international waters. The region is home to one of largest blocks of small-scale fisheries in the world. Traditionally, fisheries in the region were practiced in near-shore waters, but are rapidly transforming as countries are making conscious efforts to harness the deeper waters. Sri Lanka is leading the region in this regard while other countries are making steady progress.

The governance of coastal fisheries in the region revolves around establishing a responsible and transparent system that can ensure sustainability of the resources and livelihoods. Over the years, due to increasing concentration of fishing effort in the near-shore waters, resources are probably being fully or overexploited and there is little chance of increasing fishing effort in the coastal waters. Countries have taken note of this situation and all the BOBP countries are now engaged in developing new fisheries policies to address this situation. The draft fisheries policy of Bangladesh is focused on managing the industrial fishing fleet; India is formulating its fleet development plan for the EEZ based on the revalidated potential yield; Maldives is developing its domestic tuna longlining fishing fleet and is moving from allowing foreign fishing vessels in its waters; and Sri Lanka is strengthening its Monitoring, Control and Surveillance (MCS) to ensure sustainability.

It is now well recognized that safety at sea is an integral function of fisheries management. Therefore, the changing fisheries practices also need to ensure safety at sea for fishers. Living at the margin, fishing-related accidents and deaths push fisher families to the brink of destitution. Thus, it is

necessary that sustainable fisheries livelihood is entwined within an effective regime of safety at sea that also includes social security coverage to meet any change in fortune. Bangladesh has taken a major step in this regard by initiating a government-backed low-cost group insurance policy for fishers. The policy, which saw 200 000 fishers subscribe within two years of operation, provides cover for fishing-related death and disabilities. Among other initiatives, Sri Lanka has mounted an online accident reporting platform and is also now reporting fishing related accidents in its statistics. India, meanwhile, is articulating an MCS programme with larger stakeholder participation and has also developed an online database of fishing vessels. There is an increasing understanding in the region of the need to integrate fishers with fisheries governance and ensure that their voices and gender-related issues are properly understood and acted upon. A major ongoing initiative in this regard is Fisheries Management for Sustainable Livelihood (FIMSUL) programme being implemented in the Indian provinces of Tamil Nadu and Puducherry. A four-tier comanagement system has been proposed under this project, linking village-level decision making units to the central decision making unit. Apart from this, channels are now well-integrated in fisheries policy making decisions to reflect the views of the stakeholders. The ongoing policy initiatives in these countries are good examples in this regard.

## GOVERNANCE OF SMALL-SCALE FISHERIES IN THE ASIA-PACIFIC REGION: THE ROLE OF FAO-SSF GUIDELINES

*Sebastian Mathew, International Collective in Support of Fishworkers (ICSF)*

The Asia-Pacific Fishery Commission (APFIC) region has the largest number of marine and inland small-scale fishers, fishworkers and their dependents in the world. The significance of small-scale fisheries in the region was reflected by the number of national consultations organized by civil society organizations (CSOs) in the region in preparation for the negotiations leading to the endorsement of the FAO *Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication* (SSF Guidelines) at the 31st Session of FAO Committee on Fisheries (COFI) held on 10 June 2014, Rome. Ten out of twenty such consultations, for example, were held in the APFIC region.

The presentation, after highlighting 'governance' as broadly defined by the UNDP at the national level, discussed terms in relation to the use of renewable natural resources and their environment; as highlighted in the FAO technical guide produced to support implementation of the Voluntary Guidelines on the Responsible Governance of Tenure on Land, Fisheries and Forests in the Context of National Food Security. It discussed what the CSO's consider as the key elements of good governance of small-scale fisheries, such as; recognizing the role of fishing communities: vesting SSF communities with management rights to fishery resources, marine protected areas, and area-based fisheries conservation and management mechanisms: as well as integrating traditional knowledge into governance processes.

It was pointed out that the SSF Guidelines, in fact, are a tool for improving governance of small-scale fisheries in all contexts. It highlighted the objectives of the SSF Guidelines, for example, enhancing the contribution of small-scale fisheries to global food security; equitable development of small-scale fishing communities; sustainable utilization, prudent and responsible management and conservation of fisheries resources; and providing guidance for ecosystem-friendly and participatory processes for the achievement of responsible and sustainable fisheries. Meeting these objectives through promoting a human rights-based approach and by empowering SSF communities to participate in decision-making processes would, it was argued, help improve governance of small-scale fisheries in the APFIC region.

It was concluded that the SSF Guidelines should be used in the region to bring about amendments and inspire new or supplementary legislative and regulatory processes to promote responsible and sustainable small-scale fisheries in the APFIC region.

## KNOWLEDGE MANAGEMENT BUSINESS MODEL TO SCALE UP INVESTMENTS IN SUSTAINABLE DEVELOPMENT OF LARGE MARINE ECOSYSTEMS (LMEs) OF EAST ASIA AND THEIR COASTS AND EXPERIENCES IN MAINSTREAMING FISHERIES INTO INTEGRATED COASTAL MANAGEMENT (ICM)

*Nancy Bermas, Resource Facility, PEMSEA*

The Partnerships in Environmental Management for the Seas of East Asia (PEMSEA), a partnership arrangement involving 11 countries and 20 non-country partners, is mandated to coordinate and implement a regional marine strategy, namely the Sustainable Development Strategy for the Seas of East Asia (SDS-SEA). The principal vehicle being the partners delivering the targets and action programmes identified in the SDS-SEA. This is compatible with the integrated coastal management (ICM) framework and process, which has been tested and proven in the region for more than two decades. The SDS-SEA contains six strategies that address constraints and challenges to sustainable development, including, for example, natural and man-made hazards, biodiversity loss, habitat restoration, sustainable fisheries and alternative livelihoods, pollution reduction, waste management and water conservation and management. Under the "sustain" strategy, action programmes to promote and achieve equitable and sustainable fisheries and conservation of fish stocks are included, particularly highlighting the integration of fisheries management into ICM programmes of local governments. A multilevel approach is adopted in order to ensure that the regional SDS-SEA targets are incorporated into national and local, medium-term development and investment plans, thereby ensuring linkages between regional targets, national priorities and on-the-ground actions at the local level.

Two decades of ICM implementation in the East Asian Region involving more than 30 ICM sites in 12 countries have covered approximately 13 percent of the regional coastline, affecting the lives and properties of close to 150 million people. A wealth of knowledge and good practices has been generated that are critical in promoting replication and scaling up of ICM across the region. In particular, outcomes and impacts of current efforts on fisheries management and alternative livelihoods at selected ICM sites will be presented.

At present, PEMSEA is conducting scoping studies in collaboration with partner countries to identify new ICM sites, which will contribute to PEMSEA's target of covering 20 percent of the region's coastline with ICM programmes by 2015. The scoping process is also identifying areas of convergence and cooperation with other coastal and ocean programmes and projects, including the initiatives of national agencies, local governments, donors and international organizations, NGOs and the private sector. With regard to fisheries management, critical marine corridors and threatened fishing grounds are among the priority sites. The objective is to demonstrate the development and implementation of an EAFM-focused management intervention at the local government level using the ICM framework and process.

In order to strengthen ICM practice and support scaling up, ICM training to enhance specialized skills, networking, together with the application of various tools, products and services that have been developed and tested by PEMSEA, are some of the key strategies for capacity development. Application of additional tools, methods and approaches that are not currently within the ambit of PEMSEA will be supplemented through collaboration with partners, including other programmes and projects.

PEMSEA regard knowledge management and transfer as essential ingredients to scale up ICM and achieve the SDS-SEA objectives. We are in the process of developing an integrated Knowledge Management (KM) system for coastal and ocean governance and management across the region. The KM system will assist both governments and investors to achieve the SDS-SEA objectives through the facilitation of ICM partnerships and investment. For example, PEMSEA's State of the Coasts reporting system will be developed as an online application for promoting and facilitating public and private sector investments to protect and sustain ecosystem services. Opportunities for linking, promoting and

applying KM products and services in support of investments in sustainable fisheries and livelihoods, were also presented.

## INVESTING IN THE LONG TERM – MOBILIZING FUNDS FOR IMPROVING FISHERIES AND AQUACULTURE

*Duncan Leadbitter, Director and Co-founder, Marine Change*

Small and medium-size enterprises (SMEs) are the backbone of any economy, seafood included. In Indonesia 57 percent of GDP and 96 percent of employment is with SME's. Many reviews have found that poor access to finance is a major issue impeding growth. Supply chain inefficiencies in the seafood sector result in poor returns and wastage, both for wild harvest and aquaculture.

For wild harvest, with resources in decline or peaking in terms of production, the next step forward in terms of generating better returns is not increased catches but better use of existing catches. In addition there is also a need to drive investment in rural areas to capture value adding rather than simply exporting product for value adding elsewhere. But there is also a need to link increased returns to better resource management and social benefits.

There are many potential sources of finance – local, institutional, government, domestic, foreign – but the suitability of any given source for SMEs is variable. There is a wide variety of issues to consider such as accessibility, costs, exploitation, and the regulatory and investment climate, amongst others. However, whatever the source, there is a need to both ensure that increased money flow doesn't simply result in more/bigger boats (unless evidence that this is warranted) and that benefits flow to the wider community.

Marine Change is an Asia based non-profit organization designed to identify suitable investment opportunities and connect the companies with suitable sources of finance. It will

- Analyze fisheries and supply chains to help investors make decisions
- Help document risks in a transparent fashion and work with parties to devise mechanisms for reducing risks
- Research the business environment, also to help inform investors
- Research and provide market information for investors and companies
- Create performance metrics to attract further investment
- Work with investors to draft loan conditions that go beyond profit making
- Connect market demand with potential supply to ensure the right market signals are sent

Marine Change won't be lending money but are aiming to focus on the following:

- Improve information availability – a lack of information on both opportunities and risks is a major problem
- Improve transparency – if investors perceive a high risk they either don't lend or they charge high interest rates
- Identify big lenders already out there – e.g. local and international banks
- Use commercial rates – subsidized money has created distortions that have created short term thinking

Get information and offer suggestions – we want to look in more detail at about a dozen fisheries and supply chains and choose three to be pilots. We are also interested in aquaculture and aquaculture supply chains. Marine Change are looking for thoughts and suggestions regarding fishery assessment methods, metrics, as well as suggestions regarding suitable fisheries. Marine Change is also looking for contacts in governments who may be able to help on regulatory matters (mainly finance related).

## FAIR TRADE CERTIFIED CAPTURE FISHERIES STANDARD

*Ashley Apel, Fisheries Program Manager, Fair Trade USA*

Like their developing country counterparts in agriculture, many fishing communities struggle against fluctuating market prices, competition with corporate suppliers, limited direct market access, and unregulated working conditions. Furthermore, with many fisheries under inefficient or limited management, fish stocks and marine species are dwindling at an ever-increasing rate, and fisherfolk are struggling to improve their livelihoods while engaging in practices that don't degrade the resources upon which they depend.

Fair Trade USA seeks to address these challenges by adapting its agriculture certification process for use in wild capture fisheries. A third-party certification organization, Fair Trade USA, focuses on social empowerment, environmental sustainability, and economic development. We audit and certify products from around the world that are sold in North American and European markets.

When consumers purchase a product with the Fair Trade Certified label, they know the farmers, fishers, and workers who produced it got a fair deal for their hard work. This means better prices and wages, a financial incentive via the Fair Trade premium, safer working conditions, and improved environmental protection.

Fishery improvement takes time, manpower, money, and patience. Fair Trade USA provides a financial incentive to tackle fishery improvements, while simultaneously helping fisherfolk and their communities. It's a programme that's accessible for small-scale fisheries, moving them on a path to sustainability through a step-wise process. And it's a well-recognized certification label, allowing consumers to vote with their dollars and support Fair Trade fisherfolk, their communities, and the resources upon which they depend.

## WWF CORAL TRIANGLE PROGRAM: SECURING SUSTAINABLE FUTURES

*Jose Ingles, Strategy Leader, WWF Coral Triangle Program*

In 2007, World Wide Fund for Nature (WWF) started the WWF Coral Triangle Program (CT Program), a regional approach designed to undertake conservation on this scale and supports the government framework on the Coral Triangle Initiative on Coral Reefs, Fisheries and Food Security (CTI-CFF). It is designed to mobilize the full resources of the WWF Network in order to support and facilitate collaboration among the private sector, governments and communities.

In the last six years WWF Programs have created enabling conditions and platforms that achieve and support our work on issues of regional significance e.g. tuna fisheries, live reef fish trade, bycatch and policy reform. We have worked with and partnered actors and sectors that heavily impact the marine and fishery resources that undermine food security and future of its people. The CT Program has helped create the CTI-CFF and achieved political will at the highest level to ensure profound and the lasting changes needed to ensure long term commitments. The programme catalyzed private sector transformation with changes offshore and in the communities while our communications strategies have utilized innovative approaches to raise public awareness. This awareness has resulted in pressure advocating public and private sector commitments to elicit behaviour change.

In the next three years, WWF will continue to deliver the improvements and impacts that will bring sustainability to fisheries, food security and livelihood through interventions that protect biodiversity and ecosystem services. We will further strengthen existing collaborations, building new partnerships with both public and private sectors together with civil society to move towards our vision.

The WWF initiated regional platforms will be utilized to build sustainable fisheries and coastal and marine ecosystems for food security and livelihoods. These platforms include the *Asia-Pacific Sustainable Seafood Network*, the *Coral Triangle Fishers Forum*, the *Regional Business Forum*, the *Climate Change Adaptation Marketplace*, the *Coral Triangle Communications Platform* and the *CTI-CFF* as a policy mechanism. Fishery and Aquaculture Improvement Projects (FIPs/AIPs) supported by the private sector, will continue to become the catalysts for change, bringing small-scale fisheries towards the path of sustainability, implementing EAFM, best practices and other approaches (e.g. rights based management) and empowering stakeholders as custodians of their own resources.

After a year of extensive consultations as preparation for the next phase, the WWF CT programme will continue to work at the current scale for the next three years, giving more emphasis on working seamlessly with National organizations to deliver impacts both offshore and in the communities through the following strategies:

- Policy and advocacy-promote effective policies and leverage finance for sustainable resource management and governance to support blue economies;
- Innovation and business transformation – encourage business and industry to invest in best management practices in fisheries, aquaculture, tourism and Marine Managed and Protected Areas (MMPAs)
- Marketing and communications – champion innovation and transformation in regional fund-raising and behaviour change among targeted stakeholders

## ECOSYSTEM MANAGEMENT TO SUSTAIN ECOSYSTEM SERVICE PROVISION – IMPLEMENTING THE STRATEGIC ACTION PROGRAMME FOR THE SOUTH CHINA SEA

*Jerker Tamelander, Coral Reefs Unit, UNEP Regional Office for Asia Pacific*

UNEP's Ecosystem Management subprogramme works towards increased use of the ecosystem approach in order to sustain ecosystem service provision. This encompasses the development and testing of methodologies, tools and policy frameworks; provision of technical support to countries through the Regional Seas Programme to apply and integrate the ecosystem approach; and enhancing collaboration with the private sector for effective management of coastal ecosystem services, through public and private sector strategies.

Under the framework of the Action Plan for the East Asian Seas adopted in 1984 and revised in 1994, UNEP implemented the GEF project "*Reversing environmental degradation trends in the South China Sea and Gulf of Thailand*" between 2002 and 2008. Addressing three priority areas of concern – loss and degradation of coastal habitats, overexploitation of fisheries and land-based pollution – the project resulted in increased confidence and trust as well as essential data to support the development of a number of National Action Plans (NAP's) and a regional Strategic Action Programme (SAP). This was approved in 2008. The SAP identifies strategic priority actions for management of critical habitats including fish habitats, addressing land-based pollution, and supporting regional cooperation.

The UNEP GEF project "*Implementing the Strategic Action Programme for the South China Sea*" was approved by GEF council in May 2014, focusing Cambodia, China, Indonesia, Philippines and Viet Nam, and with US$15 million GEF IW funding and an estimated US$56 million cofinance. The objective of the project is to assist countries in meeting the targets of the approved SAP for the marine and coastal environment of the South China Sea, through implementation of the National Action Plans and strengthening regional coordination for SAP implementation. Three project components have been identified:

- Reducing habitat degradation and loss (mangroves, coral reefs, seagrass, estuaries and tidal flats).

– Strengthening knowledge-based action planning for the management of coastal habitats and land-based pollution.
– Facilitating regional and national level integration and cooperation for implementation of the SAP.

The project is currently in the preparation phase, with execution commencing in 2015. A second UNEP GEF project implementing part of the SCS SAP executed by SEAFDEC, "*Establishment and Operation of a Regional System of Fisheries Refugia in the South China Sea and Gulf of Thailand*" has already been initiated.

Other ongoing initiatives towards increased use of an ecosystem approach include a UNEP-FAO initiative on the foundations for fish food security. This is working towards a framework for collaboration between Regional Fishery Bodies (RFBs) and Regional Seas Conventions and Actions Plans (RSCAP) for management of marine ecosystems to support ocean-based food production. Based on development and proof of concept 2015–2016 in Africa, the initiative will be scaled up and replicated in other regions. Under the South Asian Seas Action Plan, UNEP is working with the South Asia Cooperative Environment Programme (SACEP) to develop a South Asia Regional Marine Biodiversity Strategy. This aims to set regional targets towards achieving the Aichi Targets and enhance coherence between *National Biodiversity Strategy and Action Plan* (NBSAP's)s to this end.

The First Regional Workshop under this initiative will be held in Colombo, 8–10 July 2014, and is expected to prepare a first order draft of the strategy. Global thematic partnerships on marine litter, waste-water, nutrients as well as coral reefs have also been convened by UNEP to address specific challenges and support the exchange of best practices and lessons learned between regions.

## SEAFDEC-SWEDEN MARINE MANAGEMENT AREAS PROGRAM

*Pattarajit Kaewnuratchadasorn, SEAFDEC*

A five-year SEAFDEC-Sweden project, (2013–2017) is building upon the earlier work done with SEAFDEC-Sweden cooperation by addressing the issues related to the management of important habitats for fisheries, fishing capacity and sociocultural aspects. The ultimate targets of the project are: poor coastal and inland communities, government staff (both local and central), NGOs and international and regional organizations. The SEAFDEC-Sweden project facilitates the Member Countries to make collaborative arrangements in the process of developing better management of fisheries and important habitats through subregional approaches. These cover the marine management subregions of the Andaman Sea, the Gulf of Thailand, and further explorations in the Sulu-Sulawesi Sea.

In addition, the SEAFDEC-Sweden project will work closely with institutions and organizations that are well placed to facilitate and support provincial and district capacity building. Sharing information such as legal frameworks and research studies between transboundary countries should enhance collaboration and provide better communication. With better information, policy makers to should be able to get more support.

## SULU-CELEBES SEA SUSTAINABLE FISHERIES MANAGEMENT PROJECT – A NEW MARINE PROGRAMME FOR MANAGEMENT OF SMALL PELAGIC FISHERIES

*Noel Barut, Bureau of Fisheries and Aquatic Resources (BFAR), National Fisheries Research and Development Institute (NFRDI), Sulu-Sulawesi Sea Marine Eco-region (SSME)*

The Sulu-Celebes Sea Large Marine Ecosystem (LME) is characterized by its tropical climate. It is a semi-enclosed sea bounded by northern Borneo (Malaysia), the southwest coast of the Philippines, and Sulawesi Island (northern coast of Indonesia). It has an area of about 900 000 km$^2$ and is comprised of

the Sulu Sea and the Celebes Sea (also sometimes referred to as the Sulawesi Sea). The LME contains many islands, surrounded by narrow shelf areas. Much of the LME has a depth greater than 3 000 meters. The LME is oceanographically well defined and is limited by the Palawan trough to the North and by Sulawesi Island to the South. There is a deeper area, and a chain of islands known as the Sulu Archipelago, separating the two seas. The Global Environment Facility (GEF) has funded the development of a transboundary Diagnostic Analysis and the preliminary framework for a Strategic Action Programme for this LME.

The Sulu-Celebes Sea Sustainable Fisheries Management Project is the initial project of the Sub-Committee on Sustainable Fisheries under the Sulu-Sulawesi Sea Marine Eco-region (SSME) Tri-National Committee composed of Indonesia, Malaysia and Philippines. The project built on the Eco-region Conservation Plan (ECP) which the three countries adopted as an ecoregion approach to the conservation of the SSME. The SSME ECP was developed in 2003 and updated in 2009. It is now called the SSME Comprehensive Action Plan (CAP).

The project objective is "To improve the condition of fisheries and their habitats in the Sulu-Celebes Sea to a sustainable level through an integrated, collaborative and sustainable tri-national management". The project components are:

- Transboundary Diagnostic Analysis (TDA) for SCS LME
- Regional agreement on governance reforms for sustainable fisheries management
- Institutional strengthening
- Demonstration of best fisheries management practices in critical sites of the Sulu-Celebes Sea (SCS)
- Knowledge management and replication of lessons learned

The Transboundary Diagnostic Analysis (TDA) identified transboundary environmental problems and analyzed their root causes. Among the many environmental issues identified, the following are the ones which the project will address. They have been prioritized as follows:

- Unsustainable fisheries exploitation
- Habitat loss and community modification
- Climate change
- Marine pollution
- Freshwater shortage
- Alien and invasive species

The governance and socio-economic sectors were identified as the root causes of the above-mentioned TDA problems.

The Regional Strategic Action Plan (RSAP) prepared by the project covers only the first issue: unsustainable exploitation of fish. This issue is mainly due to weak governance and widespread poverty in the SSME region. The governance issues were identified as:

- Lack of political will due to existing/prevailing economic models which do not measure the real economic value of the sector
- Weak regulation of regional IUU fishing
- Low priority of fisheries and the marine environment in national planning
- Inconsistencies in government laws or regulation

On the socio-economic side poverty, leading to increasing demand for small pelagic fishes for food, fish bait, fish-meal and feeds for aquaculture, was identified as the root cause.

The lessons learned from the Philippines and experiences in the implementation of the project starts from the organization of the project in the country. The demonstration site of the project is located in the Zamboanga Peninsula. Simultaneous, replication sites were implemented in three municipalities of Palawan province (Roxas, Aborlan and Narra). The project invited the Local Government Unit,(LGU) the Fishing Industry (both commercial and artisanal), academia and people's organizations, as well as other national and local government agencies. Together they form an interagency committee who oversee, recommend and formulate policies and regulation at the local level. This has resulted in the successful implementation and sustainability of the project. The members are involved in the recruitment of project staff, identification of local project sites and in the monitoring of the project activities. Strong stakeholder involvement at the demonstration and replication sites has enabled the smooth implementation of the project.

Research results from the a rapid resource assessment and a socio-economic survey provided the basis for the formulation of the Integrated Fisheries Resources Management Plan of the demonstration site. The, one of the species studied by the project, served as the basis for the declaration of a close season for sardine fishing in Zamboanga Peninsula was based on a study of the reproductive biology of sardines . The project also collaborates with other projects, e.g. the FAO-Regional Fisheries Livelihood Project, the APEC study on the potential contribution of small pelagic fish to food security within the Asia-Pacific Region and the USAID Ecosystem Improved for Sustainable Fisheries (ECOFISH). These collaborations are particularly focused on training and the development of Information, Education and Communication (IEC) campaign materials. The sharing of activities and technical expertise also reduces costs. Dialogue with the fishing communities serves as a forum to explain to fisherfolk and local fishing communities the need to gather data that will support resource management for the benefit of present and future generations.

The project has also provided capacity building for LGU staff, and academia among others. on Training has been provided integrated fisheries resources management plan formulation, RRA, Participatory Resource Assessment (PRA), basic law enforcement and basic project proposal preparation for fisherfolk.

## WORLDFISH INITIATIVES ON FISHERIES AND ENVIRONMENT

*Len R. Garces, WorldFish*

WorldFish is an international, non-profit research organization that harnesses the potential of fisheries and aquaculture to reduce poverty and hunger. WorldFish focuses its expertise and research in the following areas:

- Building adaptive capacity to climate change in fisheries and aquaculture
- Strengthening gender equality in fish-dependent communities
- Increasing the benefits to poor people from fisheries and aquaculture value chains
- Improving nutrition and health through fisheries and aquaculture
- Identifying and promoting policies and practices to increase the resilience of small-scale fisheries
- Sustainably increasing the productivity of small-scale aquaculture

WorldFish is a member of *Consultative Group on International Agricultural Research (CGIAR)*, a global agriculture research partnership for a food secure future, and participates in the following CGIAR research programmes that combine the expertise of many partner organizations:

- Aquatic Agricultural Systems
- Livestock and Fish
- Climate Change, Agriculture and Food Security
- Agriculture for Nutrition and Health
- Policies, Institutions, and Markets
- Water, Land and Ecosystems

The CGIAR Research Program on Aquatic Agricultural Systems (AAS) seeks to better harness the agricultural potential of these systems, while helping to build adaptive capacity and resilience in the face of social, economic and environmental change. Nearly 500 million people in the developing world depend on aquatic agricultural systems for their livelihoods, with 140 million living in poverty. Occurring along freshwater floodplains and coastal deltas, aquatic agricultural systems are highly productive farming and fishing systems that provide multiple opportunities for growing or harvesting food and generating income.

CGIAR is a global partnership that unites organizations engaged in research for a food secure future. CGIAR research is dedicated to reducing rural poverty, increasing food security, improving human health and nutrition, and ensuring more sustainable management of natural resources. It is carried out by the 15 centres that are members of the CGIAR Consortium, in close collaboration with hundreds of partner organizations, including national and regional research institutes, civil-society organizations, academia and the private sector (see www.cgiar.org).

The strategic framework to guide the AAS programme implementation in the Visayas-Mindanao Hub, Philippines, was also presented. Key considerations of the AAS implementation included, among others:

- The development of comprehensive programmes to break the cycle of poverty: these need to include a variety of services and bridge individual and community needs, also should take into account livelihoods, markets and governance;
- Collaboration – to provide complementary services that make the outputs or outcomes greater than could be achieved alone;
- Community empowerment – allowing the local community to participate and understand how their personal lives and the community well-being are intertwined.

The project on "Implementing an Ecosystem Approach to Fisheries (EAF) in Small-scale Tropical Marine Fisheries" was also presented. The project, with funding from the European Commission (EC), was implemented by WorldFish in Indonesia, Philippines, Solomon Islands, and Tanzania between December 2011 to December 2014.

The project aimed to use an EAF framework to improve small-scale fisheries (SSF) management in developing countries and enhance their contribution to poverty reduction. Three sequential objectives frame the project. These are to:

- Assess existing institutional arrangements and understand how an EAF can contribute to more effective integrated SSF management;
- Identify and pilot EAF strategies and actions that are appropriate for developing countries;
- Strengthen the capacity of target groups to collaborate and work within the EAF.

The project site in the Philippines covers eight coastal municipalities in the Province of Misamis Occidental in Northern Mindanao. All belong to the Iligan Bay Alliance of Misamis Occidental (IBAMO). The IBAMO is a multistakeholder body that provides a governance framework for inter-LGU collaboration and now serves as a "management constituency". The presentation emphasized that mobilizing a management constituency, that is best placed to address the threats and opportunities identified in the diagnosis phase, was an essential step in legitimizing the EAFM and increasing the potential for its success. IBAMO is also one of the innovations to enhance SSF management, in the context of the Philippines. The experiences in the strengthening of IBAMO relate to the following:

1. Starting linkages where others have accomplished initial gains;
2. A multistakeholder composition of IBAMO that includes national government agencies and the Provincial Government of Misamis Occidental serving as the secretariat;

3. The importance of "champions" from the local government units (LGUs) – mostly the Municipal Planning and Development Offices and Municipal Agricultural Offices – which serve as members of the technical working groups;
4. Strong commitment of the LGUs and local chief executives beyond party lines; and
5. The role of outside institutions (including civil society groups) in catalyzing the process of improved fisheries governance.

The AAS programme and the IBAMO experience in the Philippines provides some examples of strategies and approaches for enhancing social and economic benefits, improving services to the environment and strengthening governance systems in the context of poor and vulnerable communities in coastal areas.

## CAPACITY BUILDING NEEDS IN FISHERIES AND ENVIRONMENT IN APFIC REGION

*E. Vivekanandan, Emeritus Scientist, Central Marine Fisheries Research Institute*

**Capacity building programmes focus on:**

- Understanding the obstacles from realizing developmental goals and,
- Enhancing the abilities that will allow achievement measurable and sustainable results.

It is a confluence of new philosophies, new research and reports, and changes in international and national development approaches. The purpose of capacity building in fisheries and environment in APFIC region is enhancing skills in:

- Resource assessment
- Ecosystem assessment
- Management system implementation and governance enhancement. Capacity building for individuals, institutions, societies and trainees' trainers is instituted

**Capacity building in fish stock assessment**

Many countries in the APFIC region are moving towards sustainable fisheries management, but, to a large extent, lack a strong scientific knowledge base. Fish stock assessments are key to marine resource management. They provide high-quality science information to managers to answer important questions such as, what is the current status of a stock relative to established targets? How much catch is sustainable while maintaining a healthy stock? If a stock becomes depleted, what steps are required to rebuild it to healthy, abundant levels? Answers to these questions help managers make the best decisions to ensure sustainable fisheries, healthy ecosystems, and productive coastal communities. Stock assessments require three primary kinds of input data: catch, abundance and biology.

- Data collection
- Stock assessment
- Productivity Susceptibility Analysis
- Trophic modelling
- Ecosystem characterization
- Ecological risk assessments
- Climate modelling
- Code of Conduct for Responsible Fisheries

**Capacity building in EAFM**

As the importance of applying ecosystem approach to fisheries management (EAFM) is now globally recognized, there is a need for development of a cadre who have the resources for professional planning, together with analytical and interpersonal skills for structured and informed decision-making. The

SEAFDEC/BOBLME organized training course provides training on the EAFM process and how this can assist decision-making for responsible and sustainable capture fisheries.

- Ecosystem Approach to Fisheries Management
- Management tools
- Developing fisheries management plans
- Stakeholder engagement

**Capacity building in science communication**

Science communication is an integral part of our personal and professional lives. Communication is essential to inform others and to receive valuable inputs. This ranges from personal interactions, social media networking, getting the messages across to decision-makers and the general public using various communication tools and skills. Two forms of communication – paper writing and presentation – help in disseminating scientific results effectively across a wide spectrum of end users. In the APFIC region, there is scope for improving the science communication skills of scientists, researchers and students. Improving their delivery of scientific and technical information, and better equipping them with the skills needed to communicate their work clearly and confidently they will be better able disseminate information to a wider range of audiences.

The beneficiaries of these programmes would be students, academicians, researchers, scientists, fisher communities and other stakeholders, fisheries managers and policy makers. Needs assessment, will have to be decided based on countries objectives and priorities. Training needs assessment will be needed to identify the knowledge and skills required, as well as prevailing attitudes. The purpose, the audience, activities to be covered, cost and benefits will need to be considered to identify the most effective capacity building programmes. Partnerships and cooperation within and between countries are important to identify and engage expertise within or outside the country and region. Establishing a Fisheries Capacity Building Resource Centre will give an impetus to the programme.

## SEAFDEC/UNEP/GEF SOUTH CHINA SEA FISHERIES REFUGIA PROJECT

*Chumnarn Pongsri, Secretary-General, SEAFDEC*

The South China Sea, including the Gulf of Thailand, is characterized by high species diversity that supports food security of people in the areas, with shallow water habitats that are critical to the life cycles of most aquatic species. However, the fishery activities in these areas that are characterized by high levels of small-scale fishing effort have been faced with increasing fishing pressure, coupled with a continued decline in the expanse and quality of coastal habitats. The situation has raised serious concerns regarding the long-term sustainability of Southeast Asian fisheries. The concept of fisheries refugia was therefore developed as an approach to identify and designate priority areas in which to integrate fisheries and habitat management in the context of high and increasing levels of small-scale fishing pressure in the South China Sea.

This concept was first promoted during the UNEP/GEF South China Sea Project on "Reversing Environmental Degradation Trends in the South China Sea and Gulf of Thailand" which was successfully implemented in 2002–2008, with participating countries, namely include Cambodia, China, Indonesia, Philippines, Thailand and Viet Nam. Nevertheless, after the completion of this project, it is envisaged that further initiatives at national/regional levels will be necessary in order to sustain the outcomes of this project. They will also be needed to enhance the wider application of science to management at local level, the integration of local government and communities in managing the marine environment and to support the maintenance and expansion of the network of demonstration sites.

The new, fishery phase of the UNEP/GEF South China Sea Project on "Establishment and Operation of a Regional System of Fisheries refugia in the South China Sea and Gulf of Thailand" was therefore designed to build on achievements of the fisheries component of the first project. The new project would focus on establishing a regional system of fisheries refugia, by expanding the network of fisheries refugia in the South China Sea and Gulf of Thailand thereby improving the management of fisheries and critical marine habitats. SEAFDEC will serve as the executing organization for this project, together with participating countries: Cambodia, Indonesia, Malaysia, Philippines, Thailand and Viet Nam. The project period is four years (July 2014–July 2018), and funding is being requested from the Global Environment Facility (GEF) through UNEP.

Four components of this new project include:

- Identification and management of fisheries and critical habitat linkages at priority fisheries refugia in the South China
- Improving the management of critical habitats for fish stocks of transboundary significance via national and regional actions. This will strengthen the enabling environment and knowledge-base for fisheries refugia management in the South China Sea
- Information Management and Dissemination in support of national and regional-level implementation of the fisheries refugia concept in the South China Sea
- National cooperation and coordination for integrated fish stock and critical habitat management in the South China Sea

The first two components are to be implemented mainly by the participating countries, while the third component is to be implemented by SEAFDEC, and the last component will focus only on cooperation and coordination.

The preparatory process of the project proposal, starting from the Project Identification Form (PIF) was presented, and it was noted that currently the full project proposal is being prepared and would be submitted to GEF for endorsement by the CEO.

## RECOMMENDATIONS OF THE FISHERIES SESSION:

## "LESSONS LEARNED AND FUTURE DIRECTIONS OF THE MARINE ENVIRONMENTAL AND FISHERIES INITIATIVES IN THE ASIA REGION"

### RECOMMENDATION: STRENGTHEN FISHERY MANAGEMENT, REFORM FISHERIES

Technical measures alone do not result in improved fishery management as compliance and buy-in by fishers are keys to success. If subsidies and overcapacity are not addressed, then almost all fishery or conservation measures will have little impact or be undermined. Management plans and relevant legal reforms need to be developed, and the EAFM framework offers a practical means to achieve this. A key strength is the emphasis on stakeholder involvement to determine key issues, priority actions, trade-offs and practical management measures. It is important to recognize that there are different perspectives on management and that many fishing operations operate at marginal profitability, making change difficult. Closed seasons and closed areas are probably the most effective way to reduce effort and capacity, especially if these are linked to short term incentives. Reforms can be driven from within the fishery when the benefits are clear to fishers. (e.g. fishers calling for an extension of a closed season or increased zoning).

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| **Action** | – Develop EAFM pilot management plans for some key fisheries (subnational level)<br>– Implementation of the APFIC tropical trawl fishery guidelines<br>– Redirect fishery sector support/subsidies/incentives to drive fishery improvements. e.g.<br>❍ Redirect fuel subsidies towards effort reduction measures<br>❍ Encourage price incentive programmes (e.g. premiums linked to catch certification, vessel licensing and compliance)<br>❍ Direct compensation schemes for lost fishing days can lead to beneficial outcomes that reduce rather than increase fishing effort |
| **Knowledge** | – Use of logbooks to improve reporting<br>– Improve vessel registration and licensing<br>– Develop and scale up the use of proven analytical and science based tools to determine spatial and temporal fishery management measures |
| **Cooperation** | – It is essential to establish effective dialogue with the industry to get acceptance of changes/regulations |
| **Capacity building** | – Develop institutions for management e.g. fishery management committees/ councils which are inclusive and involve local government authorities, fishers, fishery value chain stakeholders and the national fishery institution. |

## RECOMMENDATION: INTENSIFY EFFORT TO COMBAT IUU FISHING

IUU fishing remains a pressing problem within the region, both within and between countries. Transboundary and border issues are also relatively common in the region where there are many adjoining *exclusive economic zones* (EEZs) and in many cases, maritime boundaries have not yet been fixed. There is a regional need for better understanding of IUU fishing to inform relevant management action. IUU fishing is also linked to other complex issues relating to labour conditions and transnational crime. Combating IUU fishing therefore requires effective coordination between a number of national agencies as well as cooperation and information exchange between countries. Whilst this may be sensitive, it is increasingly going to become an issue that will affect trade and will even affect market access of products that are not IUU.

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| **Action** | – Develop (or implement) national plans of action (NPOA's) to combat IUU fishing<br>– Catch landing procedures for foreign vessels.<br>– Establish VMS requirements for priority segments of fishing fleets and links to vessel licensing and registration<br>– Improved MCS networking and sharing of information [through RPOA]<br>– Strengthen regional dialogue on IUU with the private sector [within the framework of the RPOA],through a roundtable process |
| **Knowledge** | – Assess IUU fishing issues and identify priority actions (as part of NPOA) |
| **Cooperation** | – Develop effective coordination between other agencies responsible for maritime transport, labour, vessel safety and other dimensions related to fishing which do not come under the direct competence of the department of fisheries<br>– There is still a major need for greater cooperation between the countries in the region to address compliance of vessels that have foreign crews and foreign beneficial ownership (including de-registration, dual flagging, transhipment)<br>– Improved communication programme regarding registration/de-registration of fishing vessels |
| **Capacity building** | – Training for all relevant departments in port inspections of fishing vessels<br>– Training of fishery inspectors, fish wardens and MCS staff to conduct correct procedures ensuring that IUU court cases are not dismissed on technicalities<br>– Work with vessel owners to understand the need for, and benefits of, VMS and MCS related identification systems |

## RECOMMENDATION: IMPROVE POLICY COHERENCE BETWEEN NATIONAL AND LOCAL LEVELS

In situations where there is a high degree of local autonomy over management of natural resources, there may be a breakdown in policy coherence between national and subnational levels. This may occur where national regulations are undermined or adjusted locally, enabled by the decentralized powers accorded to local authorities. Harmonization of policy and regulations can help maintain policy coherence between national and local governments. Involvement of local government is a crucial part of generating political will to support fishery management and reform of fisheries. Short term political horizons may be overcome through longer term national policies linked to greater understanding of the political capital that can arise from effective fishery management.

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| **Action** | – Develop national strategies for longer term, more consistent policy on fisheries management<br>– Link the national fishery agency to a fishery management committee thereby helping balance short term thinking by local government. |
| **Capacity building** | – Sensitize local government officials and local mayors/governors to develop greater political will and understanding |

## RECOMMENDATION: IMPROVE INFORMATION COLLECTION FOR FISHERY MANAGEMENT AND ECONOMIC VALUATION TO INFORM DECISION-MAKING

Data collection for improved fisheries management remains a significant challenge, as is finding ways to ensure that knowledge is integrated effectively into decision-making processes. The valuation of natural resources, especially when they are subjected to pressures and become degraded, is of great importance. The lost potential to economies through this degradation is not always fully assessed nor taken into account when developing national fisheries policies where it is assessed, short-term solutions to the economic instability in fisheries rather than solutions that secure the long-term viability of the ecosystems and services that sustain fisheries, are often proposed. In addition to biophysical data there is a need for better social metrics to inform management decisions. There is also the need to use ongoing data and information collection systems, (e.g. social, ecological and environmental data) for incorporation into decision making.

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| **Action** | – Ecosystem valuations of fisheries should be carried out to ensure that natural resources are not undervalued by decision-makers and planners<br>– Knowledge bases and decision-making systems for generating information on fisheries that actually support management decision-making should be created/ strengthened.<br>– Economic analysis of fisheries management improvement measures is necessary to provide economic evidence/incentives for reform. Link measures to tangible economic benefits. |
| **Knowledge** | – The economics of the fishery industry should be looked at broadly – both in terms of the national economy and long-term sustainability. |
| **Cooperation** | – Engagement with the fishing industry in discussions on fisheries management needs, and proposed solutions, are necessary to gain buy-in for changes in fisheries management measures (e.g. gear measures). |
| **Capacity building** | – Staff involved in the generation of information for the effective management of fisheries, may require capacity building to develop the necessary skills.<br>– The capacity of regional institutions to train trainers to undertake training and develop capacity for stock assessments and stakeholder analysis and dialogues should be enhanced.<br>– The capacity to process and analyze information and to communicate effectively to policy and decision makers should be developed. This may involve seeking competent communication training partners, e.g. COMPASS and others.<br>– Demonstrations and information support may be required to help industry engage in dialogue with governments and agencies. |

## RECOMMENDATION: PROMOTE INNOVATIVE SUSTAINABLE FINANCING AND ECONOMIC INCENTIVES

To achieve improved sustainable fisheries management, there is often a need to move away from grant-based/project-based drivers towards institutionalizing change and making sure these changes are long-lasting. Access to local government budgets for fishery management and reforms may be poorly understood (as opposed to, for example tourism industries, which are often quick to capitalize on these opportunities). In many cases improved fisheries management may require harnessing commercial investment to provide the necessary finance to bring about desired changes. However, there is a need to increase understanding of the potential for investing in fisheries. Recent moves towards the production of responsible fishmeal have been driven by real demand through the value chain. Economic incentives exist but need to be captured and transferred to producers

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| **Action** | – Potential benefits in the value chain that can reach producers should be identified<br>– Investments in fisheries management should be leveraged from local government funds, including from fisheries related government revenues (landing fees, markets, park fees etc.)<br>– Proven business models for insurance and microfinance for fisher stakeholders and SMEs should be applied<br>– Future projects/initiatives should support changes that are being driven or pressured by market requirements<br>– Adding value to fishery products should concentrate on opportunities for women's groups |
| **Knowledge** | – The communication of knowledge on fisheries, with those outside the fisheries sector, particularly in the investment arena, is required to generate the confidence to invest. |
| **Cooperation** | – Cross-sectoral representation, particular from the investment and banking sectors would strengthen the dialogue on sustainable financing. |
| **Capacity building** | – Awareness building for women about fishery management and fisheries product value addition |

## RECOMMENDATION: CAPTURE THE OPPORTUNITIES OF IMPROVED VALUE CHAINS AND MARKETS TO INCENTIVISE REFORMS

In order to achieve change and adoption of good practices for responsible fisheries, fishery stakeholders need to have sufficient incentives and compensation for decent work and livelihoods. Better integration into financially beneficial value chains and markets is essential. The basis for any fisheries value chain is a fisheries product which is of good quality and safe to consume, but there is also a wider range of contributing elements.

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| **Action** | – Promote and assist countries in the Asia-Pacific towards organizational development of associations and cooperatives and other structures which improve livelihoods and promote sustainable fishing practices.<br>– Design and implement interventions to improve the value of fisheries products, particularly in the post-harvest sector, as many fisheries in the region still have significant potential to improve the value of the catch together with food safety.<br>❍ Establish a "safe fish" competition (equivalent to the "Smart Gear" competition) to promote innovations in the subsector to reduce post-harvest losses.<br>– Develop, promote and implement responsible monitoring and traceability systems aimed at reducing the flow of IUU products into responsible and certified market chains (including improved catch documentation and traceability systems).<br>❍ Raise awareness with companies<br>❍ Assist fishers to better achieve and also identify the quality of their fish,<br>❍ Promote "tagging" and improved traceability systems to assist entry to international markets<br>❍ Support the development and applications of mechanisms that facilitate and ensure the return of the premium to the producers |
| **Knowledge** | – Identify fisheries which would benefit from sustainable seafood certification/ recognition<br>❍ Base this on performance and monitoring for targeted fisheries as examples of good practices for scaling up; e.g. Fair Trade and other sustainable certification schemes.<br>❍ Investigate the inclusion of such mechanisms into fishery improvement projects or linkage to certification (e.g. the Marine Stewardship Council), noting the requirement to put adequate logistics in place (volume, timelines, transport facilities).<br>– Identify and use ways and means to get incentives passed down the value chain<br>❍ Prevent existing price incentives for better practice being skimmed off by traders, and not reaching the vessel operators/fishers.<br>❍ Create greater awareness by fishers of the incentives which are available and obtainable. |
| **Capacity building** | – Develop capacity in on-board handling practices; e.g. preventing delay in icing, improving hygiene and cleanliness, deck layout, landing site facilities and management<br>– Increase value addition of fisheries products, focusing on women's groups, while at the same time creating awareness and strengthening capacity of women in fishery management |

## RECOMMENDATION: PROMOTE THE USE OF EAFM AS A PLANNING FRAMEWORK FOR MANAGEMENT IN THE REGION

The Code of Conduct for Responsible Fisheries (CCRF) remains the relevant instrument to improve fisheries, and also the benefits derived from them. The Ecosystem Approach to Fisheries Management (EAFM), and the more recently adopted Blue Growth strategies, are ways to implement the CCRF. In particular, the ecosystem approach offers a practical and effective means to manage fisheries more holistically. It represents a move away from fisheries management that focuses on target species, towards systems and decision-making processes that balance environmental, human and social well-being within improved governance frameworks. However, many fisheries, environment and planning staff lack experience in how to implement the ecosystems approach. The Essential EAFM (EEAFM) training course has been developed by a group of partner organizations to address these capacity development needs. Essential EAFM training will help institutions and their staff to prepare and implement improved fisheries management plans and provides the practical skills, tools and resources to do so.

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| **Action** | – Establish an EEAFM coordination unit and helpdesk to act as a moderator of the EAFM community practice, and as a facilitator of a (virtual) network for trainers.<br>– Encourage feedback from regional trainers<br>– Develop the Essential EAFM into an online ("Massive Open Online Course – MOOCS") course, starting with the EAFM LEAD (Leaders, Executives, and Decision-makers)<br>– Adapt the EEAFM course further to its application for inland fisheries and aquaculture systems (EEAAM). |
| **Knowledge** | – Establish and maintain an inventory of EAFM plans that have been developed as a result of the training and application of EAFM in the region.<br>– Integrate fishers' knowledge into fishery management planning, through an EAFM approach to planning, which safeguards their participation and inclusion.<br>– Mobilize private sector investments for EAFM/Integrated Coastal Management (ICM) programmes by giving private sector representatives a place on the board of ICM committees and improved access to and collaboration with local government officials. |
| **Cooperation** | – Improve the linkage of EAFM to broaden ICM planning processes by linking EAFM and ICM training.<br>– Encourage PEMSEA and WWF to join the EEAFM consortium to develop capacity in their networks for EAFM. |
| **Capacity building** | – Scale up EAFM training and capacity development and realize benefits from all the good practices and experiences gained by national and regional projects and programmes. |

## RECOMMENDATION: INCREASE EFFORTS TO INTEGRATE ENVIRONMENTAL AND FISHERIES MANAGEMENT

There is a strong, direct linkage between fish, fisheries, and habitats and, therefore, between fisheries resources management and considerations for environmental conservation. There is also a need to improve the linkages between the responsible institutions, and related actors, with the aim of improving coordination and cooperation. This has become even greater when applying the Ecosystem Approach to Fisheries Management.

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| **Action** | – Reduce the ecological footprint of fisheries<br>❍ including reducing gear impacts and optimization of energy use |
| **Knowledge** | – Further exploration of the expected impacts from external sources<br>❍ oil and gas exploration and exploitation, mineral extraction and water management (inland fisheries)<br>– Improved monitoring of abandoned, lost and discarded fishing gear<br>❍ potential problems of "ghost fishing" and entanglement of Endangers, Threatened or Protected species (ETP)<br>❍ land-based runoff and pollution in near-shore/coastal areaso<br>❍ microplastics in the food chain and nutrient pollution of land based runoff |
| **Cooperation** | – Facilitate and further improve collaboration between Regional Seas Action Plans, Regional Fisheries Bodies and regional projects working on management of marine ecosystems for support services such as fisheries<br>❍ e.g. Bay of Bengal LME SAP and the South Asian Seas Biodiversity Action Plan<br>– Promote and foster improved collaboration between fisheries and environment agencies at all levels |

## RECOMMENDATION: STRENGTHEN POLICY SUPPORT TO SMALL-SCALE FISHERIES

The Code of Conduct for Responsible Fisheries continues to be even more relevant as these are now strengthened by the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), which were adopted by the Thirty-first Session of COFI, the Governance of Tenure of Land, Fisheries and Forests in the Context of National Food Security, The Right to Food and the outcomes of the Rio +20, The Future We Want, Sustainable Development for Food Security.

The APFIC region remains the home to the majority of the world's inland and marine small-scale fishers. The sector continues to provide highly nutritious fish and fishery products for food and nutrition security, employment and foreign exchange generation. However there remain many challenges and needs to improve their livelihoods and wellbeing as well as their social, cultural and economic contribution. There is a strong need to support the organization and the empowerment of small-scale fishers so that they may fully, and effectively, take part in the management of fishery resources. It was noted that there is competition and conflict between small-scale and industrial fisheries and that catch per unit effort (CPUE) and length frequencies of commercial species are declining. Small-scale fisheries need to be effectively managed so as to maximize benefits and guarantee long term sustainability. Modernization, infrastructure development and markets are driving traditional small-scale fisheries towards more industrial/commercial fishing.

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| **Action** | – Develop national Policies for securing small-scale fisheries<br>❍ incorporate the key recommendations of the Voluntary Guidelines for Securing Sustainable Small-scale Fisheries in the Context of Food Security and Poverty Eradication (SSF Guidelines), the Voluntary Guidelines for Governance of Tenure and the Right to Food and other relevant sustainable instruments<br>❍ Safety at Sea, incorporating the occupational safety of men and women in both marine and inland fisheries and social security and social protection measures into fishery development programmes. |
| **Knowledge** | – Develop advocacy, awareness-raising programmes to mainstream the implementation of the SSF Guidelines in policy and planning processes and in project development and implementation<br>– Lessons learned relating to the use, methodology and benefits of government financial transfers should be shared and consideration be given to using these types of transfers in a beneficial manner rather than to increase fishing capacity and effort, e.g.<br>❍ self-sustaining death and disability insurance schemes have been successfully implemented in Bangladesh<br>❍ social welfare payments are being used in India to offset income losses during temporal closures. |
| **Capacity building** | – Since the main focus of the SSF Guidelines are the stakeholders (men and women, fishers, fish workers and their communities) capacity development and awareness raising training and other media should be directed to them allowing them to better know their rights and understanding of the SSF Guidelines. |

## RECOMMENDATION: ADDRESS PRESSING SOCIAL ISSUES THAT RELATE TO SUSTAINABLE FISHERIES

The national demand and globalization of trade in fish and fishery products has brought with it many aspects that are sometimes outside the area of competence of fishery departments. These include: gender equity and equality, human rights, migrant workers internal migration of vulnerable and marginalized people into the fisheries sector. They have all presented challenges and issues related to the sustainability of fisheries, regional and international trade, decent work and the economic and financial viability of certain fishing operations. In many instances and, common throughout the region, different Ministries and departments have responsibility and mandates to address these challenges. In order to address these challenges there is a need for improved coordination and cooperation between Ministries and Departments to effectively address these issues and challenges in integrated, holistic and coherent ways.

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| **Action** | – Bringing gender equity and equality into mainstream policy, development, administration and management of fisheries and related areas<br>– Developing legal, formal and informal mechanisms to promote coordination between competent authorities and agencies to:<br>❍ strengthen Flag State Measures and develop instruments and mechanisms to address sea safety, OSH[13], hygienic and decent[14] work aboard fishing vessels, in processing plants and in all aspects related to operations along the value chain.<br>– Ensuring fishers, fish workers, both men and women and their fishing communities have rights to social protection and social security, improved access to health, education, food and decent work. Policies, programmes and projects should:<br>❍ incorporate the rights of the child and the elimination of child labour[15] in the fisheries value chain<br>❍ address the needs and importance of social, cultural and economic well-being of all fishers and fish workers |
| **Capacity building** | – Develop training and capacity building in gender, decent work, migration management and occupational safety and health for both State and non-State actors. |

[13] OSH = Occupational Safety and Health

[14] ILO Work in Fishing Convention, 2007 (C.188)

[15] ILO Minimum Age Convention 1973 (C.138) Worst Forms of Child Labour Convention 1999 (C.182)

## RECOMMENDATION: PROMOTE PREPAREDNESS AND ADAPTATION TO IMPACTS OF CLIMATE CHANGE ON MARINE AND INLAND FISHERIES

Climate change and disasters are constant and real threats to the resilience of fishers and particularly to vulnerable and marginalized groups. More efforts are needed to carry out studies and implement projects on adaptation to climate change and to better prepare for disasters. Existing information and guidelines towards better preparedness for disasters and adaptation to the impacts of Climate Change and the inclusion of marine and inland fisheries into National Adaptation Plans of Action (NAPAs) are important elements to improve resilience of the small-scale fisheries sector.

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| **Action** | – Include marine and inland fisheries into National Adaptation Programmes of Action (NAPAs) |
| **Knowledge** | – More effort needed to carry out studies and implement projects on adaptation to climate change and to better prepare for disasters.<br>– Promote greater awareness of existing information and guidelines towards better preparedness for disasters and adaptation to the impacts of Climate Change |

## RECOMMENDATION: ENCOURAGE REGIONAL HARMONIZATION, COOPERATION AND NETWORKING

The wide range of initiatives in both fisheries and environment that have been identified during the RCFM highlights the importance of networking and communication. The opportunities to learn from best practices, approaches and even mistakes of different national or regional initiatives must be captured if they are to contribute to sustainable development and its associated implementation approaches (e.g. EAFM, ICM, blue growth initiatives, blue economy, green economy, etc.)

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| **Action** | – Promote cooperation between programmes to convene this sort of information sharing and networking events. e.g.<br>❍ IW Learn Regional Asia-Pacific Workshops offer a venue or platform of exchange<br>❍ encourage APEC Ocean and Fisheries Working Group to engage more with Asia regional processes<br>❍ revive or strengthen fishery dialogue in BIMSTEC, SAARC, ASEAN FI WG<br>– Encourage or develop focused round-table event that bring broad public private participation<br>❍ continue the Asia regional fishmeal round table<br>❍ round table of small-scale fisheries stakeholders for the implementation of Voluntary Guidelines on small-scale fisheries (VG SSF). This could be taken up by the Coral Triangle Fisheries Forum<br>❍ roundtable on fishing labour and safety at sea<br>❍ ASEAN public-private roundtable |
| **Capacity building** | – Harmonization and cooperation in best practice and training between fisheries/ environment planning frameworks (e.g. EAFM, ICM, including the management of protected and ecologically sensitive areas) |

# AQUACULTURE SESSION

# PROMOTING SUSTAINABLE INTENSIFICATION OF AQUACULTURE FOR FOOD AND NUTRITIONAL SECURITY IN ASIA-PACIFIC REGION

Intensification of aquaculture has been an ongoing process in the region which aims to increase the productivity and economic efficiency of aquaculture through intensified use of inputs (materials, energy and investment) and resources (water, feed ingredients), application of new technologies and improved production management practices. Intensification of aquaculture has been the main factor in the rapid increase in production in the APFIC region over the past two decades. It has made significant contributions to both food security and rural livelihoods in the region. For many years the region has contributed over 90 percent of world aquaculture production, supplying nearly 50 percent of the food fish for the world population. However, with intensification, there has come increasing public concern.

Being the most populous region with relatively scarce natural resources, Asian aquaculture is facing great challenges to maintain the growth needed to meet increasing demand for fish both inside and outside the region resulting from population growth and economic development. Efforts are being made by international/regional organizations, country governments, civil society organizations and the private sector to achieve sustainable intensification of aquaculture. To achieve sustainability requires "producing more with less", that is, increasing production and economic efficiency with reduced consumption of resources and, lessening negative environmental and social impacts. This can be achieved through improved governance, management practices and adoption of innovative technologies.

The aquaculture session was intended to provide an opportunity for regional and national representatives related to aquaculture to meet and exchange their views about the future directions for aquaculture in the Asian region and, importantly, on the roles of the private sector and public sector in promoting sustainable intensification of aquaculture in Asia and the Pacific.

The aquaculture discussion covered five thematic areas:

1) Improving control of aquaculture related biosecurity and transboundary/epizootic diseases
2) Aquaculture products to meet the market requirements – what do we need to do to improve?
3) Improvement of aquaculture governance and management practices
4) Responsible aquaculture feed and seed production for sustainable intensification
5) Increase the resilience of small farm holders in Asia and the Pacific

## THE NEED FOR SUSTAINABLE INTENSIFICATION OF AQUACULTURE IN THE ASIA-PACIFIC AND KEY ISSUES TO BE ADDRESSED BY THE SECTOR

*Weimin Miao, Aquaculture Officer, FAO Regional Office for Asia and the Pacific*

In 2012 aquaculture contributed 49 percent of fish for food, globally. The intensification of production is the main factor in the growth, together with an expansion of the area used for culture. Intensification has improved efficiency and aquaculture is now a significant contributor to national and global food. There are however some issues. Intensification has risks for both smallholders as well as larger commercial companies, but smallholders are less economically resilient and there are concerns that smallholders will be left behind and not included in the development of the aquaculture sector.

Some of the challenges that have come with the intensification of aquaculture include:

- spontaneous developments with little or no planning and without regulatory systems in place; an increase in transboundary movement of live aquatic animals without proper biosecurity controls and aquatic health management strategies;
- management practices at farm level having to rapidly adopt new technologies and issues in the value chain arising from these developments;
- commercialization developments without proper systems and mechanisms in place to ensure equitable distribution of benefits along the value-chain;
- threats from natural disasters, climate change
- market fluctuations increasing the risks for farmers as increasing investment is held in the intensive ponds.

In October 2012, FAO held a regional consultation on sustainable intensification of aquaculture in the Asia-Pacific in Bangkok, Thailand. They have also been funding development of an aquaculture planning and management toolkit and the Blue Growth initiative, which deals with sustainable aquaculture development and intensification.

During the discussion after the presentation, disease control, breeding programmes and new technologies were areas that increased aquaculture growth making more efficient use of inputs. Special attention, especially from governments, should be given to smallholders, to ensure they are included in the development. Good examples, from outside the region, of smallholders keeping a competitive advantage and still remaining part of, even long value chains, were given.

## FAO CODE OF CONDUCT FOR RESPONSIBLE FISHERIES AND SUSTAINABLE INTENSIFICATION OF AQUACULTURE

*Doris Soto, Fisheries and Aquaculture Department, FAO, Rome*

The FAO Code of Conduct for Responsible Fisheries was drawn up by FAO, following a call from the international conference on responsible fishing in 1992, to strengthen the international legal framework for more effective conservation, management and sustainable exploitation and production of living aquatic resources. The Code of Conduct is intended to help countries and groups of countries, to develop, or improve their fisheries and aquaculture. Whilst also ensuring the long-term sustainable use of fisheries resources and habitat conservation, and also guaranteeing food security and alleviating poverty in fishing communities.

FAO biannually monitors the progress of implementation of the Code of Conduct and related instruments through a self-assessment questionnaire. This process enables FAO to better understanding member countries needs and is used, for example, to guide the design of Technical Cooperation Programme (TCP) and other types of assistance.

The self-assessment by member countries is still far from realistic and objective in some regions and countries. In Asia there is room to provide a better and more credible assessment. This could be done through training and dissemination to countries which should improve the responses and their quality. This instrument has great potential for national and regional assessment of aquaculture performance in complying with the Code. The data base can be complemented with information on national production, value and other parameters to provide a combination of productivity and sustainability indicators.

# THEME 1:

# IMPROVING CONTROL OF AQUACULTURE RELATED BIOSECURITY AND TRANSBOUNDARY/EPIZOOTIC DISEASES

## NEED FOR IMPROVED CONTROL OF AQUACULTURE RELATED BIOSECURITY AND TRANSBOUNDARY/EPIZOOTIC DISEASES: LESSONS LEARNT FROM RECENTLY OUTBREAK OF AHPNS/EMS

*Ed Leaño, Network of Aquaculture Centres in Asia-Pacific (NACA)*

Transboundary aquatic animal diseases are one of the major concerns for establishing biosecurity measures and strengthening of aquatic animal health management capacity in the region. Biosecurity is a strategic and integrated approach that encompasses both policy and regulatory frameworks aimed at analyzing and managing the risks of the sectors dealing with plant and animal life and health, food safety and the environment.

In aquaculture, it entails protection of fish or shellfish from infectious agents (viral, bacterial, fungal or parasitic) as well as from invasive species. Several transboundary aquatic animal diseases have swept the region over the past 25 years which have caused massive economic and social losses. These include the spread and outbreaks of epizootic ulcerative syndrome (EUS) in freshwater fish, viral nervous necrosis (VNN) in marine fish, viral haemorrhagic septicaemia (VHS) in marine and freshwater fish, and several viral diseases in shrimps. The spread of these transboundary diseases clearly demonstrates the vulnerability of the aquaculture industry to disease emergence where impacts have been exacerbated by the lack of effective preparedness and response when diseases emerge.

Recently, outbreaks of a new emerging disease (Acute Hepatopancreatic Necrosis Disease (AHPND), also popularly known as Early Mortality Syndrome (EMS) of cultured shrimps were reported in China and Viet Nam (2010), Malaysia (2011), Thailand (2012) and Mexico (2013). This disease has caused significant losses in the production of *Penaeus monodon* and *P. vannamei* in the affected countries. National, regional and international responses to this emerging disease have signified that improved control of biosecurity and transboundary diseases is still needed in the region.

Since there is still no evidence that of inbreeding in shrimp, it seems that this is not related to Acute Hepatopancreatic Necrosis Syndrome (AHPNS). It was noted that even highly biosecure farms had AHPNS. There was a comment that zonal management is strongly related to disease management. The sharing of water resources also increases the risk of sharing a disease.

## STRENGTHENING NATIONAL AQUATIC BIOSECURITY CONTROL AND ANIMAL DISEASE SURVEILLANCE AND CONTROL SYSTEM IN INDONESIA SUPPORTED BY FAO TECHNICAL ASSISTANCE

*Maskur Maskur, Ministry of Marine Affairs and Fisheries, Indonesia*

In Indonesia, fisheries and aquaculture make a significant economic contribution to livelihoods, income generation, job creation and food security. In 2013, the fisheries sector produced 5.6 million and aquaculture 13.7 million tonnes. Fish consumption in Indonesia is 35.62 kg per capita per year. Since capture fisheries production has remained constant or with only slightly increased production levels, aquaculture is becoming an important subsector for providing aquatic protein.

Implementation of biosecurity measures and surveillance of shrimp and fish diseases have experienced some constraints. There has been a lack of guidance on surveillance methods to detect disease, estimate prevalence, and how to work with OIE listed diseases. The implementation of the Free Trade Area of ASEAN in 2015, with increased transboundary movement of live fish will exacerbate the spread fish and shrimp diseases throughout the region. Therefore competent regional authorities, and diagnostic laboratory guidelines are very important. AHPND still occurs in some countries, however information regarding this disease, such as transmission, diagnostic kits, and treatment, is limited.

Examples were given in the discussion about the importation of live animals into Indonesia. There were several examples where the private sector had brought in live feed, live broodstock and seed, representing an aquatic animal health risk. There should be an ASEAN-wide approach to managing the transboundary movement of animals and improved standardization between reference laboratories.

## PUBLIC-PRIVATE AQUATIC ANIMAL HEALTH MANAGEMENT WORKING GROUP AND ITS ROLE TO IMPROVE GOVERNANCE AND MANAGEMENT PRACTICES IN ASEAN

*Timothy Moore, ASEAN-MARKET Project – USAID*

Outbreaks of aquatic animal diseases threaten the Association of Southeast Asian Nations' (ASEAN) aquaculture industry, regional and international trade in aquaculture products, and the economic livelihoods of producers, especially small-scale. Over the past 25 years, several transboundary aquatic animal diseases have decimated different farmed species populations within Asia, including ASEAN countries, creating massive economic and social losses. Such vulnerability to disease emergencies as well as the lack of preparedness and response programmes across the region needs be addressed to ensure the long-term sustainability, growth and success of the industry. As global and regional demand, as well as investment, for farmed seafood from ASEAN, increases, growth opportunities will dictate the increased movement of live aquatic animals and their products within countries and across borders. This presents a challenge to prevent breaches in biosecurity – at borders, in hatcheries, watersheds and on farms – that have historically led to colossal losses caused by aquatic animal diseases, poor water management and pollution. Given the scale and scope of the challenges in the region, multiple approaches and stakeholders are needed to improve the management of the health of aquatic animals in ASEAN, including regional networking, investment and partnerships.

As efforts for public-private cooperation in addressing aquatic health management are fairly new in ASEAN, enhancement and strengthening of collaboration amongst stakeholder groups is merited, and is foreseen to result in more comprehensive solutions and hopefully investment in the industry. Several gaps in aquatic health management that could benefit from a stronger public-private cooperation approach and commitment include the: 1) Continued underestimation of the need for sound aquatic animal health programmes; 2) Reliance on passive versus active surveillance; 3) Implementation of ad hoc projects with limited long-term impacts and learning and 4) Continuation of inappropriate or illegal activities that threaten to spread diseases.

It is recommended that there should be an increase in facilitating and encouraging network approaches to draw on available and proven diagnostic expertise, and formalizing organizational structures, such as:

- a taskforce, to coordinate activities and communicate progress
- encouraging learning from experiences in Australia's system for aquatic animal health governance and terrestrial animal industries in ASEAN (e.g. poultry)
- implementing methodologies to undertake effective but low-cost active monitoring and surveillance, and developing new and cost effective technologies

- identifying lead private sector players willing to invest in capacity building, research and surveillance including lead farmers/groups and industry as partners in the delivery of health management services and planning
- implementing programmes to help farmers to access and adopt improved technologies.

It was noted that there are limited partnerships addressing aquatic animal health in ASEAN, and how could a taskforce accelerate partnerships and also investment in aquatic health management in the region? What aspects of aquatic animal health management offer the most potential for public-private or multistakeholders partnerships?

It is important that there are good strong national Good Agricultural Practice (GAP) and regulations in place to build regional/ASEAN harmonization. There is a lack of experience in governments with public-private partnerships and therefore guidelines are needed to help partners get started. Good examples from terrestrial animal production on how to deal with public-private partnerships could be used.

## AQUACULTURE BIOSECURITY AND ANIMAL HEALTH MANAGEMENT – INDIAN EXPERIENCES

*Rajendran Kooloth Valappil, Central Institute of Fisheries Education (CIFE), India*

Epizootic ulcerative syndrome (EUS) is the first transboundary fish disease recorded from India. Of the 26 OIE-listed pathogens, four crustacean diseases and one each of finfish and molluscan diseases have been reported so far. Historically, diseases and pathogens did not get much attention until the early 90's when white spot syndrome virus (WSSV) caused catastrophic mortality in cultured tiger shrimp. Cultured shrimp contributes more than 60 percent of the total seafood export earnings for the country. However, infectious diseases, especially WSSV have been a serious impediment to shrimp culture. This crisis led to the introduction of *Litopenaeus vannamei* into the country in 2009.

Concomitant with the transformation of shrimp culture from a traditional farming practice to an export-oriented industry, progressive change in health management of cultured animals also took place. Further, the introduction of non-native species has changed the whole scenario of health management and biosecurity in aquaculture.

A national strategic plan and guidelines for aquatic exotics has been prepared together with quarantine, capacity building in disease diagnosis, harmonization of diagnostic tests and accreditation of PCR laboratories, developing, disseminating and implementing better management practices (BMP) through cluster-level approaches.

Biosecurity policy and guidelines are being implemented. However, there are several issues which need to be addressed, e.g. a lack of surveillance data on diseases of aquatic animals; a lack of data on the socio-economic impact of diseases; a lack of coordinated, harmonized and synergistic research efforts; limited information on chemicals and biological agents used in aquaculture; the continued reliance on imported or wild shrimp brood stock and limitations in the effective implementation of biosecurity regulations,. For the effective implementation of biosecurity, there is a need for capacity building and increased awareness among the stakeholders. As smallholders cannot afford to create biosecure farm facilities, promoting the formation of small-scale farmer groups operating as clusters can be an effective strategy. Further, application of biosecurity measures requires considerable research on diseases and their epidemiology.

Biosecurity does not work in a vacuum but needs support from strong research and through regional level cooperation. It is also recommended that both national and regional aquatic animal pathogen repositories be established.

Questions were raised about how heavily the aquaculture industry in India has been involved in this work. So far there has been limited buy-in from the private sector in the development of aquatic animal health in India. Good examples were given from Australia, where both public and private industry has seen an added value in working together and examples of this sort of cooperation should be more widely disseminated in India.

## HOW PRIVATE SECTOR AQUATIC ANIMAL HEALTH MANAGEMENT SERVICES CAN SUPPORT AQUACULTURE DEVELOPMENT

*Don Griffiths, Operations Director, Fish Vet Group Asia*

It is important that governments set the frame for the work on aquatic animal health and then the private sector can operate within this framework. Often the private sector can act faster and more efficiently than governments. Despite improvements across the aquaculture sector, it is estimated that, conservatively, 20 percent of world aquaculture production is lost, from hatchery to harvest, due to disease. Furthermore, the increasing relocation of people to, and anthropogenic impacts on, coastal areas and the concomitant impacts of climate change will increase the likelihood and magnitude of disease outbreaks in coastal production with resultant economic losses.

One way of addressing the above scenario will be by engaging private sector companies in the provision of aquatic animal health care. Private sector companies have greater flexibility of operational procedures, which are required to provide rapid and accurate disease diagnosis, and follow-up in order to meet their client's specific needs (i.e. problem driven). The private sector can partially fund this research and development, sharing the research 'risk' with government and producers.

During the discussion the clear links between environmental parameters and aquatic animal disease builds a good case for including health management with zonal management. It was recommended that aquatic health management guidelines and management practices be linked to environmental surveillance.

There was a question on how to operationalize the private involvement and if there was enough trust among producers, to use the private sector in preference to, for example, government extension and university/research institutions. There might be a need to build capacity within some countries in the region on issues relating to aquatic animal health.

## RECOMMENDATION: STRENGTHEN BIOSECURITY CONTROL AND ANIMAL HEALTH MANAGEMENT IN AQUACULTURE

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| **Organization coordination** | – Establish strong national/regional industry stakeholder groups/associations, through which governments and regional organizations can effectively interact with the private sector in strengthening biosecurity control and animal health management (Regional organizations, national government and industrial sectors)<br>– Establish a regional system/mechanism to monitor, report and publicize industrial performance on disease and health management in the region. NACA could coordinate such a mechanism together with the FAO/OIE (International and regional organizations, national governments, private sector and NGOs)<br>– Establish regional and national emergency response systems and operational mechanisms for tackling major disease problems in the region, including establishing a special fund for emergency response (NACA/FAO, national governments and private sector) |
| **Policy** | – Recommend a zonal approach in managing biosecurity, both in terms of environmental resource management, and disease management. Governments to develop guidelines for implementation at local levels (International and regional organizations, national governments, private sector and NGOs) |
| **Capacity building** | – Strengthen capacity building for applying biosecurity measures at different levels (e.g. farm, watershed, national, regional levels). Use of a farmer group approach is recommended (i.e. farmers sharing the resource helping each other for win-win) (NACA, FAO, academic institutions) |

# THEME 2:

# AQUACULTURE PRODUCTS TO MEET THE MARKET REQUIREMENTS – WHAT DO WE NEED TO DO TO IMPROVE?

## THE ROLE OF FARMER ORGANIZATIONS IN FACILITATING AQUACULTURE MARKETING IN INDIA

*Nagesh Kumar Barik, Central Inland Fisheries Aquaculture, India*

Aquaculture in India is a fast expanding sector. The annual contributions to AgGDP rose from 2.9 percent in 1990–1991 to 4.4 percent in 2010–2011. Exports are worth US$5 billion and 14 million people are employed directly in the sector. The small-scale sector is the backbone of the industry, but there are social implications and regional disparities.

There are many good examples of farmer's organizing in groups in India – informal groups (farmers clubs, youth clubs), more formal groups (self-help groups, societies), cooperatives, community organizations, farmers interest groups and farmer-producer organization (FPOs) groups.

Discussions were held on agriculture/aquaculture corporations and how to facilitate the forming of such groups through legislation to make them work to international principles and the sharing of resources and government support for FPO's and how to make such groups legal entities. An example was given of the government giving total support for the first year until the FPO was strong enough to survive without financial aid. It was questioned why forming farmer organizations in, for example, the horticulture and dairy industries, seemed to have met with greater success than in aquaculture.

## GROUP CERTIFICATION OF SMALL AQUACULTURE FARMERS FACILITATING MARKETING IN THAILAND

*Ubolratana Suntornratana, Department of Fisheries, Thailand*

The majority of certification schemes present in the aquaculture industry today, focus on individual farm certification, with only a few promoting and certifying groups or clusters of farms. In Thailand the majority of aquaculture producers are smallholders and it is estimated that 72.5 percent of registered farms in Thailand have an area of less than10 hectares.

There are great benefits from group certification. Well-functioning groups of farmers can, if certified, improve access to international value chains for smallholders. Forming a group and conducting internal control systems for smallholders can also improve management practices.

The questions after the presentation focused around the possibility of farmers receiving a premium price for their product. How this could be achieved was not clear, but there was an advantage in negotiating better prices for feed, postlarvae and other farm inputs. Benefits of larger production volumes from groups of farms rather than from small individual farms were also seen as an advantage that gave better access to international traders and buyers.

## PROMOTION OF NATIONAL STANDARD ON GOOD AQUACULTURE PRACTICES (GAP) IN THAILAND

*Ubolratana Suntornratana, Department of Fisheries, Thailand*

The Thai Good Aquaculture Practices (GAP) standard is one of the best developed national GAP schemes in ASEAN and in the Asia-Pacific. Departments responsible for the food safety programme work together with the Fisheries Extension Bureau in setting up training programmes for "training of trainers" in GAP standards and related regulations. The objective is to provide information related to regulation, standards and certification for local extension officers so that they can better inform farmers.

There is a need to integrate and promote GAP standards and "learning-by-doing" is an important method in disseminating this information to farmers. Extension officers are important actors in promoting the GAP standards, however, they don't have much opportunity to observe/participate in the standard development process. The use of market mechanisms to promote standards has been successful for commercial species like shrimp but has not worked well for species that are produced for the domestic market.

In the discussion it was noted that the national GAP schemes are useful as tools for the management of aquaculture, but there is a need to benchmark these schemes towards international GAP standards. There are clear standards for processing units, but it is less clear at farm level where there are many new developments.

## PROMOTION OF ASEAN STANDARDS ON GOOD AQUACULTURE PRACTICES, FACILITATING REGIONAL AND INTERNATIONAL TRADE OF AQUACULTURE PRODUCTS

*ASEAN-Australia Development Cooperation Programme (AADCP), Department of Fisheries, Thailand*

Most of the ten ASEAN countries are major shrimp producers and export to both international and regional markets. The export of shrimp generates income for local producers in the countries and many of the farmers are smallholders and important SME's in their area.

There is additional value in having a regional standard within ASEAN. The ASEAN standard would primarily be used inside ASEAN, but also to promote ASEAN products in international markets. There is some interest from buyers inside ASEAN, but contacts and knowledge about the standard is limited.

It was noted that it is difficult for the private sector and buyers to take part in the ASEAN process for developing standards. There was agreement that the involvement of all stakeholders, including in the development phase, was crucial for a recognized and respected standard both for governments, consumers, producers and for the industry as a whole.

## RECOMMENDATION: FACILITATE SMALL AQUACULTURE FARMER TO MARKET THEIR PRODUCTS EFFECTIVELY

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| **Knowledge research** | – Evaluate the performance of existing farmer (business) organizations and their operation in the region with reference to successful business organizations and management models which have been effective in empowering smallholders in long supply chains in the rest of the world. Document and demonstrate the successful organization operational models/practices identified inside and outside the region (NACA to take the lead)<br>– Support the development of national and regional aquaculture standards through an inclusive consultation process that ensures effective participation of all stakeholders, particularly the private sector (FAO/NACA, national governments regional government bodies e.g. ASEAN and SAARC) |
| **Policy** | – Support governments and IGO's in establishing regulatory systems/ mechanisms that will ensure/facilitate a fair share of value for primary producers in the profit distribution along the aquaculture value chain (FAO/ NACA, governments) |
| **Capacity building** | – Strengthen the capacity of smallholders for doing aquaculture as a business by providing training and other activities (FAO/NACA/SEAFDEC, governments) |
| **Communication** | – Promote public awareness on how consumers can benefit from certified aquaculture products and lobby the different stakeholders, particularly the consumers, to share the added costs (Industry/private, government, civil society organizations). |

# THEME 3:

# IMPROVEMENT OF AQUACULTURE GOVERNANCE AND MANAGEMENT PRACTICES

## DYSFUNCTIONAL AQUACULTURE POLICY, PLANNING AND PRACTICE IN ASEAN: IMPACTS ON INVESTMENT OUTCOMES AND SUGGESTED PATHWAYS TO SUSTAINABILITY BY 2023

*Anthony Emms, USSEC*

Government structure, aquaculture policy, regulations and practices have not developed at the same pace as farm level production to regulate and protect the investments in the industry. There is a need to look into the structures and develop new mechanisms to attract and protect future investments and suggest solutions for sustainable or at least responsible development of the aquaculture sector in Asia-Pacific towards 2023.

The development pattern often seems to be that aquaculture develops quickly and then the farmers hit a production wall. This is often because governmental regulation fails to keep pace with the rapid development. It was noted that, to ensure sustainable development and avoid the boom and bust circle that is often seen and government should work together.

Ecosystem approaches to aquaculture are important and it is necessary for a systems approach to ensure production in a given area is within its carrying capacity, both socio-economic and environmental.

## STRENGTHENING AQUACULTURE GOVERNANCE AND PLANNING IN CHINA (AQUACULTURE REGULATIONS, ZONING AND FARM REGISTER/LICENSING)

*Wang Qingyin, Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences*

Aquaculture in China has a long history and is a very diverse sector. China is the world's largest producer of seafood from aquaculture. The sector is, as any other production of animals, reliant on input in terms of seed/fry, feed (e.g. fish meal, fish oil and soy protein), trash fish, chemicals and water quality. Aquaculture also has negative environmental impacts including discharge of liquid and solid wastes together with pathogens. Sustainable intensification of the sector is about increasing production with the fewest inputs and the least negative environmental impact.

Food safety is a strategic issue both nationally and internationally. It is estimated that the markets demand for marine fisheries products will exceed 40 million tonnes by 2020 in China. The increased production will largely come from mariculture. This will put increased pressure on ecosystems e.g. harmful algal blooms and ocean acidification. Constraints on land and water resources and increasing feed costs will raise production costs. Climate change will also pose risks for the mariculture industry, and all these factors will make sustainable development a challenge.

## AQUACULTURE ZONING SUPPORTED BY SPATIAL PLANNING IN THAILAND

*Pholphisin Suvanachai, Department of Fisheries, Thailand*

Agricultural zoning in Thailand was initiated in early 2013 by the Ministry of Agricultural and Cooperatives (MOAC) and was targeted at:

a) Plant crops e.g. rice, rubber, sugarcane, and cassava
b) Livestock e.g. poultry, pork and beef cattle and
c) Aquaculture e.g., tilapia and coastal shrimp production

Spatial planning refers to the methods used by the public sector to influence the distribution of people and activities in spaces at various levels.

Aquaculture planning of is based on a number of parameters that are taken into account when deciding if an area is suitable for development of aquaculture. These variables are: soil pH, permeability and texture; topography; water availability and quality; rainfall and infrastructure. Between these variables there is a weighting which is based on a score given for the area, from most suitable to unsuitable. It should be noted that in the first phase, zoning schemes are carried out on a voluntary basis.

In the discussion the point was raised that when talking about aquaculture zoning and planning there should be a consideration for the market, and not only the capacity of the area. For example there might be a situation where the carrying capacity is higher than the market can absorb. This zoning in Thailand focuses only on inland ponds and does not include cages in rivers, lakes, coastal waters and reservoirs.

What are the implications for farmers if there is development of farming outside the zones? Because the zonal work is, initially, on a voluntary basis, the existing farms are included. When performing zonal planning there are a number of factors that should be included to estimate the carrying capacity. Developing more detailed models to improve zonal planning is an ongoing process.

## PUBLIC-PRIVATE PARTNERSHIPS IN CO-MANAGEMENT OF AQUACULTURE: GOING TRULY ZONAL

*Anton Immink, Sustainable Fisheries Partnership (SFP)*

Aquaculture development in Asia has focused around increasing the number of farmers to improve livelihood opportunities, maximize short-term economic returns from natural resources and provide foreign exchange from exports. This rapid, often unplanned, expansion has led to catastrophic failures as a result of disease and pollution.

Over time governments have initiated planning processes and instigated development controls, with varying degrees of success. The increasing use of science as a basis for decision making is a positive trajectory, but there are still significant improvements to be made – in terms of planning, licensing, operational and emergency management, industry structure and public-private partnerships.

Zonal management takes planning and management to the next level and offers planners, regulators and responsible industry leaders a toolkit to deliver sustainable development based on credible science. A public-private partnership based on the use of scientifically determined limits to pollution and disease risks, clear and enforceable licensing requirements for all scales of producers, and the engagement of the industry in the future comanagement of the resource base should deliver growth, whilst protecting the environment and the industry itself.

The links between zonal management and disease management/epidemiology are clear, but there needs to be specific work done on the epidemiology aspects.

## INTRODUCTION TO ASIAN AQUACULTURE PLANNING AND MANAGEMENT TOOLKIT

*Weimin Miao, Aquaculture Officer, FAO Regional Office for Asia and the Pacific*

APFIC organized a regional consultative workshop on "Strengthening assessment of fisheries and aquaculture in the Asia-Pacific region for policy development" in 2011, Yangon, Myanmar. The workshop reviewed performance assessment of both fisheries and aquaculture and concluded there was a general lack of good assessment of aquaculture in the Asia-Pacific. It was recommended that a regional study on aquaculture assessment in the region be conducted and a tool kit, that would include tools to address all major planning and management at different levels and along the value chain, be developed. It was underlined that the tool kit should be practical in applicability and instructive, with a focus on how it would be implemented by users.

The current status is that FAO/APFIC has conducted an expert consultative meeting and is now in the process of further refining and finalizing the tools included in the toolkit and to make it available to potential users for comments and suggested modifications in the near future.

## RECOMMENDATION: IMPROVE GOVERNANCE AND MANAGEMENT PRACTICES IN AQUACULTURE

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| **Policy** | – Promote the application of complementary aquaculture planning and management tools (e.g. zoning tools, carrying capacity and impact monitoring) for sustainable development and to support the required capacity building<br>– Promote the implementation of good aquaculture standards and certification as the vehicle for sectoral improvement and encourage the cluster/group/zone approach in the process where possible<br>– Support the ecosystem approach to aquaculture (EAA) as the most important aquaculture planning approach; capacity building for such application; promote area management of aquaculture based on a zonal approach; implement conducive government policy and stimulate public-private partnership (PPP) in both the development and implementation of zonal process |
| **Capacity building** | – Develop and implement a regional training programme on aquaculture governance based on the necessary country level assessment and documentation of governance practices within, and beyond the region.<br>– Scientific capacity building needs to be strengthened to support the development and implementation of zonal and ecosystem approaches |

# THEME 4:

# RESPONSIBLE AQUACULTURE FEED AND SEED PRODUCTION FOR SUSTAINABLE INTENSIFICATION

## CHALLENGES OF FISHMEAL USERS IN AQUACULTURE FEEDS STANDARDS AND CERTIFICATION DEADLINES

*Andrew Jackson, International Fishmeal and Fish Oil Organization (IFFO)*

Although aquaculture is growing the global use of fishmeal usage has remained constant. Although fishmeal is used in both poultry and pig production, the majority of fishmeal is currently used in aquaculture. It is predicted that although there will be an increase in aquaculture production, there will eventually be a decrease in the fishmeal used overall, as more fish goes for direct human consumption and at the same time more efficient fishery management practices will be put in place. An increasing amount of fishmeal comes from processing by-products (33 percent), but there are still fisheries that are not controlled well enough and are being overfished to meet the growing demand for fishmeal. The question is how the market can determine which fishmeal to procure if it only wishes to use fishmeal from responsible sources.

Consumers and retailers want to be reassured that aquaculture products are being responsibly produced and they are increasingly using third party certification programmes for reassurance. The Global Aquaculture Alliance BAP certification, for example, states that from 1 June 2015, 50 percent of fishmeal must come from either MSC certified fishery + chain of custody or material from an IFFO Responsible Supply (RS) certified factory.

The growth of aquaculture is driving concerns that overfishing is taking place to provide fishmeal for aquaculture feeds. For now this is mostly a European and US driven issue, but the trend is that it will become a global concern over the next ten years, and several of the aquaculture feed standards are being revised to be "fit for purpose".

It is recommended that governments and industry must prepare to demonstrate responsible production of fishmeal for use in all forms of aquaculture, with good fisheries management (e.g. control of fishing effort, knowledge of impacts, no IUU) being required . Full traceability through well managed factories will also be necessary.

The discussion noted that there are many unsolved problems particularly concerning fish oil. There are some experimental projects (e.g. using yeast derivatives) but these are not yet at a commercial scale. There are also alternative sources of protein (e.g. soy) which are sometimes used.

## PUBLIC-PRIVATE PARTNERSHIPS ON TRAWL REFORM – CURRENT PROGRESS

*Duncan Leadbitter, Marine Change*

Trawls and trash fish are regional fisheries management issues, and there is a supply chain risk for those buying products from these fisheries. The APFIC trawl guidelines provide tools for management of the fisheries and are a large step in the right direction.

There have been several initiatives at both national and regional level to address the challenges with trawl fisheries, e.g. the regional, sector-roundtable that on a regular basis meet and exchange information and ideas. IFFO and MSC have committed to reviewing their fishery assessment methods

to better cater for multispecies fisheries. There is a need to increase the pace of development in the right direction through, for example, the use of Fisheries Improvement Projects (FIP) pilots to encourage a wider interest in trawl management planning via the roundtables. Also further work is required on fishery assessment methods for multispecies trawling and to taking a risk based approach to management.

## ENDEAVOUR OF THAI FEED MANUFACTURERS IN PRODUCING RESPONSIBLE AND COST-EFFECTIVE AQUA-FEED TO SUPPORT SUSTAINABLE INTENSIFICATION OF AQUACULTURE IN THE REGION: PROGRESS AND MAJOR ISSUES AND THE PARTICIPATION OF PRIVATE AQUA-FEED SECTOR IN A DIALOGUE ON THAI FISHMEAL

*Pornsil Patchrintanakul, President, Thai Feed Mill Association*

With their multispecies, multigear and multisize characteristics, the fisheries of Southeast Asia are different from many others. This variety makes it difficult to develop a standard for fisheries in Southeastern Asia as "no size fits all", making fisheries management complex and difficult.

The Thai Sustainable Fisheries Roundtable (TSFR) key objective is to develop internationally accepted standards for Thai fisheries. These standards will be a minimum requirement which will be practical for all relevant stakeholders and be based on the *FAO Code of Conduct for Responsible Fisheries (CCRF)* and the *FAO International Guidelines on Bycatch Management and Reduction of Discards*. The Fisheries Improvement Programme (FIP) approach will also be used to move to more responsible fisheries.

The FIP includes work on non-IUU fisheries, legal labour use and promotion of good labour practice together with environment impact assessments and aspects of food safety. The advantages are that the FIP approach is internationally accepted and tailor-made to the character of specific fisheries. Because the variety of the multispecies fisheries is taken into account, there will be continuous development and improvement of the concept.

It was noted that there were large differences between the percentages of farmers using commercial feed among the countries in the region, ranging from nearly 100 percent to as low as 10 percent.

## MANUFACTURING AND SUPPLYING RESPONSIBLE AQUACULTURE FEEDS FOR FARMERS IN INDIA (1)

*Amit Kumar Saraogi, Managing Director of Anmol Feeds Pvt Ltd, India*

Anmol Feeds originally produced feed for poultry and cattle, but sees great future in the aqua segment and has also been developing feeds for this sector. In India, only 10 percent of feed for aquaculture is commercially produced, with the rest coming from farm-based inputs. Compared to other countries in Asia-Pacific the per capita consumption of fish is low in India, but production has increased over the last decade and therefore the aqua feed segment is seen as a good business opportunity.

## MANUFACTURING AND SUPPLYING RESPONSIBLE AQUACULTURE FEEDS FOR FARMERS IN INDIA (2)

*Amit Dubey Godrej Agrovet, Ltd, India*

There has been a shift in Indian aquaculture over the last 10 years, notably from a focus on export markets to a focus on domestic markets. Other changes have included a move from black tiger to whiteleg shrimp production and China having gone from being a net exporter of shrimp in 2003 to a net importer in 2013. Shrimp feed production is expected to increase 40 percent over the next seven

years and feed for fish is expected to increase nearly threefold from 0.9 tonnes today to 2.5 tonnes in 2020.

In the Indian feed industry there is a focus on food safety, better management practices, improved efficiency in feed conversion ratios and alternative protein usage. Some of the challenges in the future will be based around fishmeal and fish oil replacement, availability of alternative proteins (e.g. soy and maize), biosecurity of farms, facilitation of public-private partnerships and international certification of Indian farms.

In the discussion it was noted that the use of ICT information systems from tablets and smart phones gives feed companies an opportunity to get "real time" information which benefits both farmers and the company. This works like an online extension worker, and lessens the response time to farmers' problems and challenges.

It was noted that there is good cooperation for R&D with universities, but there is also an in-house facility to develop the products further.

## IMPACT OF GENETIC EROSION OF CULTURED SPECIES AND APPROACHES TO ADDRESS THE ISSUE

*A. Ponniah, Central Institute of Brackish Water Aquaculture, Ministry of Agriculture, India*

The production potential of cultured species is among others, dependent on the genetic diversity of broodstock. Genetic erosion of the broodstock can lead to reduced performance and loss of income for farmers and pose a risk for food security. When there is crossbreeding between domesticated and wild stocks, we jeopardize future gains in productivity that can be made through genetic selection and the capacity to meet challenges posed by climate change. The main cause of genetic erosion is the lack of awareness among seed production units about the importance of intraspecies genetic variability. The need to have better scientific guidelines for interhatchery cross breeding to improve genetic variability is also lacking.

In order to facilitate and strengthen the genetic improvement at a national level it is recommended that FAO/NACA establish an expert working group which examines practical examples of genetic erosion in hatcheries and of natural stocks. If an evaluation of the national initiatives on broodstock banks and network of hatcheries is carried out, there is scope to strengthen these initiatives by developing specific guidelines, technical advice and models of public private partnership.

## IMPROVING THE NATIONAL AQUACULTURE SEED PRODUCTION SYSTEM – NEPAL TCP ON CARP SEED QUALITY

*R. Mishra, Fisheries Development Programme, Nepal*

A recent project by the Nepalese government and FAO on carp seed quality has shown promising results. Seed production is particularly important in Nepal as there is no wild collection of seed for aquaculture. The aquaculture sector is reliant on carp seed being produced in sufficient quantity by hatcheries. The total carp seed requirement for 2013–2014 is 180 million and 81 percent of the carp seed is produced by the private sector.

Some of the issues with seed quality in Nepal are genetically degraded brood stock due to inbreeding; uncontrolled cross breeding; unintended selection and broodstock of unknown pedigree. There are cases of poor broodstock management and hatchery operating practices. Farmers often complain about slow growth and poor survival of seed, reduction in reproductive performance and increased incidence of disease and morphological deformities.

The way forward for the Nepalese government along with other stakeholders is to build a solid infrastructure to ensure seed quality and supply so that improving aquaculture production can be improved. However, technical as well as financial support is required for such a comprehensive project and is in the process of development. We are hopeful we will receive support from our regional and global friends to implement it. There is good scope to build a private-public partnership around the already large presence of private involvement in the production of seed.

## RECOMMENDATION: PROMOTE RESPONSIBLE PRODUCTION AND USE OF QUALITY FEED AND SEED

| | |
|---|---|
| **Organization coordination** | – Support a regional and national dialogue on production and the use of responsible feed ingredients (particularly fishmeal and oil) in aquaculture feed production with multistakeholder participation. (SEAFDEC/NACA, CSOs, government, fishing industry, feed industry and farmers)<br>– Establish a joint industry/government working group including fisheries and aquaculture stakeholders to implement the APFIC trawl guidelines. (SEAFDEC, APFIC)<br>– Support private sector involvement in national genetic breeding and management programmes (NACA lead) |
| **Regulation** | – Strengthen regulations on aquaculture seed production and distribution, promote the implementation of good hatchery practices and guide the farmers not to use poor quality seed from "copy" hatcheries (National governments and ASEAN/SAARC) |
| **Research development** | – Support the development of alternative protein sources for production of more cost-effective aqua-feed and ensuring food security. (Industry, academic institutions, government)<br>– Establish a regional expert group for assessing the genetic improvement and management programmes in the region, promote the sharing of information and products from the national genetic breeding programmes, including addressing intellectual property right issue and guide the regional collaboration on genetic breeding work |
| **Capacity building** | – Promote good feed management practices (including "farm-made feed") at farm level and disseminate available information on feed and feed ingredients and additives, including relevant FAO data (Government, FAO, NGOs, private) |

# THEME 5:

# INCREASE RESILIENCE OF SMALL FARM HOLDERS IN ASIA-PACIFIC

## ADAPTATION TO CLIMATE CHANGE AND EXTREME CLIMATE EVENTS

*Doris Soto, Fisheries and Aquaculture Department, FAO, Rome*

Climate change will potentially have a large impact on aquaculture, both in coastal and inland areas. Some of the long term impacts will be changes in temperature, salinity, pH, freshwater availability, increased storminess and sea level rise. Some of the short term impacts are increased climatic variability, unexpected changes and increased magnitude and frequency of extreme weather events. These long term and short term changes require alterations in planning and management (e.g. genetic improvement and selection of alternative species). It is important to underline that in some situations the impacts on aquaculture can be positive and not only negative.

In a recent FAO study different aquaculture activities were analyzed against their vulnerability towards climate changes. The most vulnerable were those in freshwater and shallow water. Aquaculture reliant on wild fry (seed) collection, species with long culture cycles, narrow tolerance levels and monoculture systems, would also be negatively impacted. The less vulnerable systems were marine and deep water systems, fry/seed supplied from hatcheries with a shorter culture cycle and with low trophic level multispecies systems.

Issues of planning for larger countries with many different ecosystems were raised. There was also mention of regional sharing of geospatial information to prepare for disaster management. There is a need for a regional strategy. There is some baseline information available on choice of species, value chains etc., however, there is a need for more work to be done.

It was noted that climate change and fisheries and aquaculture should be included in the National Adaptation Programmes of Action (NAPAs).

## PROTECTING THE INTEREST OF SMALL PRODUCERS THROUGH SUSTAINABLE AND ETHICAL TRADE OF AQUACULTURE PRODUCTS

*Jesper Clausen, FAO Consultant*

The small-scale farmers in the Asia-Pacific account for around 60–70 percent of the region's aquaculture production. Eighty to ninety percent of all farmers are smallholders. It is important to note that as a group smallholders are very diverse, ranging from extensive household units to more commercially oriented operations, still small-scale, but highly intensive. There are some challenges being a smallholder, especially in the longer global value chains. Constraints include:

- Limited and variable volumes of product – risk management strategies of larger traders and buyers, requiring large volumes of product, working against smallholder farmers producing small quantities of product;
- Difficulties in traceability;
- Limited access to financial services for investment in changes that are required for improvement of farm management/certification;
- Smallholder farms may not be formally registered leading to issues with land use rights;
- They may not be producing a product for export, and therefore producing at least cost to sell within the domestic market, where safety standards are often less stringently applied;
- Commercial/government servicing is less oriented towards the needs of smallholders.

When the smallholders have to deal with ethics that are sometimes dictated by consumers and retailers in the international market, sometimes there is a lack of knowledge about what is needed. In general, aquaculture producers have good ethics, but sometimes there is a lack of understanding when dealing with animal welfare, environmental impacts and non-prudent use of drugs. This is mostly a matter of capacity building. The ethics of consumers are sometimes not included in the discussion, however there is a clear ethical consideration for consumers on how much they are willing to pay for a product that lives up to the high quality and production standards they require from the producers.

## RECOMMENDATION: INCREASE THE RESILIENCE OF FARMERS IN CONFRONTING CLIMATE CHANGE AND OTHER RISKS

| | |
|---|---|
| **Policy** | – Develop a regional strategy to assess and address the vulnerability and risks in aquaculture due to climate changes and variability (e.g. ocean acidification). (NACA, SEAFDEC, FAO, governments)<br>– Develop a regional policy support platform on climate changes using available information to address specific risks including the conduct of country level case studies (NACA) |
| **Knowledge Communication Awareness** | – Conduct regional assessment to address weaknesses and gaps in national capacities within fisheries and aquaculture to address climate changes including increased communication and information sharing among different government line ministries/departments (e.g. between fisheries and environmental departments) to ensure inclusion of fisheries and aquaculture into the NAPA's (ASEAN/SAARC, NACA/SEAFDEC, FAO, governments)<br>– Assess and promote awareness of potential positive contributions and opportunities of aquaculture in addressing climate changes (FAO, WB/GEF) |

## PLENARY SESSION ON RECOMMENDATIONS FOR THE ASIA-PACIFIC FISHERY COMMISSION

The recommendations of the Fifth RCFM which are found in each of the sections of the report were presented in the final plenary session. The participants at the Fifth RCFM were presented with the consolidated conclusions and recommendations for action from the two parallel sessions (Fisheries and Aquaculture). In the plenary, these recommendations were commented on and amended and subsequently endorsed by the forum. The consolidated conclusions and recommendations from the Fifth RCFM were forwarded to the Thirty-third APFIC Session for consideration by the Commission, which endorsed them as a guide to regional priorities.

## CLOSING OF THE FIFTH RCFM

In closing, the APFIC secretary thanked the hosts, the Department of Animal Husbandry, Dairy and Fisheries, Indian Ministry of Agriculture and the Indian National Fisheries Development Board, for their generous support and excellent facilitation of the Fifth RCFM. The secretary also thanked Mr Yugraj Yadava, BOBP-IGO, for his assistance to organization which contributed to the outcomes of the forum. He also thanked all the participants from APFIC member countries, other organizations and the private sector for their active participation in the meeting.

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## APPENDIX B – AGENDA

| OPENING AND PLENARY SESSION | |
|---|---|
| **Day 1** | **19 June 2014** |
| **08.00–09.00** | **Registration** |
| **09.00–10.15** | **Opening Ceremony**<br>– Welcome remarks by the APFIC Chairman, Department of Animal Husbandry, Dairy and Fisheries, Ministry of Agriculture<br>– Address by the representative of the Assistant Director-General, FAO Fisheries Department |
| **10.15–10.45** | **Keynote address: "Blue growth for the future responsible management of fisheries and aquaculture in the Asia-Pacific"**<br>*Doris Soto, Fisheries and Aquaculture Department, FAO, Rome* |
| **10.45–11.15** | **Morning tea/coffee** |
| **11.15–11.30** | **Forum arrangements**<br>*Presentation by the APFIC Secretary*<br>*Group photo* |
| **11.30–12.00** | **Regional overview of fisheries in the subregions of Asia (2014)**<br>*Simon Funge-Smith, APFIC Secretariat, FAO Regional Office for Asia and the Pacific*<br>*Covers resource assessments, status and trends in fisheries of the region* |
| **12.00–12.30** | **Status and trends of aquaculture in the subregions of Asia (2014)**<br>*Weimin Miao, APFIC Secretariat, FAO Regional Office for Asia and the Pacific* |
| **12.30–14.00** | **Lunch** |
| **FISHERIES SESSION**<br>**Parallel Session 1 – Lessons learned and future directions of the marine environmental and fisheries initiatives in the Asia region** | |
| **Day 1** | **19 June 2014** |
| **14.00–14.30** | **Improving the management of trawl fisheries (SEAFDEC/REBYC II)**<br>*Rick Gregory & Isara Chanrachkij, SEAFDEC/REBYC II progress country successes – Improving management, reducing bycatch* |
| **14.30–15.00** | **The APFIC regional guidelines on trawl management**<br>*Simon Funge-Smith, Secretary, Asia-Pacific Fishery Commission* |
| **15.00–15.30** | **Development of the essential EEAFM training course**<br>*Rudi Hermes, Bay of Bengal Large Marine Ecosystem Project BOBLME, NOAA Coral Triangle Support Project* |
| **15.30–16.00** | **Afternoon tea/coffee** |
| **16.00–16.30** | **Fishery governance & IUU in the ATSEA region**<br>*Tonny Wagey, UNDP/GEF Arafura and Timor Seas Ecosystem Action (ATSEA) Program* |
| **16.30–17.00** | **Improving the management of the BOBLME: the essentials for ecosystem approach to fisheries management training; and ecosystem characterization tools**<br>*Rudi Hermes, Bay of Bengal Large Marine Ecosystem (BOBLME) Project* |

| Day 2 | 20 June 2014 |
|---|---|
| **09.00–09.30** | **Coastal fisheries governance, safety at sea and comanagement**<br>*Yugraj Yadava, BOBP-IGO* |
| **09.30–10.00** | **Governance of small-scale fisheries in the Asia-Pacific region: the Role of FAO-SSF Guidelines (Chairperson's text) from a CSO perspective.**<br>*Sebastian Matthew, International Collective in Support of Fishworkers (ICSF)* |
| **10.00–10.30** | **Knowledge management business model to scale up investments in sustainable development of LMEs and their coasts and experiences of ICM in fisheries in East Asia**<br>*Nancy Bermas, PEMSEA* |
| **10.30–11.00** | **Morning tea/coffee** |
| **11.00–11.30** | **Linking investment to improved fishery practices**<br>*Duncan Leadbitter* |
| **11.30–12.00** | **WWF Coral triangle program: Securing sustainable futures**<br>*Jose Ingles, WWF Coral Triangle Program* |
| **12.00–12.30** | **Progress developing the Fair Trade standard for fisheries products**<br>*Ashley Apel, Fair Trade USA* |
| **12.30–13.00** | **General discussion** |
| **13.00–14.30** | **Lunch** |
| **14.30–15.00** | **South China Sea SAP implementation project/spatial management to reduce environmental impacts**<br>*Jerker Tamelander, UNEP* |
| **15.00–15.30** | **SEAFDEC/SIDA Marine management areas programme**<br>*SEAFDEC SIDA Programme* |
| **15.30–16.00** | **Sulu-Celebes SME – a new marine programme for management of small pelagic fisheries**<br>*Noel Barut, BFAR/SCSSME* |
| **16.00–16.30** | **Afternoon tea/coffee** |
| **16.30–17.00** | **WorldFish initiatives on fisheries and the environment**<br>*Len Garces, WorldFish* |
| **17.00–17.30** | **Capacity building needs in APFIC Region**<br>*E. Vivekanandan, Emeritus Scientist, Central Marine Fisheries Research Institute, Chennai* |
| | **Plenary discussion** |
| **Day 3** | **21 June 2014** |
| **09.00–09.45** | **Plenary Identification of regional opportunities and needs for capacity building**<br>Regional training courses; Capacity building for regional trainers Potential for harmonization of approaches; Strategies for institutionalization of regional or national training courses into regional training institutions |
| **09.45–10.30** | **Future direction and expected areas of work (to improve coordination/reduce overlap between projects and programmes)**<br>Identify areas of overlap and interest; improving communications; propose potential future cooperation; general networking |
| **10.30–11.00** | **Afternoon tea/coffee** |

# AQUACULTURE SESSION

**Parallel Session 2 – Promoting sustainable intensification of aquaculture for food and nutritional security in the Asia-Pacific region**

| **Day 1** | **19 June 2014** |
|---|---|
| **14.00–14.45** | **1A) Background – the need for sustainable intensification of aquaculture in the Asia-Pacific – and key issues to be addressed by the sector**<br>*Weimin Miao, FAO Regional Office for Asia and the Pacific*<br>**2A) Empowering aquaculture development in Asia – the need for a Global Aquaculture Advancement Programme**<br>*Doris Soto, Fisheries and Aquaculture Department, FAO, Rome* |
| **Session 2 – Theme 1** | **Improving control of aquaculture related biosecurity and transboundary/epizootic diseases** |
| **14.45–15.30** | **3A) Need for improved control of aquaculture related biosecurity and transboundary/ epizootic diseases: Lessons learnt from recently outbreak of AHPNS/EMS**<br>*Ed Leaño, NACA*<br>**4A) Strengthening national aquatic biosecurity control and animal disease surveillance and control system in Indonesia supported by FAO technical assistance**<br>*Maskur Maskur, Ministry of Marine Affairs and Fisheries* |
| **15.30–16.00** | **Coffee break** |
| **16.00–17.00** | **5A) Public-Private aquatic animal health management working group and its role to improve governance and management practices in ASEAN**<br>*Mr. Timothy Moore, ASEAN-MARKET Project, USAID*<br>**6A) Aquaculture biosecurity and animal health management – Indian experiences**<br>*Rajendran Kooloth Valappil, Central Institute of Fisheries Education (CIFE) ICAR, India*<br>**7A) How private sector aquatic animal health management services can support aquaculture development**<br>*Don Griffiths, Operations Director, FishVet Asia* |
| **17.00–17.30** | **Plenary discussion on key recommendations** |
| **Day 2** | **20 June 2014** |
| **Session 2 – Theme 2** | **Aquaculture products to meet the market requirements – what do we need to do to improve?** |
| **08.30–10.00** | **8A) Role of farmer organization facilitating aquaculture marketing in India**<br>*Nagesh Kumar Barik, Central Inland Fishereis Aquaculture, India*<br>**9A) Group certification of small aquaculture farmers facilitating marketing in Thailand**<br>*Ubolratana Suntornratana, Department of Fisheries, Thailand*<br>**10A) Promotion of national standard on good aquaculture practices (GAP) in Thailand**<br>*Ubolratana Suntornratana, Department of Fisheries, Thailand (TBC)*<br>**11A) Promotion of national standard on good aquaculture practices (GAP) in Viet Nam**<br>*Department of Aquaculture, MARD, Viet Nam (TBC)*<br>**12A) Promotion of ASEAN standard on good aquaculture practices facilitating regional and international trade of aquaculture products**<br>ASEAN-Australia Development Cooperation Programme (AADCP), Department of Fisheries, Thailand |
| **10.00–10.30** | **Plenary discussion on key recommendations** |
| **10.30–11.00** | **Coffee break** |

| Session 2 – Theme 3 | Improvement of aquaculture governance and management practices |
|---|---|
| **11.00–12.30** | **13A) Dysfunctional aquaculture policy, planning and practice in ASEAN: Impacts on investment outcomes and suggested pathways to sustainability by 2023**<br>*Anthony Emms, USSEC*<br>**14A) Strengthening aquaculture governance and planning in China (aquaculture regulations, zoning and farm register/licensing etc.)**<br>*Wang Qingyin, Yellow Sea Fisheries Research Institute, Chinese Academy of Fishery Sciences*<br>**15A) Aquaculture zoning supported by spatial planning in Thailand**<br>*Pholphisin Suvanachai, DOF, Thailand*<br>**16A) Public-private partnerships in comanagement of aquaculture: Going truly zonal**<br>*Anton Immink, Sustainable fisheries Partnership SFP*<br>**17A) Introduction to Asian aquaculture planning and management toolkit**<br>*Weimin Miao, Aquaculture Officer, FAO Regional Office for Asia and the Pacific* |
| **12.30–13.00** | **Plenary discussion on key recommendations** |
| **13.00–14.00** | **Lunch break** |
| **Session 2 – Theme 4** | **Responsible aquaculture feed and seed production for sustainable intensification** |
| **14.00–15.30** | **18A) Challenges of fishmeal users in aquaculture feeds standards/certification deadlines**<br>*Andrew Jackson, IFFO*<br>**19A) Understanding the demand for small pelagic/low value-trash fish for fishmeal – moving towards sustainable and responsible supply**<br>*Duncan Leadbitter, Marine Change*<br>**20A) Endeavour of Thai feed manufacturers in producing responsible and cost-effective aqua-feed to support sustainable intensification of aquaculture in the region: Progress and major issues and participation of private aqua-feed sector Thai fishmeal dialogue**<br>*Pornsil Patchrintanakul, Thai Feed Mill Association*<br>**21A) Manufacturing and supplying responsible aquaculture feeds for farmers in India (1)**<br>*Amit Kumar Saraogi, Managing Director of Anmol Feeds Pvt Ltd, India* |
| **15.30–16.00** | **Coffee break** |
| **16.00–17.00** | **22A) Manufacturing and supplying responsible aquaculture feeds for farmers in India (2)**<br>*Amit Dubey Godrej Agrovet, Ltd, India*<br>**23A) Impact of genetic erosion of cultured species and approaches to address the issue**<br>*A. Ponniah, Central Institute of Brackish Water Aquaculture, Ministry of Agriculture, India*<br>**24A) Improving national aquaculture seed production system – Nepal TCP on carp seed quality**<br>*R. Mishra, Fisheries Development Programme, Nepal* |
| **17.00–17.30** | **Plenary discussion on key recommendations** |

| Day 3 | 21 June 2014 |
|---|---|
| **Session 2 – Theme 5** | **Increase resilience of small farm holders in Asia-Pacific** |
| **08.30–09.10** | **25A) Adaptation to climate change and extreme climate events**<br>*Doris Soto, Fisheries and Aquaculture Department, FAO*<br>**26A) Protecting the interest of small producers through sustainable and ethic trade of aquaculture products**<br>*Jesper Clausen, FAO Consultant* |
| **09.10–09.35** | **Plenary discussion on key recommendations for the Theme** |
| **09.35–10.30** | **27A) Plenary discussion – Roles of public and private sector in supporting the sustainable development of the aquaculture industry in Asia (who is doing what)** |
| **10.30–11.00** | **Afternoon tea/coffee** |
| **JOINT SESSION** | |
| **11.00–11.30** | **Presentation of the recommendations of the fisheries and environment theme**<br>**Session rapporteur** |
| **11.30–12.00** | **Presentation of the aquaculture sector public/private dialogue**<br>**Session rapporteur** |
| **12.00–12.30** | **General discussion** |
| **12.30–14.30** | **Lunch** |
| **14.30–15.30** | **Plenary discussion summary and recommendations for reporting to APFIC**<br>*Summary and recommendations for APFIC* |

# APPENDIX C – OPENING REMARKS

**Address on behalf of FAO**
**by**
**Mr Simon Funge-Smith**
**Secretary, Asia-Pacific Fishery Commission**

On behalf of Mr Hiroyuki Konuma, Assistant Director-General and Regional Representative, FAO Regional Office for Asia and the Pacific, Bangkok and Mr Arni Mathiesen, Assistant Director-General, Fisheries and Aquaculture Department, FAO, Rome

Dr Raja Sekhar Vundru, Joint Secretary (Fisheries), Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture
Mr M.V. Rao, Chief executive, Indian National Fisheries Development Board
Distinguished participants from APFIC member countries
Colleagues from regional and international partner Organizations, projects and programmes

On behalf of Mr Arni Mathiesen, Assistant Director-General of the Fisheries and Aquaculture Department and Mr Hiroyuki Konuma, Assistant Director-General and Regional Representative of the Regional Office for Asia and the Pacific of the Food and Agriculture Organization of the United Nations, I warmly welcome you all to this Fifth APFIC Regional Consultative Forum Meeting.

The implementation of responsible management and governance of fisheries worldwide, together with their sustainability, are of prime importance to FAO. Notwithstanding the numerous challenges faced in achieving these goals, they are indeed vital for the Asia-Pacific region in order to secure continued supplies of nutritious food from our oceans for present and future generations.

The deliberations in APFIC Sessions over the years, together with the outcome of the recent Session of the FAO Committee on Fisheries in Rome, clearly demonstrate that APFIC Members fully recognize the urgent need to improve the management of fisheries and aquaculture in line with the FAO Code of Conduct for Responsible Fisheries. Member States are well aware of the benefits which are brought about by strengthened governance, regional cooperation, unified strategies, policies and processes which underpin the management actions needed for sustainable fisheries management.

FAO is leading and participating in a number of global initiatives and processes which are intended to achieve the long-term conservation and sustainable use of living marine resources. Amongst these are, the Blue Growth Initiative, the Global Partnership for the Oceans, Rio +20, the Areas Beyond National Jurisdiction project, Climate Change Adaptation projects, Large Marine Ecosystem programmes, as well as a capacity development programme to assist countries in the combat of illegal, unreported and unregulated fishing (IUU) through the implementation of international instruments such as the 2009 FAO Agreement on Port State Measures.

The FAO has recently revisited its global strategic framework and has orientated its focus on the following five key objectives which all relate, in some way or other, to fisheries and aquaculture:

- To eradicate hunger, food insecurity and malnutrition
- Sustainable management of agriculture, forestry and fisheries
- To reduce rural poverty
- To build inclusive and efficient agricultural food systems and
- To increase livelihood resilience to threats and crises

In addressing these objectives, the FAO Fisheries and Aquaculture Department is endeavouring to strengthen cooperation with and amongst Member States, including through Regional Fishery Bodies, in order to develop sustainable practices, policies and legal frameworks, with a view to enhance governance, sustainable production, empowerment and organization of fisher and farmers groups. The Department firmly believes in the crucial role of Regional Fishery Management Organizations in promoting and overseeing the implementation of international fisheries instruments through regionally-agreed measures and the fostering of cooperation among their Contacting Parties.

Furthermore, FAO is also extending its reach to work with public and private sectors to address trade and product quality issues, market access for fishery products, as well as the reduction of losses and waste in the fishing industry. The threats of climate change on aquatic environments and resources, are also given due consideration by FAO and is working with Member States and international organizations on increasing resilience to disasters and crises in the fishery and aquaculture sectors.

This Regional Consultative Forum Meeting on "Responsible management of fisheries and aquaculture in the Asia-Pacific" provides an open platform for discussion and the opportunity to explore new and emerging ideas, issues and challenges related to fisheries and aquaculture. We trust that you will therefore have the opportunity and benefit of taking stock of the work of APFIC's Secretariat, its Member Countries and regional partners. The Fifth RCFM is an occasion for discussion on widespread topics of mutual interest to all who aspire to achieve responsible management of fisheries and aquaculture in the Asia-Pacific Region.

Immediately after this Meeting, the set of summary conclusions and recommendations emanating from your discussions will be put before the Thirty-third Session of the Asia-Pacific Fishery Commission, for its consideration. This is indeed an important step in synchronizing and integrating all the important work that is being undertaken in this vast region.

This valuable feedback loop between the Consultative Forum and the APFIC Session, not only sets the regional fisheries priorities agenda, but it also feeds into the FAO Regional Conference for the Asia-Pacific which now recognizes, that priorities established by APFIC can be presented for consideration as priorities for FAO's work in the Region. Therefore, your active participation, discussions and recommendations have far reaching implications for your own countries and the Region as a whole.

Such a forum presents an effective way in bringing Member States and their development partners in a priority setting process which is open, inclusive and which concurrently works towards concrete and achievable outcomes and strategies in support of responsible fisheries and aquaculture.

It is extremely encouraging to see so many of our Member Countries and regional partners participating here today – this is a clear indication of the importance you that you have attached to the Regional Consultative Forum Meeting and we are highly appreciative and thankful for your support and participation. We would like also to take this opportunity to thank the member countries, regional organization partners and all those who enthusiastically contributed to convening this meeting and the work of APFIC during this biennium.

On behalf of the Director-General of FAO, the Regional Office for Asia and the Pacific, FAO Fisheries Department and APFIC Secretariat, we would like to sincerely thank the Government of the Republic of India for hosting this event and for its generous support in convening this meeting.

We would also like to extend our thanks to you Mr Joint Secretary for honouring us with your presence for the opening of this meeting, and to your dedicated staff of the Ministry of Agriculture and the National Fisheries Development Board, who have been responsible for much of the meeting organization and which will surely contribute to a successful outcome.

Finally, I thank you, the participants for your participation and assistance in helping APFIC continue to perform its function as a regional fisheries and aquaculture advisory body owned by its members and dedicated to responsible fisheries and aquaculture in the region.

Thank you.

**Welcome Remarks**
**by**
**Mr Raja Sekhar Vundru, Joint Secretary (Fisheries)**
**Department of Animal Husbandry, Dairying and Fisheries**
**Ministry of Agriculture, Government of India**

Ms Doris Soto, FAO Fisheries and Aquaculture Department, Rome
Mr Simon Funge-Smith, Secretary of APFIC
Esteemed delegates from APFIC countries
Distinguished invitees, colleagues
Ladies and Gentlemen

It is my pleasure and proud privilege to extend our hearty greetings and warm welcome to you all on behalf of the Government of India and Department of Animal Husbandry, Dairying and Fisheries, for this Regional Consultative Forum Meeting (RCFM) of APFIC being conducted at Hyderabad – a heritage city having more than 400 years of history and famous for pearls, culinary, hospitality, Information technology, besides, scenic places with a pleasant climate.

I am honoured to be here amongst you all, the very important fisheries experts, policy makers of the some of the most important fisheries nations of Asia-Pacific, intellectuals etc. It is matter of pride and most appropriate to hold this type of consultative meeting in India, which actually ranks second both in global fish production and in aquaculture production. The importance of this forum meeting can hardly be over emphasized as fisheries and aquaculture makes multifarious contributions to food security, poverty alleviation, gainful employment, trade and overall improvement in the quality of life in developing countries. Fisheries and Aquaculture has a long history in Asia and is also linked to our heritage and culture although we are, of late, facing severe challenges in fisheries and aquaculture sustainability and its management.

At the outset, may I draw your kind attention to the fact that, of late, there is consistent decline in marine capture fisheries in many countries as fish stocks are either fully exploited or over exploited and depleting. Even the status of inland capture resources too does not offer much hope. While on the other hand, there is a rapidly growing demand for fish. Growing middle classes in the developing countries with increasing purchasing power and increased levels of awareness and demand for healthy nutritious food is a clear indicator of future trends. Therefore, the ultimate answer for meeting this demand lies in an increased fish production; or blue growth, an answer Asia recognized centuries ago through aquaculture, but the rest of the world is waking up now.

Fish, either produced through fish farming/aquaculture activity or caught from wild marine or freshwater stocks, is a primary source of protein and essential nutrients, and there is a growing recognition of its nutritional and health-promoting qualities. The contribution of fisheries and aquaculture to food security and nutrition is driven by many interactions between several environmental, development, policy and governance issues.

But, paradoxically, limited attention has been given so far to fish as a key element in food security and nutrition strategies at national level and in wider development discussions and interventions. It is of interest to note that specialist fisheries debates have concentrated predominantly on questions of biological sustainability and on the economic efficiency of fisheries, neglecting issues linked to their contribution to reducing hunger and malnutrition and to supporting livelihoods.

In the last three decades, farmed fish production through aquaculture has increased significantly at an average annual growth of over 8 percent, making it one of the fastest growing food production sector. It is now widely agreed that the future increase in demand for fish will have to be satisfied through

aquaculture. When the environment, production ecosystems and/or the resource bases (fish stocks) are degraded or overexploited, the capacities of the sector to deliver its food security and nutrition functions are limited or reduced. The sustainability of fisheries in their environmental and natural resource dimensions is therefore recognized to be an ultimate condition for food security and nutrition.

Small-scale fisheries account for 90 percent of fisher folk. Small-scale fisheries, as compared to larger scale fisheries, generally make broader direct and indirect contributions to food security. They also make affordable fish available and accessible to poor populations and are a key mean to sustain livelihoods of marginalized and vulnerable populations in developing countries. The importance of small-scale fisheries in terms of overall production and contribution to food security and nutrition is often underestimated or ignored. Catches from subsistence fishing are rarely included in national catch statistics. There is, however, sufficient evidence to support a focus on small-scale fisheries for food security and nutrition interventions in developing countries. It is heartening to note that FAO in its recently held COFI meeting has approved the voluntary guidelines for securing small scale fisheries, which is an important mile stone in development of small scale fisheries.

Climate change is an important challenge and already its impacts are visible in the fisheries sector, which will affect the production as well. Inland fisheries and aquaculture may face higher mortality due to heat waves, water scarcity and competition for water. Impacts of extreme events are increasing, with more risks of damage or loss of infrastructure and housing. Sea level rise might lead to the relocation of communities. We also have seen moving of fish stocks to meet the climate change challenges.

Fish and Fishery products are one of the most internationally traded food commodities. Seafood is a popular product that is tasty, nutritious and renewable and that can be marketed in number of ways. In 2012, international trade represented 37 percent of the total fish production, with a total export value of US$129 billion, of which US$70 billion from developing countries. As countries compete in the global economy, national and international policies and interventions have so far provided strong support to international fish trade, often giving little attention and support to regional and domestic fisheries trade.

We are all aware that malnutrition and hunger are the two important critical areas which require special attention of policy makers and developmental organizations. Sustainable development of fisheries and aquaculture resources are the key to achieve the objectives of food security in order to overcome these problems. Sustainable Development, a term coined by the Brundtland Commission in 1987 implies, "development that meets the needs of the present without compromising the ability of future generations to meet their own needs." Being a development practitioner in a large developing country like India, I know bringing a balance between the two is quite difficult, although not impossible. I understand that fisheries sector has established itself as a mass employer, especially in the developing countries. Presently, over 38 million people are engaged in marine capture fisheries and this employment has increased steadily from about 27 million in 1990s as depicted in the FAO's 2012 edition of the State of Fisheries and Aquaculture. This rising employment is possibly not only due to increase in population traditionally engaged in fisheries, but also due to migration from other sectors into the fisheries sector. Apart from this, a larger number of people, especially women, have also found employment both in upstream and downstream activities.

However, the price that we are paying to achieve this prosperity is quite significant. As we understand, major commercially exploited fish stocks are fully or over exploited. Whereas stocks available for further expansion of fishery are steadily going down. In search of fish, more and more fishers now cross coastal waters and many also venture in the high seas, much beyond the EEZ or their national boundaries. Therefore, sustainable development is challenging but not impossible to meet the two objectives, namely, fisheries conservation through increases in production and livelihoods protection. One way to balance these seemingly contradictory objectives is to reduce wastage in the sector. We are having an advantage here. The fisheries in the region are mostly operated in small-scale. They land nearly

everything they catch. However, we need to ensure that this practice is strengthened further. Secondly, we need to ensure that the fish landed remains in good condition by improving post-harvest practices. We also need to ensure that fish habitats remain in the best condition so that their productivity is not compromised.

For achieving sustainability, Sound environmental conservation and proper marine resources management are critical to address the challenges including overfishing and the loss of marine biodiversity. And this has to be effectively addressed through international and regional cooperation. Of late aquaculture has been graduating from mere food farming to a viable commercial activity. This is creating a paradigm shift in our aquaculture policies and practices. In this context, it is important that while looking for greater share in global trade in aquaculture and creating newer markets, we do not neglect the food and nutritional needs of our own populations. Our region with specific developmental perspectives should motivate us to balance fisheries trade and exports with the growing demand for food fish within our own countries. It is observed that focus and emphasis in global and regional fora has become restricted primarily to species which are internationally traded and are of commercial value in the markets of the developed world. While by itself it indicates the growing economic strength of aquaculture sector, it also lead to serious concerns that indigenous fish species, especially carps, which form nutritionally rich staple food of Asian population, are being neglected. It is an opportune moment for the leading aquaculture producing nations, all of which are developing nations and belong to our region to collectively address these issues.

Aquaculture now accounts for nearly 50 percent of the world's fish food production for human consumption. World capture fisheries production having remained almost stagnant over the past few years it is an admitted fact that entire fish food need in future would be supplied by aquaculture. Maintaining growth of aquaculture in a sustainable manner is therefore is a big challenge that we all must realise and face, more so in Asia-Pacific, which is also known 'cradle' of aquaculture. Sustainable growth of fisheries and aquaculture is possible only if the sector's socio-economic benefits accrue to a large social spectrum. The main challenge for policy makers and development agents is to maintain its growth while preserving the natural resource base and millions of livelihoods. We must recognize and acknowledge the fact that our fisheries and aquaculture are predominantly livelihood activities and are a long way from graduating to what is known as industrial fishing and aquaculture. Our region is home to the largest number of fishers and fish farmers, but is one of the lowest in productivity.

The environmental impacts of aquaculture development have received a high degree of attention in the past two decades, typically in cases where societal benefits were negatively affected by unregulated aquaculture development. With the increasing demand for products and services in a situation of diminishing land, water and feed resources, this attention is likely to become more pronounced in the coming decades. With weak or improper regulations for the allocation and use of natural resources, there is always a tendency for conflicts to emerge between resource users. However, we have witnessed that increasing public awareness and continued commercial necessity have led the aquaculture sector to reduce its environmental impacts and the governments are increasingly recognizing that aquaculture can yield broad societal benefits without concomitant environmental degradation. Aquaculture in many instances helps to reduce the negative impacts of effluents released by agricultural and sometimes even industrial operations. We need to effectively counter, both through words and action, the powerful adversarial positions some groups take on the environmental impacts of aquaculture. This too requires a collaborative and cooperative approach as environmental issues are transboundary in nature; we may not be able to address these individually.

It has been our common experience that increasing food fish exports are creating several problems associated with market requirements, and these problems are becoming more and more complex. In fact, we as producers and exporters are often at a receiving end of these requirements. More often than

not, we are left to individually comply with the frequently changing requirements and standards of importing entities. This creates trade barriers and puts pressure on our scarce national resources and on our small farmers. A common regional position on trade related issues is an option we must explore to sustain our growth. The core issue of the vast and diverse aquaculture of the region is the sustainability of supply to meet growing market demand and stringent market requirements besides sustaining livelihoods of millions of small-scale farmers. We would best address these issues if we collaborate and cooperate besides encasing the social capitalisation concept in our region. Instead of considering one another as competitors in the global trade, we need to join hands to create an environment of equity in global fish trade of which aquaculture has a lion's share and as admitted by each one of us its contribution to global trade is going to significantly increase in the future. Aquaculture development in the Asia-Pacific region is demonstrating an increasing number of successes and the sector has now bypassed capture fisheries production in most Asian nations. Let us use this opportunity to promote collaboration and evolve an action-oriented approach leading to establishment of regional goals and strategies for aquaculture development; and also assert our legitimate rights in global trade in aquatic products.

In India, Fisheries is an important economic activity and an engine of growth. The aquaculture sector together with inland fisheries development is emerging as a major development initiative. Inland fisheries and Aquaculture contributes over 5 million tonnes i.e. more than 50 percent to the total production of 9.51 million tonnes. The production from capture fisheries is stable while culture fisheries are growing at 6.0 percent. In addition, fisheries and aquaculture in India also contribute to foreign exchange earnings worth US$5 billion through exports. Being a country in possession of rich and varied aquaculture resources, India would like to join other nations in the region to play a lead role in aquaculture and fisheries and its sustainable development. As in the rest of the region, aquaculture in India is the avocation of small farmers with carps as the mainstay of production.

Ladies and Gentlemen, you are all aware that India being the second largest producer of fish and aquaculture products has always played and will play a proactive and responsible role in the sustainable management and development of fisheries and aquaculture. We expect that the regional community would recognize the uniqueness of small-scale fisheries and aquaculture in developing countries such as India and work towards its further growth and sustainability.

I thank you, and while wishing the RCFM a grand success. I once again welcome you all and wish the guests from abroad a very pleasant stay in Hyderabad and a safe return home.

Thank you.


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