RAP PUBLICATION 2009/13

FAO/APFIC/SEAFDEC

Workshop on assessment and management of the offshore resources of South and Southeast Asia

Bangkok, Thailand 17-19 June 2008

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC
BANGKOK, 2009

ISBN 978-92-5-106359-0

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For bibliographic purposes, please reference this publication as:

APFIC. 2009. Workshop on assessment and management of the offshore resources of South and Southeast Asia, 17–19 June 2008, Bangkok, Thailand. FAO Regional Office for Asia and the Pacific, Bangkok, Thailand. RAP Publication 2009/13, 37 pp.

FOREWORD

This Workshop was held to provide a regional review and synthesis of current knowledge on the status of offshore resources in South and Southeast Asia and to consider the technical and economic feasibility of developing new fishing activities directed to these resources. The workshop was organized in close cooperation with the Southeast Asian Fisheries Development Center's (SEAFDEC) programme on "Deep Sea Fisheries Resources Exploration in the Southeast Asia".

The workshop provided an excellent overview of the many exploratory fishing/research cruises that have been carried out in the region and identified the main potential species that may support commercial fishing. The overall conclusion, however, was that these resources are rather limited, and in the case of oceanic tuna, already heavily exploited. There are also a large number of technological, social and ecological constraints that make offshore fishing a high risk undertaking. Accordingly, the workshop recommended a precautionary approach to offshore fishing in South and Southeast Asia, starting with in-depth economic feasibility studies, risk assessments – especially with respect to impacts on existing fisheries and potential environmental concerns – and gradual development as more information and knowledge are accumulated. A need for better regional collaboration in carrying out and analyzing exploratory and research cruise data was noted.

In terms of future management, the role of the regional fishery management organizations for highly migratory species was acknowledged, but the lack of regional arrangements for other shared fish stocks was highlighted. The workshop recommendations provide a number of important actions that need to be followed if South and Southeast Asia are to benefit from the sustainable development of their offshore resources.

He Changchui
Assistant Director-General and
Regional Representative for Asia and the Pacific

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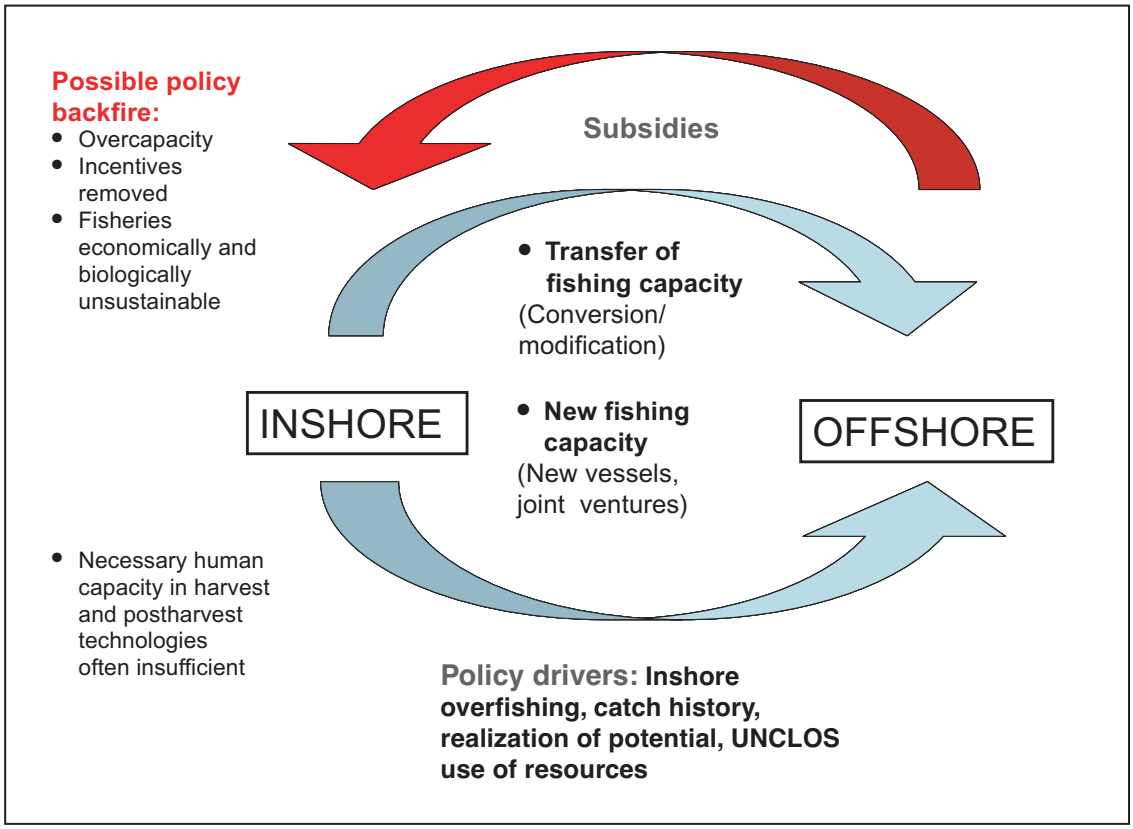
WORKSHOP CONCLUSIONS AND RECOMMENDATIONS

The countries of South and Southeast Asia all have policies to promote and expand fishing further offshore from their coasts. As shown in the diagram below, the main policy drivers are (i) overfishing in inshore areas, (ii) attempting to realize the potential of offshore fishing (iii), building up catch history records for subsequent negotiations in regional fisheries management organisations (RFMOs), and (iv) ensuring full utilization so that others cannot fish under the provisions of UN Convention on the Law of the Sea (UNCLOS). In some cases, the policy explicitly states that the move offshore is to transfer fishing from overexploited inshore areas to underexploited areas.

The push offshore will need a concerted effort and development of appropriate technologies and human capacity that make harvesting, processing and marketing these resources effective, efficient and environmentally responsible. Governments are providing a number of incentives to facilitate this move (see diagram).



Whilst it is known that there are resources which could be exploited in the offshore waters of South and Southeast Asia, including tunas, small pelagic resources, oceanic squid and some economically important demersal species such as snapper and grouper and deep-sea shrimp, the extent of the potential is not known as exploratory fishing and technology advances are still being made. However, the indications are that these resources are limited and, in the case of the oceanic tuna, already heavily fished in both the Pacific and the Indian Ocean.

There is some concern that the policy to move offshore could backfire if not managed effectively and overall fishing capacity could increase even further. Attention will need to given to what could happen if the incentives are removed, the potential has been overestimated, and the costs of fishing in the offshore are too high relative to the revenue gained (see diagram above).

A precautionary approach, therefore, should be adopted to the development of these fisheries. A strategic vision and goals, shared by all key stakeholders, should be developed, based on initial analyses of available information on ecological, economic and social aspects. The number of vessels should be built up slowly as more information and data from the fishery and from research activities become available. The fishery development should be carefully monitored and the status of offshore fisheries at national and regional levels should be reviewed regularly, preferably yearly.

The development approach needs to be different for each resource between the countries, but the options for development approach are:

1. Joint ventures

- feasible, but can create problems, especially conflict with existing fishers
- does not transfer effort from inshore
- reversible if not successful

2. National development by an expansion of existing fleets offshore

- opportunity for fishermen and private sector within the country
- increased uptake can be facilitated through limited subsidies
- reduces effort in inshore waters

3. National development through building or acquiring new boats

- does not transfer effort from inshore
- difficult to reverse
- results in overall increase in fishing capacity

4. Regional development through bilateral or trilateral agreements among adjacent countries

- provides for cooperative development

In any of these approaches, there are a number of important challenges that have to be addressed before the full potential is realized. In the first instance, there are important information gaps on abundance, biology and distribution of the resources, and the economic feasibility and socio-economic impacts of exploiting them, particularly for demersal offshore species. Where fishing is taking place, there is little information on their operations, including catch, fishing gear and location of fishing. Other constraints include high investment costs, safety at sea issues, lack of appropriate technology for of handling and maintaining fish quality and possible environmental impacts that could curtail fishing.

Fisheries management will also need to be strengthened so that the pattern of “boom and bust” development that resulted in overfished inshore fisheries is not repeated in the offshore area. Key management issues are:

1. Illegal, unreported and unregulated (IUU) fishing is already a major constraint to sustainable development in many of the coastal fisheries of the region. This is also linked to limitations with monitoring, control and surveillance (MCS) programmes and other management controls. There is a high risk that this limited control will become even more overstretched as fishing capacity moves offshore, leading to increased IUU activity and subsequent undermining of sustainable management objectives.

2. Some of the offshore resources of the region, especially the highly migratory species like tunas, are being exploited by countries both from within the region as well as from outside the region. Likewise, competition exists for the same resources between countries in the region as well as between small-scale and large-scale fishing boats within the countries.

3. The current de-facto open access system has resulted in overfishing and overcapitalization that would be better managed through a limited access or rights based systems.
4. In some countries, the current system of collecting and using fishery information is unsatisfactory and its uptake by policy makers and fishery managers is weak.
5. Societal benefits and returns from offshore fishing are generally uncertain and but could be improved through better post-harvest practices and marketing.

WORKSHOP RECOMMENDATIONS

Improving information

- To address the information gaps, it was considered that (i) compiling a full list of surveys carried out in the region and (ii) sharing information (taking into account confidentiality issues) among countries, and (iii) conducting regional collaborative analyses of existing data through extensions of regional databases such as TRAWLBASE[1] would be very useful. Good information is available in some countries e.g. India, that could be used to build a better regional picture.
- Noting that an enormous amount of information already exists (exploratory fishing, assessment surveys, past joint ventures and current fishing), existing information should be compiled and made available in a form that is useful for planning and management.
- Information and expertise on technology development should be shared among countries in the region.
- Exploratory surveys to find new resources involving new technologies to harvest and preserve fish quality should be conducted in the offshore areas both nationally and with regional coordination.
- Regular monitoring of the status of the resources, through standardized surveys techniques should be conducted along with regular analyses of catch and effort statistics.

Addressing the challenges

- Countries to initiate desk studies to evaluate the social and economic potential of selected offshore resources.
- Based on the regional consultations on offshore fishing, any fishery development should be accompanied by strengthening responsible fishing technology and practices as well as the fish handling and post-harvest capacity.
- Where social and economic benefits of fishing can be demonstrated countries should proceed to pilot scale fisheries projects, based on sound planning and a vision for the fishery.
- Returns to fishing and livelihood of fishers should be improved by reducing post-harvest losses and increasing of fish quality to meet market requirements.
- Recognising that a move offshore will require new skills, there is a need to increase technical skills from of all involved right from harvesting through to market.
- Safety at sea should be improved with adoption of safer vessels, technologies and human capacity building.

[1] TRAWLBASE was an ADB-funded project, coordinated by the WorldFish Center, that brought together time series data from a number of trawl surveys conducted by several countries in the Asian region.

Improving fisheries management

- Countries must engage in developing national strategies for the sustainable utilization of offshore resources, including future vision for offshore fisheries and objectives shared by the key stakeholders. This will be based on the best available knowledge, and include costs, opportunities and risks.
- The entire system of fishery information collection, dissemination and its use will, in many cases, need to be revamped to include offshore fisheries. This may require the blending of indigenous and scientific knowledge and the development of appropriate information products for decision making at different levels.
- Access rights to offshore resources will need to be determined to ensure proper resource management and equitable distribution of resources. In the offshore EEZ this will be between fisher groups within the country (especially small-scale and large-scale units), noting that RFMOs may also allocate rights under certain circumstances. On the high seas, this will be between (i) coastal States within the region, and (ii) between coastal States in the region and those from outside the region.
- Fisheries management at the national level requires the development of an adaptive co-management system with strong participation from relevant stakeholders and the development of appropriate structures at all levels backed by suitable legislation.
- Developing coastal States in the region need to strengthen their negotiations with distant water fishing nations and with other coastal States to improve their access to highly migratory and shared fish stocks.
- Where unknown, shared demersal stocks in the region and the relevant States and stakeholders involved in their management need to be identified. Where appropriate, States and regional bodies should form fishery management arrangements that will guide the future management of shared stocks.
- Regional cooperation needs to be strengthened to ensure that the national management systems are effective and do not clash with those of other nations.

OPENING OF THE WORKSHOP

Mr Sanchai Tantawanit on behalf of the Department of Fisheries Thailand, welcomed the participants and expressed his appreciation to FAO, SEAFDEC and APFIC for organizing the workshop on "Assessing and managing offshore resources in South and Southeast Asia". Because all countries in the region are pursuing policies to exploit their offshore resources, he considered the workshop to be very timely. He also noted that some countries are attempting to relieve the pressure on inshore fisheries by transferring fishing pressure further offshore. Promising opportunities to develop offshore fisheries exist but he cautioned the need to take into account resource abundance, economic feasibility, and appropriate technology. He stressed the need for effective management so as not to repeat experience of mismanagement that occurred in inshore fisheries. He warned that exploiting the offshore resources should not cause an increase in overall fishing capacity. He expressed the wish that the workshop should guide the future development in a sustainable manner. He wished participants a fruitful workshop and encouraged them all to participate actively and officially opened the workshop.

Mr Siri Ekmaharaj, Secretary General of the Southeast Asian Fisheries Development Centers (SEAFDEC) while welcoming the participants to the workshop, explained that SEAFDEC has been promoting the fishery potential in the Southeast Asia region by providing technical advice and information to member countries for over 40 years. More recently, however, SEAFDEC is also acting as fishery policy forum. He noted that international organizations have expressed concerns about unsustainable fishing in the region and the need for improvement in fishery management. Echoing these international concerns, countries in Southeast Asia have discussed how to improve fisheries management and have formed a Regional Advisory Committee (RAC) at the 40th SEAFDEC Council.

In responding to the challenges in providing better management, he noted the need for awareness building on sustainable management based on the best available information. In supporting the workshop, SEAFDEC would like explore ways for countries to consider effective management for promoting sustainable offshore fisheries. He concluded by noting that he looked forward to concrete and specific recommendations that will help countries with their offshore management policies.

Mr Simon Funge-Smith, Secretary of the Asia-Pacific Fishery Commission (APFIC) and also representing the FAO Regional Office for Asia and the Pacific welcomed all the participants to the workshop. In providing background to the workshop he described the unprecedented growth and huge expansion of fisheries in Asia, especially of trawlers, that was largely unregulated and has resulted in sequential overexploitation of fish stocks and widespread overfishing.

He noted that there has been a significant global shift of fishing effort into the tropical offshore fisheries, in pursuit of tunas and even across oceans from one side of the Pacific to the other and into the Indian Ocean as fleets shift their attention to less exploited stocks. Overcapacity, declining catch, spiralling fuel price and increasing conflicts between larger operators such as trawlers and the small-scale sector is placing pressure on governments to relieve poverty and resolve the crisis in coastal and near-shore fisheries. He noted that several temporary measures were being put in place in an attempt to resolve the crisis, including subsidies and looking to move part of the nations fishing capacity away from the coastal area. This is being driven by a number of factors, including the assumption that there are abundant fish resources away from the coast that remain open for exploitation, the perception that other fishing nations are already exploiting these resources and this represents a lost opportunity to the country. He concluded by noting that the outcomes of the workshop will be communicated into other fora and disseminated within the region to promote awareness as to the potentials and problems of fisheries expansion. He welcomed the participants to the regional workshop and thanked FAO's partners SEAFDEC for their excellent preparations and hosting arrangements.

The three opening addresses are included in **Annex 1**.

ELECTION OF CHAIR AND RAPPORTEUR

Mr Johnathan Dickson was elected chair and Dr M.E. John co-chair. Two rapporteurs were also elected – Ahmad Adnan bin Nuruddin from Malaysia and Smith Thummachua from Thailand, who reported on their perceptions on the workshop each day. The agenda of the workshop is at Annex 2 and the list of participants at Annex 3.

INTRODUCTION TO THE WORKSHOP OBJECTIVES

In introducing the workshop Ms Gabriella Bianchi (FAO) provided a brief overview of the status and development of marine capture fisheries worldwide. While global landings have been stable for the past 20 years, fluctuating around 80 million tonnes, this stability may be the result of a dynamic situation in the fisheries where as stocks become overexploited, new resources and fishing grounds compensate for the loss in catches due to overexploitation, i.e. there is succession in catch composition. In fact, there is an increase in the percentage of stocks that are fully exploited, overexploited/depleted, while the percentage of the underexploited/moderately exploited stocks is decreasing, which may be an indication of this succession.

Despite stagnation in landings overall, both tunas and deep-sea fisheries have been showing a steady increase globally. Their growing importance is also demonstrated by analyses showing decreasing average depth of catches, as observed in the Indian and the Central Pacific Oceans.

The history of fishing is characterized by an opportunistic behaviour of the fleets. As stocks became overexploited, capacity moved to new resources/fishing areas. Exploitation of new resources usually stimulates overcapitalization, with subsequent overexploitation and depletion. This situation has often been exacerbated by provision of subsidies. Despite its obvious limitations, this pattern is still dominant in many fisheries today. The observed expansion of the fisheries in South and Southeast Asian countries towards the offshore areas, mainly for tunas but also for valuable deep-water demersal species, poses even greater challenges as compared to that experienced in shallower waters. In fact, most species have low productivity, they are often associated to vulnerable marine habitats; they are difficult to monitor (leading to IUU); they are difficult to study/assess and require greater technological effort and investment.

The workshop aims were introduced, the main being creating awareness in South and Southeast Asian countries of the environmental, technological and economic challenges of offshore fisheries, as a basis for their sustainable management. To achieve this objective, the workshop would consider 4 main themes:

1. Status and potential of offshore fishing in Asia
2. Technological challenges, socio-economic benefits and costs of offshore fishing in Asia
3. Sustainable development, management and the precautionary approach
4. Local, country and regional actions.

Other aspects of the workshop were also considered, including the organization of the workshop into sessions for themes 1 to 3, covering invited technical presentations, country papers and posters and working group discussions, and with. A fourth session envisaging working groups discussions was planned to elaborate responses to a number of key issues:

- Status and potential of offshore fishing
- Technological challenges and socio-economic benefits
- Management for sustainable development.

THEME I: STATUS AND POTENTIAL OF OFFSHORE FISHING IN ASIA

Overview of status and potential of offshore fishing in South and Southeast Asia
Derek Staples (FAO consultant) and Gabriella Bianchi (FAO)

Mr Derek Staples made a presentation based on the information contained in the national papers prepared by the countries in preparation for the workshop. His paper first covered a summary of the physical characteristics of the region's offshore area[2], the size of the country's exclusive economic zones (EEZs) and the characteristic of continental shelves and offshore areas. He described the gross bathymetry of the region based on the position of the tectonic plates of the area – the Philippine plate, the Indo-Chinese plate and the large Indo-Australian plate. Areas where these plates abut are characterized by deep trenches and numerous sea mounts. He noted that much of Southeast Asia's seas are covered by the respective country's EEZs and that high seas areas were largely confined to the Pacific and Indian Ocean. Furthermore, management of the offshore areas in the EEZs in most countries was the responsibility of the respective central governments, while highly migratory tuna stocks were managed by two Regional Fisheries Management Organizations – the Indian Ocean Tuna Commission (IOTC) and the Western Central Pacific Fisheries Commission (WCPFC).

In reviewing the results of the many research surveys and exploratory fishing surveys carried out in the region, he noted that although it is known that there are offshore resources which could be exploited in the region, including tunas, small pelagic resources, oceanic squid and some economically important demersal species such as snappers/groupers and deep-sea shrimp, the extent of the potential is not known. However, the indications are that these resources are limited and, in the case of the oceanic tuna, already heavily fished in both the Pacific and the Indian Ocean.

Currently fishing in offshore areas is a result of either expansion of existing fisheries moving further offshore or development of new fishing capacity by either joint ventures or the building and acquiring of new boats. Fishing for pelagic species, especially oceanic tuna, is much more widespread that fishing for demersal species. He emphasized that much of the current fishing is taking place using relatively small-scale vessels and that in many countries this involves a large number of fishers and associate fishworkers. He then gave a brief outline of the constraints that were discussed in greater detail in the rest of the workshop.

Country statements on status and potential of offshore fisheries

Participants from the different countries at the workshop provided summaries of the status and potential of offshore fisheries in their countries and the challenges of their sustainable management.

Brunei Darussalam

In line with the national economic policy to diversify the economy away from oil and gas, offshore fishing is considered to be one of the new contributors to GDP. Brunei manages its fisheries using 4 zones – the offshore zone ranges from 45-200 nm that covers 75 percent of the country's EEZ of 38 600 km^2. Deep-waters are defined as those <3 000 m.

During the 1980s and 1990s there were extensive research surveys and more recent surveys have been carried out using the *MV SEAFDEC 2* and the national research vessel. The potential yield has been calculated as 1 200 tonnes, mainly large oceanic tunas. Currently there are no vessels operating

[2] For the purpose of the workshop, offshore was defined as waters deeper than 100 m, i.e. the outer continental shelf, the slope and deep-sea areas of country's EEZ as well as the high seas. During the workshop, it was noted that different countries had different definitions for their offshore areas, some based on distance offshore, making comparisons among countries difficult.

in zone 4 but fishing in the next zone inshore for skipjack fishing is occurring. IUU is an issue and a national plan of action (NPOA) has been prepared. Joint ventures are welcome and tax exemptions are available to encourage participation. Port facilities and basic infrastructure (fish landing complex, cold storage and market facilities) are being upgraded to encourage future offshore fishing.

India

The Indian Exclusive Economic Zone covers an area of 2.02 million km^2, out of which 1.63 million km^2 falls in the offshore (>100 m) sector. The annual fish production from the EEZ is of the order of 2.9 million tonnes. While the resources in the inshore segment (<100 m) are more or less fully utilized, the production from the offshore area is rather limited. The estimated potential yield from the offshore areas is 635 000 tonnes, comprising of 39 percent large pelagics, 25 percent small pelagics and 36 percent demersal resources.

The current fishing policy is oriented to promote exploitation of the deep-sea/oceanic resources through introduction of resource specific vessels and also conversion of trawlers for tuna longline fishing for which a subsidy scheme is in place. Resources surveys are being undertaken on a continuous basis, presently with greater focus on deep-sea and oceanic resources. MSY from the EEZ is estimated to be 3.92 million tonnes out of which about 16.2 percent is from the offshore region. Recent surveys indicate decline in the CPUE of demersal species. Through successive policy initiatives, the government had permitted operation of a limited number of vessels of foreign origin in Indian waters by chartering, joint ventures, leasing etc. Tuna longlining and deep-sea trawling were the harvesting methods practiced under these schemes.

The present fishing policy permits import of resource specific fishing vessels by Indian enterprises under LOP scheme. The major components of the current commercial fishery include about 40 Indian deep-sea vessels fishing for demersal resources, particularly shrimps; 20 large trawlers and several mechanized boats, converted as longliners, fishing for tunas and 92 vessels (71 longliners and 21 others) permitted under the LOP scheme. Tuna longlining is the thrust area of commercial fishing and during the year 2006-2007 about 24 000 tonnes of tuna products were exported. With due consideration to the fishery potential in the offshore/oceanic areas, it is proposed to build up a fishing fleet of 725 vessels of >20 m OAL in a phased manner, which will include tuna longliners, purse-seiners, mid-water trawlers and squid jiggers. The subsidy for conversion of vessels for tuna fishing which has already been given to about 100 units and approved for another 265 boats will continue. Though tuna is the principal target resource for expansion, the oceanic squid could be another candidate stock for which further R&D efforts are required.

Indonesia

In Indonesia offshore fishing is being promoted in order to reduce fishing capacity within 12 nautical miles, with incentives including of subsidized diesel fuel price (maximum of 25 KL/month) for Indonesian fishing vessels being given. The policy is to control offshore fishing through licenses and joint ventures are allowed. More than 1 422 longliners fish for tuna in the Indonesia EEZ and also 399 purse seiners and 64 fish trawlers. All vessels above 30 GT (catcher and carrier) need to obtain licenses from the Central Government.

Based on exploratory surveys and experience in fishing, Indonesia considers that the potential yield of large pelagics is rather limited. Surveys have shown decreasing catch rates of oceanic tunas and, increasingly, smaller fish are being caught. Where this is occurring (decreasing catch rate, smaller size of fish caught and longer distance of fishing ground), licenses to fish in the offshore area are being limited on the basis of its fish resource availability. Vessels under joint venture are only permitted to fish in Indonesian EEZ waters of South China Sea, Indian and Pacific Ocean, and Arafura Sea, where the catches shall be reported at the Indonesian territories and fish processed at the fish

processing industry factories in Indonesia. Information about the demersal resources is limited but there has been recent deep-sea surveys conducted in cooperation with the Japanese Deep-Sea Trawl Association and an economic feasibility trial has been conducted.

Future plans for expansion into offshore waters include (1) to consider the request of the purse seiners to convert to longliners to fish in offshore area (Indian and Pacific Oceans); (2) to limit fishing aggregating device (FAD) application in order to avoid FAD as fish migration barrier; and (3) to obligate fish catches from catcher and/or fish carrier vessel of the Integrated Fishing-based Fisheries Industry to be processed at fish processing facilities in Indonesia.

Malaysia

Malaysia also has a policy to encourage deep-sea fishing. To promote this, a moratorium on licenses in coastal waters has been established and there are attempts to reduce fishing vessels in inshore waters. Inshore fishers are being offered offshore licenses or other activities including aquaculture to facilitate the reduction. Diesel subsidies and new ports are being developed to encourage offshore fish through improved handling and processing of fish.

In Malaysia, fishing zones are based on distance from shore and the deep-sea is defined as water greater than 30 nm offshore. Catch statistics also based on these zones, making it difficult to calculate statistic based on the workshop definition of offshore (approximated by adding deep-water with the next inshore zone). The total EEZ is 515 000 nm^2. Waters deeper than 100 m depth are mainly found off the state Sarawak and a small strip in Sabah.

Research surveys were carried out in 1986/87 and 1997/98 and 2004/05 – the density of demersal fish (including trash) range from 3.7 to 4.9 tonnes per nm^2. The *R/V SEAFDEC 2* in 2005 also carried out surveys that showed that the catch rates was greater at depths of 175 m compared with 135 m. The current catch from offshore waters is 75 000 tonnes (45 000 offshore demersals, 5 000 from reefs and rough ground, 25 000 small pelagics) but the potential yield has been estimated as 542 000 tonnes (79 000 for offshore demersals, 28 000 for reefs and rough ground, 340 000 for small pelagic, 25 000 for oceanic tuna and 70 000 for leatherjackets). The target is to increase the production to 380 000 tonnes by 2010, but fishers are not taking up the challenge.

Licenses have been given to 836 deep-sea fishing vessels >70 GRT, both trawlers and purse seiners. The main constraints to offshore expansion are seen to be – manpower, IUU, rising fuel prices and lack of expertise and equipment. Future plans include 281 new permits.

Maldives

In the Maldives, the main policy is to diversify fisheries to reduce stress on reef fisheries, which support most of the current fishing activities, to develop the longline fishery and promote multi-day fishing vessels. Currently 40 joint venture vessels are fishing in offshore areas but this number will decrease with increasing number of national vessels. Incentives include long-term lease of longline vessels and multi-day and a temporary fuel subsidy programme.

An exploratory survey to assess resources of both surface and deep swimming tunas was carried out in the offshore waters in 1987 with the use of longlining gear at depths from 30-100 m. Catch composition of this survey showed abundance of sharks, skipjack tuna, billfish and yellowfin tuna. A reef resources survey carried out around the same time period also used longlines in the waters outside the atolls, up to depths of 210 m. Catch from this was composed of snappers, groupers, emperors as well as jacks. In 2007, few grouper fishermen carried out experimental longlining for the giant grouper from the outer reef rim of atolls to depths of approximately 300 m.

Future plans for expansion into offshore waters include programmes to provide multi-day fishing vessels on a long term lease, projects on construction of longline fishing vessels and training of master fishermen, expanded fishing zones exclusive to Maldivian fishers, as well as the formulation of a guideline for safer and stable fishing vessels that can operate further away from shore.

Myanmar

In Myanmar , offshore fisheries are defined as areas outside of 5 nm from Rakhine coast and 10 nm from Ayeyarwady and Tanintharyi coast. These “offshore” fisheries typically have vessels more than thirty-feet in overall length and engine power more than 12 HP. In a 486 000 km^2 EEZ, the total MSY has been calculated as 1.05 million tonnes. Joint ventures are allowed to fish from the territorial line to EEZ border.

Joint surveys have been carried out by *R/V SEFDEC 2*. Large pelagic fishes are assessed as underexploited in Andaman Sea. Swordfish was a dominant species and can be considered as commercial species in the future and also taken were thresher shark, sail fish, and rays. Deep-sea squid (purpleback flying squid and flying squid) is also seen as a potential new resource. Other potential resources include deep-sea lobster and deep-sea fish. In the surveys, the dominat species were lizard fish, squid, goat fish and bigeye.

Longlining started in the Myanmar EEZ with the issuing of experimental licenses to 12 freezer vessels in 1999-2000. Initially the catch rates were good and in 2001-2002 the number of licensed vessels rose to 110. Tuna are currently being taken by joint venture longliners operated by 2 companies and 48 vessels in 2007-2008. The main constraints are seen to be lack of shore facilities, infrastructure and technologies for fishing vessels and fishing gear.

Pakistan

As with several counties in the region, the marine waters in Pakistan are zoned. Zone 3 is beyond 35 nm out to 220 nm. The overall biomass of the EEZ has been estimated as 11 million tonnes with a MSY 5.71 million tonnes. A number of surveys were carried out from 1960s up until 1980s, but there have been no surveys recently. There have been joint ventures since 1979, but vessels encroached onto shelf and caused conflicts with local fishers and were stopped in 1994. There is only limited potential for tuna and other tuna-like fish in the Pakistan EEZ. The demersal resources also show signs of being well developed and only a limited expansion is possible. The major portion that is available is off the Balochistan coast where the continental shelf extends less than 35 nm offshore. The potential yield in waters <35 nm has been estimated at 16 000 tonnes.

Most fishing now is by small-scale artisanal boats. Lack of modern facilities, limited size of boats (only 4-5 large vessels), poor post-harvest technology, unfriendly gears are all seen as constraints. Pakistan is currently modernizing 200 of the 1 000 fishing boats with modern facilities for handling and improving quality of fish.

Philippines

The EEZ of the Philippines is 2 200 000 km^2 with an offshore area of 2 015 400 km^2. There has been a long history of research surveys, dating back as early as 1799. The most recent surveys have been carried out with the *MV SEAFDEC 2*. Main species caught were yellowfin and skipjack tuna as well as pelagic squid. Many resources and oceanic large pelagic, such as marlin, swordfish and sailfish are not considered fully exploited at the moment. Beam trawls and deep-sea traps have found encouraging catches of pandalid shrimp.

A total 6 363 licensed commercial vessels and around 400 vessels fishing have been provided with international fishing permits to fish in other EEZ, especially in PNG and Indonesia and in the Western

and Central Pacific Fisheries Commission area. The large commercial fishing boats mainly engage in purse seining. Major species include round scad, Indian sardines frigate tuna, skipjack and yellowfin tuna. Tuna also taken with small-scale artisanal boast, including dug-out bancas with outriggers, using troll lines and hook and lines and other wood or steel vessels with purse seine, ringnets, bagnets and tuna lonlines. In depths <100 m the main demersal species are groupers, bigeyes and snappers and are caught by hook and line, bottom set longline and traps.

Sri Lanka

The offshore area is 4 955 000 km^2 – 96 percent of the area of the EEZ. Under the framework of the "Mahinda Chinthanaya" the concept of His Excellency the President of Sri Lanka, the Ministry of Fisheries and Aquatic Resources has formulated a 10 year fisheries development plan for implementation during the period 2007-2016 based on the national fisheries and aquatic resources policy objectives. The plan envisages the increase in the total production of fish in sustainable manner by the end of plan. Although coastal fisheries will continue to make a considerable contribution to total fish production, they have serious limits to further expansion due to resource constraints. Therefore, the major contributions to the increase in production are expected from inland fisheries and aquaculture with a contribution from the high seas and offshore fisheries. The current offshore fishing policy is towards management of resources and reduction of post-harvest losses. In implementing the offshore fishing policy the government provides incentives to improve the facilities in the boats to preserve the catch and to minimize the post-harvest losses. Fishing is carried out by about 2 600 multi-day boats fishing with combined gillnets/longlines. Future plans include conversion of gillnet fishery to longline, improvements to existing multi-day boats and development of 100 harbours/ anchorages.

The maximum sustainable yield of the coastal marine resources has been estimated (based on the Dr Fridtjof Nansen surveys in 1979-1980) at about 250 000 tonnes, of which up to 170 000 tonnes are pelagic fish (small and medium-sized sardine, scad, mackerels, anchovies, seerfish and tunas) and up to 80 000 tonnes are demersal or semi-demersal fish (breams, snappers, groupers etc.).

Fisheries in offshore/deep-sea waters are supported by medium-sized and large pelagic species mainly tuna, and a range of deep-water commercial species. The MSY for these species has not been systematically estimated but the government has estimated the offshore resource potential at 150 000 tonnes. The total fish production is 102 560 tonnes. Observed catch levels and landings indicate that coastal fisheries are nearing their MSYs but expansion of offshore/deep-sea fisheries is feasible. However, there is an urgent need for a more scientific and reliable estimate of the possible catch from these waters and to install an effective monitoring system to ensure the sustainable use and protection of Sri Lanka's fish resources.

Thailand

There are 2 main fishing areas for Thai fishermen, the Gulf of Thailand and the Andaman Sea. The EEZ of Thailand covers 420 280 km^2: 304 000 km^2 in the Gulf of Thailand and 116 280 km^2 in the Andaman Sea. As the Gulf of Thailand is less than 100 m deep the fishing activities in this area can not be defined as an offshore fishery and the only offshore fishery of the country is in the Andaman Sea and some in the high seas. The offshore fishery policy is to promote responsible offshore fishery within Thai waters and high sea fishery with the view to reduce fishing pressure in the coastal areas and to utilize the opportunities in the offshore and high sea areas using incentives such as information on resources and tariff exemptions.

The surveys for pelagic and demersal resources have been conducted on the continental shelf of the Andaman sea, in depths of 100 to 1 350 m. The results indicate high abundance of demersal fish but limited abundance of tunas. The major pelagic resource was thresher shark. For demersal resources, the main fish were grouper, snapper and sea bream caught by bottom longline. Deep-sea trap catches are increasing.

The future plans for expansion into offshore waters are to continue resource surveys, establish a revolving fund, formulate and implement legislation for the management, produce database, improve fishing ports and their infrastructure, disseminate information to all concerned stakeholders and implement fleet development plan for tuna fisheries in the high sea.

Viet Nam

Viet Nam has an EEZ of 1 000 000 km^2. Its policy is to shift the fishing pressure from onshore to offshore waters. To do this existing boats will be converted and new boats built. Management power is also being decentralized to local governments and fishery co-management models applied in coastal areas. To facilitate the move, a number of subsidies including loans, oil supplements, tax cuts and insurances are being provided.

Gillnet and longline surveys have been carried out annually from 2000 to 2004 and bottom trawl surveys carried out in offshore water of the Southeast area in the period of 2000-2005. Acoustics surveys were implemented in 2003-2005 for stock assessment of the small pelagic fish. Most surveys showed a decrease trend in abundance of high valued fish species over the 5 year period although large pelagic species are still inadequately estimated.

Russian fishing vessels carried out fishing activity in Viet Nam waters during 1978-1986, Korean fishing boats fished in 1991. Results of these trail fishing indicated limited resources and fishing boats fished at the “break even” point. In 2006, there were about 20 800 offshore fishing boats, 1 670 tuna longliners and 921 boats equipped with >90 HP engine capacity. Average catch rates of most fishing fleets have been seriously declining over recent years. Future plans include encouraging fishing effort to shift to offshore waters in order to decrease fishing pressure in the inshore waters, reduce small boats fishing in inshore areas, investigate the marine resources in deep-sea areas, continental slopes and sea mountains and restructure the capture fisheries in a sustainable manner.

Results of experimental fishing in offshore resources in the region
Somboon Siriraksophon (SEAFDEC)

Mr Somboon presented results from a number of exploratory fishing cruises conducted by the *MV SEAFDEC* (super purse seiner) and *MV SEAFDEC 2* (trawler cum longliner) over the periods October 1993 to December 1999 and from January 2001 to February 2005. The status of tuna resources in the eastern Indian Ocean were described based on the 2001-2005 cruises. Tuna averaged 94 percent of the catch from 2001 to 2005, *viz:* frigate tuna, skipjack tuna, yellowfin tuna and bigeye tuna. Within the 6 percent by-catch, the dominant species was rainbow runner followed by trigger fish, unicorn leatherjacket, sharks, wahoo and common dolphin fish. Highest catch rates were recorded in the high sea area between 4°N-8°S and 86°E and 96°E, centered over the mid-Indian Ocean ridge.

Surveys for oceanic squid have also been conducted in the South China Sea using the *MV SEAFDEC 2*, covering the EEZs of western Philippines, Viet Nam, Malaysia (Sabah, Sarawak), and Brunei Darussalam in collaboration with the DA/BFAR, the training and research vessel of the Philippines. Oceanic squid were found in areas where the depth was greater than 150 m, especially on the outer shelf and continental slope areas. Although they were common and widely distributed in the region, current constraints to a viable industry include the technology of harvesting and processing. Automatic squid jigging may be the gear of future, although single lined jigging has been tried. Biomass of purple back squid in the South China Sea is estimated as 1.1 million tonnes.

The *MV SEAFDEC 2,* also surveyed large pelagic resources in the South China Sea, Sulu Sea and the Andaman Sea from 2004-2006, using pelagic longline (EEZs of Indonesia, Myanmar and Thailand, Brunei Darussalam, Malaysia (Sabah), Philippines and Viet Nam. The highest catch rate (15 percent), but lowest diversity of species was found in the Sulu Sea, but much of the catch was snake mackerel, a species of low commercial value. In the Andaman Sea, catch rates were lower but more commercial

species such as tuna and tuna-like species such as bigeye tuna, swordfish, sailfish, as well as rays and sharks. Along the east coast of Brunei Darussalam and the Sabah coast of Malaysia hook rates were variable but as in the Sulu Sea, a high percentage of snake mackerel were caught, as well as many lancet fish and only 10 percent were tuna or tuna-like species. Off Viet Nam, the most common catch was lancet fish and only about 20 percent were commercial species. Off the Philippines, like that of Brunei Darussalam and Sabah, about 80 percent of the catch was snake mackerel and lancet fish.

Survey data of the *MV SEAFDEC 2* using trawls mainly covers inshore waters on the continental shelf. On the continental slope between 150-250 m, because much of the area is un-trawlable, fishing with bottom longline was carried out. Highest catch rates were found off the Thailand/Malaysian coast in the Andaman Sea. Almost 44 percent of the catch were sharks and rays. However, many species were commercially important species such as snappers, groupers and threadfin breams were taken. In conclusion Mr Somboon highlighted the main potential resources that included:

- Purple backed flying squid in all deep-sea areas;
- Sword fish in Andaman Sea;
- Sickle pomfrets in Sulu Sea and West coast of Borneo;
- Snapper, groupers and bream on the continental slope, especially in Andaman Sea
- Snake mackerel in the Sulu Sea

He concluded by saying that there were many constraints, however, in both harvesting and post-harvesting will have to be overcome before these resources can be exploited effectively.

Plenary Discussion

In discussion, a number of questions were raised including (i) how other fishing activities by Distant Water Fishing Nations (DWFN) were taken into account (ii) what is the mandate of regional management in country's EEZs. In reply, IOTC noted that information of vessels of DWFN. Using another Commission as an example, it was also pointed out the RFMOs can set a Total Allowable Catch (TAC) and allocate a portion of that to members and DWFNs, regardless of whether they fish in the high seas or in EEZs.

There was concern about how developing countries gain access to large pelagic fish stocks if offshore fishery resources are limited. The need for developing countries to be involved with countries that are already exploiting the stocks was highlighted.

A distinction was made between exploratory fishing and assessment surveys and a question was raised as to how the information from exploratory surveys was being utilized. In response, it was stated that an overview of regional status is being attempted, but management issues are not yet addressed.

It was agreed that the country papers supplied very valuable information. The workshop was also informed that Bay of Bengal Initiative for Multi-Sectoral Technical and Economic Cooperation (BIMSTEC) is conducting research surveys in the Bay of Bengal. Attention was drawn to the results from Malaysia where biomass of fish seemed to increase with depth (i.e. catch rates were greater at depths of 175 m compared with 135 m), a trend not found in other surveys.

THEME II – TECHNOLOGICAL CHALLENGES, SOCIO-ECONOMIC BENEFITS AND COSTS OF OFFSHORE FISHING IN ASIA

Technological challenges associated with offshore fishing using case studies
Francis Chopin (FAO)

Mr Chopin highlighted the risks associated with offshore fishing. These may be broadly categorized as risks to (i) safety of the vessel and crew, (ii) the profitability of the operation, and (iii) the resources being harvested and the marine environment.

With respect to offshore pelagic resources, countries in the region are already developing the capability to harvest the large pelagic fish such as tuna. However, he contended that it is a high cost and high risk operation and is a not just an extension of inshore fishing. Operations need specialized knowledge and specialized fishing gears for different sized fish and species. For example, different species have different depths and temperature preferences and also undergo diel and lunar cycles of vertical migrations. Fishing success is also influenced by gyres and currents and considerable knowledge of ocean currents and conditions is needed. Fishing in offshore waters requires more skills in finding fish, ensuring safety, and finding markets. These types of operations need specialised winches, sensor for surface temperature, gear finding techniques, ship to shore communication, information on sea surface temperatures and good boat positioning gear.

Significant investments are required, and obtaining information concerning financial risks are important – both for harvesting and for markets. He pointed out that catching fish is only part of the overall scene and other considerations such as transportation to markets are also critical. In order to make the operation cost effective – questions such as what type of gear and vessels should be used, need to be asked. Small-scale longlines can catch fish close to shore but is it cost effective in an offshore setting? Also important to realize that tuna are widespread and not schooling, consequently hooking rate will be low.

In summary he raised the following considerations, including:

- if the stage of development is considered as low to emerging, then the opportunity should be considered as high risk;
- take a “cautious” approach to development
  - controlled access
  - pilot scale fisheries with clearly defined license conditions for participants (data reporting, by-catch, conservation)
  - attempt to reduce the unknowns;
- don’t compromise on safety;
- recognize that technology is a tool not a solution; and
- coastal states to prepare 5 year development plan for tuna fisheries.

Challenges related to post-harvest and market access issues
S. Subasinghe (INFOFISH) and Francisco Blaha (FAO)

Mr Subasinghe in introducing his topic, considered that the increased volume of fish harvested from open ocean areas is a result of technological developments from the 1950’s onward as well as the introduction of distant water fishing fleets. In the case of offshore fisheries, due to the distance of the fishing grounds from the shore facilities, offshore fleets have to have appropriate facilities to chill fish to ensure quality. Because both getting to the fishing grounds and back, and catch preservation consumes fuel, it is important to preserve the prime quality of the fish caught to get maximum income. Swift handling, hauling/processing and storage of the catch is thus of paramount importance. The first day is the critical time period and will determine the price of the fish. For tuna, spiking, gutting and bleeding and pre-cooling are all important.

Leaving fish in nets or on the line for a long time, especially in tropical waters, affects fish quality. Less soaking time of nets, minimal stress for fish and careful handling help to preserve quality. The chilling of fish immediately after harvesting is very important as the temperature during this critical period determines keeping quality of fish. If fish are iced or held in chilled seawater, periodical re-icing or change of water is important. For some high value specie, such as certain tunas, freezing at -6°C is recommended.

Modern day fish marketing has to face many challenges in accessing markets, especially major markets, taking note of growing consumer expectations in resource sustainability and environmental implications of fishing. Quality and safety, such as mercury and chemical contamination, are also constraints. Though tariffs on fish imports to major markets have gone down after WTO, market access has become difficult due to various more stringent technical barriers to trade. The image of offshore fishing is also tainted with IUU fishing, an area which RFMOs have increasingly focussed in recent times.

Assurance of fish safety needs the collective efforts of both the government sector and industry. Providing satisfactory shore based infrastructure including port facilities and a regulatory system catering for the requirements of the major markets call for significant public sector commitment. The competent authorities have a valuable role to play in this respect. In conclusion – know your product and the market.

Economics of offshore fishing
Rolf Willmann (FAO)

Mr Willmann first discussed the difficulty of defining offshore fishing and pointed out that this definition can differ among countries. He then looked at the economics of offshore fishing. One can look at economics from the point of view of individual fishing owners, or the country or the fishery as a whole. These can be at conflict and country economics can often override regional optimal fishing level.

He noted that many factors affect the economic performance of fishing including (i) abundance, seasonality and kinds of offshore resources; (ii) distance from shore (and harbour facilities); (iii) water depth and currents; and (iv) prevailing sea and weather conditions. These biophysical and geophysical factors influence the choice of vessel size, engine power, fish hold capacity and fishing method(s).

Some examples were given for Sri Lanka and India. He noted large variations between fishing vessels due to skill of skippers etc. but highlighted one analysis that showed that return on investment can be high for all types of vessels, especially on small vessels (6 m vessel in Sri Lanka).

He discussed overfishing and overexploitation, using the conventional surplus production model that shows that catch can increase by taking smaller and smaller fish up to a biological optimum and then decline. Evidence of catching small fish is apparent across the region e.g. Aceh in Indonesia. He argued that in terms of tuna fishing, resource rents are already being lost and pointed out that, globally, resource rent lost in capture fisheries is $55 billion per year.

Mr Willmann presented a hypothetical interaction between an inshore and an offshore fishery. If boats only fish for 30 percent of the time offshore but encroach inshore. Offshore fishing has lower resource rent but can be more profitable initially but as effort increases, profitability declines and also becomes non viable. This type of development can also reduce the opportunity of inshore fishers to harvest the stocks. He concluded that investments in small-scale fisheries is an option where handling can be improved and a viable small-scale fishery can be sustained.

In conclusion:

- Investments in offshore fisheries can be significant and risky and should be based on thorough financial and economic analysis;
- Caution is needed to avoid negative impacts of offshore fishing on inshore fisheries; and
- Where offshore fishing for large pelagics can be done at different levels of scale, consideration should be given to maintaining and expanding the opportunities of small-scale fisheries which contribute to much needed employment and income in coastal areas.

Offshore fisheries: Opportunities and threats to small-scale fishers
V. Vivekanandan (International Collective for Small-scale Fishworkers)

Mr Vivekanandan introduced his presentation by pointing out that, in the past, small-scale fishing was confined to the near shore region due to limited markets and low population densities. He noted, however, that many communities also had a long tradition of seafaring in offshore region. With the rapid change technology and markets in last few decades a conflict between trawl and non-trawlers has occurred in many areas. Small boats have also been modernized and these boats can also fish further offshore than trawlers.

He felt that most governments have ignored the potential of small-scale fishers to fish offshore, based on perception gained from temperate waters where conditions are different. Governments are rushing into offshore fishing and trying to increase production (catch up with other countries) but he contended that high tech solutions are not required. The current focus on “sashimi” grade yellow fin tuna is distorting the fishery. Are there other products that can be marketed profitability e.g. domestic markets?

There is strong evidence that artisanal fishers can tap offshore resources. For example, small island fishers showed the way as they are close to deep-waters i.e. deep-sea artisanal fishers. Another good example is Sri Lanka where multi-day fishing was with gillnet-cum-longlines was encouraged. Gradually boats increased the distance they can cover and now can fish in India and the Maldives. All that is required is for these boats to improve fish handling to increase profitability. Another good example was the development of a shark fishery in India without government intervention in depths of up to 200 m and now fishing tuna.

Socio-economic benefits are high if artisanal fishers can expand into offshore areas, although managing small-scale fishing is a challenge. Shark resources have already been overexploited in some areas of India. Also need to manage the cross border issues and license fishers to fish in other countries.

Plenary discussion

In discussing small-scale fishers from Aceh, there was agreement that small-scale fishing should be supported as these depend entirely on the sea for their livelihood. Improved technology of handling is the important intervention that is needed. Some participants could not agree with endorsing cross border fishing. It was noted that cross-border movement requires authorization under RFMO rules.

One participant felt that Sri Lanka multi-boats still need further development as they were still very primitive and developed under international aid many years ago. Some participants did not agree with small artisanal boats fishing further offshore as it introduces serious safety issues.

In discussing the broader technology challenge one participant noted that solutions should include alternative energy sources and energy efficient vessels as increasing fuel costs could undermine the profitability of offshore fishing. It was noted from the country presentations that most governments are providing subsidies and the question was raised – is offshore fishing viable without subsidies? It was agreed that we need to understand rationale of subsidies – e.g. is it to support a claim for the resources and future access?

Noting the importance of different environmental influences e.g., sea temperature on offshore pelagic fish catches, it was thought that the impact of climate change will result in large shift in species distribution in the near future and fishing practices will have to adapt. Are tuna stocks already moving to new areas and not sustainable?

A concern was raised that there was a consistent theme to move capacity offshore but no real plans for capacity reduction. In general, there was an acceptance that offshore vessels will also need to increase their capacity. Malaysia replied that they have a plan to reduce capacity – small vessels to switch to bigger vessel or other gear or aquaculture or leave the industry.

Wrap-up day 1

In wrap up, the rapporteur noted that:

- There is a trend to move inshore fishing effort to offshore waters;
- There seems to be a general confidence in some countries about the availability of offshore demersal resources;
- Many countries are targeting their tuna fisheries for further development – although in some areas tuna is estimated to be already fully exploited;
- There are effort in some countries to convert other fishing gears to longlines such as India (trawlers) and Sri Lanka (gill-netters) with financial incentives;
- Tuna is not an extension of inshore/coastal fisheries and should be treated as a separate entity/industry with its own complexities and dimensions – development of this fishery should use a precautionary approach;
- Common constraints/issues in developing offshore fisheries include lack of facilities, knowledge, fishing and post-harvest technology, capital investment and expertise;
- Common approach to developing offshore fisheries include building and developing infrastructure (e.g. fishing ports/harbours), new vessels, improving existing vessels, promoting multi-day fishing (increasing fishing effort), providing subsidies (especially for fuel) – leading to overcapitalization or overcapacity?;
- Although charter and joint-venture fishing is supposed to be still popular, many countries have stated that no foreign fishing vessels operate in their waters;
- There were no recent surveys in the offshore areas in some countries – can planning for expansion of offshore fisheries be done effectively without recent information on resource status?;
- Great care should be given to post-harvest fish handling to ensure minimal loss in value of the catch and to ensure high quality to meet the requirement of the market;
- While offshore fisheries can target high value species like tuna and tuna-like species or other valuable non-tuna species, how can efficient resource utilization and sustainability be ensured?; and
- Topics/issues not raised during country presentation
  - measurement or estimation method of fishing capacity in offshore areas (or in any area), since there is concern about overfishing/overexploiting these waters.
  - country socio-economic & bioeconomic information – should these topics be included in offshore fisheries discussions.

THEME III: SUSTAINABLE DEVELOPMENT, MANAGEMENT AND PRECAUTIONARY APPROACH

Policy directions of SEAFDEC member countries relating to offshore fisheries
Yasuhisa Kato (SEAFDEC)

Using the South China Sea (SCS) as an example, Mr Kato pointed out that it is a semi-enclosed sea with no-high sea area, and thus, the establishment of Regional Fisheries Management Organisation (RFMOs) for the region has never been seriously discussed. He contended that there was no need for Regional Fisheries Management mechanism in the SCS but regional fisheries management policy should be developed to coordinate the individual fisheries management policies of countries bordering the South China Sea.

As background to his presentation, he described the past history of fishing in the area, where resources declined as early as 1970s. He pointed out that global generalizations do not always apply to Asian tropical fisheries. Asia, as a low productivity area, have ecosystems that contain low population numbers of many species. Inshore waters can be more productive through land-based nutrients and habitats such as mangroves and seagrass. Because inshore areas are more productive there are many incentives to fish inshore, and offshore fishers are lured back inshore.

He defined offshore fisheries as those that cover the commercial fisheries in deeper water but he felt that it should not include high seas. With respect to demersal species, eexpanding the fishing ground within 100-200 m depth (most of the areas have been considered as untrawable areas) is possible, but needs to invest in construction of big-capacity vessels. It has also been identified that the target species of trawl fishing in these areas are low priced species such as inputs into surimi. More selective fishing gear such as bottom longlines on slopes of shelf and untrawable grounds is also a possibility. He warned that cautious expansion is warranted.

With respect to pelagic resources, he considered that searching and harvesting of small-sized pelagic species in the large areas of offshore cannot be financially viable under the increasing trend of fuel cost. New species such as Oceanic squid can be a potential pelagic species if appropriate fishing gears effectively catching these species are developed.

He concluded by stating that there is little hope that offshore fishing can compensate for the overfishing in inshore areas. Further, by recognizing the nature of fisheries resources in tropical areas, developing appropriate fisheries management system both in offshore and inshore areas should be the priority. If the promotion of offshore fisheries is required for some political reasons, it could be used as an opportunity to introduce stringent right-based fisheries to regulate the numbers of offshore fishers. “Burden of Proof” of precautionary approach on the fisheries resources and the feasibility of the fisheries can also be applied if any offshore fisheries are proposed by any interested groups.

Management of tunas and tuna-like species in the Indian Ocean — opportunities and obligations
Chris O’Brien (Indian Ocean Tuna Commission)

Mr O’Brien briefly described the structure and function of the Indian Ocean Tuna Commission (IOTC) that is one of five international tuna RFMO’s set up to manage and conserve the world’s stocks of tuna and tuna-like species. The IOTC’s area of competence includes the Indian Ocean high seas and EEZ’s of its coastal States. There are 16 species under the Commissions mandate, including bigeye, yellowfin, albacore and skipjack tunas, swordfish, marlins, small tunas and mackerels. Currently IOTC has 27 members and 3 cooperating parties and it is estimated that these members account for 80 percent of the 1.5 million tonnes of tuna and tuna-like species taken annually.

IOTC adopts management and conservation measures which become legally binding under the fisheries laws of its respective members. IOTC's major focus is in the activities of all vessels over 24 m fishing for IOTC species and vessels <24 m fishing outside of their EEZ's. However, the Commission expects that the principles and spirit of the Commissions management and conservation measures are put into place within the EEZs of its members i.e. they pertain to the domestic fleets. The Commission places an emphasis on obtaining accurate fisheries statistics and fleet information; understanding status of the stocks and implementing measures to ensure the sustainable use of these stocks; eliminating IUU fishing, and mitigating the impact on species associated fishing (with an emphasis on sharks, seabirds and sea turtles).

With regard to the status of the tuna under its mandate, he noted that bigeye tuna, yellowfin tuna and swordfish are currently considered to be not overfished but likely fully fished. Skipjack tuna and albacore are probably underfished. Status of other billfish and neritic species is unknown. In general, there is little room for expansion of fishing for the major tuna species and swordfish. At this stage there are no catch limits or quotas on IOTC species but the Commission has taken steps to limit fishing capacity. To this end, fishing capacity limits for fleets fishing for tropical tunas (bigeye, yellowfin and skipjack) and albacore and swordfish (combined) have been set in terms of the numbers and tonnage of vessels.

Operators fishing for IOTC species are required to have their vessels authorized (vessels over 24 m fishing for IOTC species and vessels <24 m fishing outside of their EEZ's), ensure their vessels are marked appropriately and carry required documentation, install required gear (e.g. VMS on vessels over 15 m), implement bycatch mitigation procedures, report catches and other required information to their relevant government agency. Member States are obliged to ensure IOTC management measures are included in national fisheries regulations, authorise vessels and ensure their compliance with IOTC requirements, take action against un-reporting or illegal operators, manage IOTC species in conformity with IOTC conservation and management measures; inspect vessels transhipping or unloading IOTC species and deny unloading or transhipment to unauthorized vessels.

IOTC is an intergovernmental organization and as such it is government officials that represent their countries interests on matters addressed by the Commission. It is important that industry and other non-government stakeholders work with their governments to have their views taken into account in national policies and ultimately by the Commission. Many non-governmental stakeholders attend IOTC meetings as part of an official government delegation.

The Commission acknowledges the access rights of new members (currently there are 18 coastal States that are entitled to membership) and the aspirations of certain current members that wish to continue to develop their fleets. Moreover, the opportunities to fish for tuna and tuna-like species in the Indian Ocean will only be available to operators who are in compliance with IOTC management and conservation measures. Unauthorized vessels run the risk of being declared as IUU, being banned from fishing and unloading, and being denied access to international markets.

He pointed out that there were definite advantages of being a member of IOTC, including market advantages. There are also a number of obligations of both flag States, port States and market States including catch reporting, amend legislation and control their fishers.

Management of shared offshore resources: economic and legal aspects
Rolf Willmann (FAO)

Mr Willmann introduced his talk by first defining the different types of shared stocks – highly migratory, trans-boundary and straddling stocks. Management of shared stocks should be cooperative among countries, especially highly migratory stocks. This can be at different levels starting with cooperation at a primary level i.e. in research through to a secondary level with coordinated management programme. The legal basis for this cooperation is in the UN Convention on the Law of the Sea (UNCLOS) and UN Fish Stocks Agreement (UNFSA).

In discussing the economics of shared stocks he introduced the concept of game theory that examines the interactions among players that share the stocks. He pointed out that there was 2 ways to play – a competitive game and cooperative game that includes communication. It assumes that each "player" is trying to get the best outcome for themselves. As the number of players increase, the game gets more complex, often with the formation of coalitions among players. One basic condition of game theory is that if one gains advantage, the other loses i.e. by tradeoffs. It can also allow for side payments e.g. allowing other vessels to fish in one's own waters, that helps finding stable solutions. The main conclusion from game theory is that it very risky to assume that non-cooperative management of shared stocks will produce "good enough" results. Cooperation does matter.

Cooperation at the level of joint, integrated management is admittedly difficult and costly, but several examples of successful cooperative management do exist. Stability in arrangements requires that certain conditions are fulfilled, including the fact that every country is better off with cooperation and the outcome of cooperation is perceived as fair and equitable. There is a need for "time consistency" and for ensuring that the scope for bargaining is broad: significance of so-called side payments or negotiation facilitators.

Environmental concerns
Gabriella Bianchi (FAO)

Ms Bianchi noted that the impacts of fisheries on marine ecosystems are high on the political agenda of national and international agencies, both governmental and non-governmental. In addition to the impacts on target species, concerns regarding other impacts such as those on vulnerable species caught as bycatch, and on overall ecosystem structure and functioning are receiving greater attention. Offshore fisheries for large pelagics are known to result in severe mortality of several vulnerable marine organisms such as sea turtles, sharks and sea birds, a mortality that is not managed. As regards demersal species, those in deeper waters tend to have a slower growth than shelf species and are therefore more vulnerable to fishing. Furthermore, they can be associated with habitats, such as cold water corals and sponges, the distribution of which is largely unknown and that can easily be damaged as a result of fishing operations. Irreversible cascading effects have been demonstrated in ecosystems where a significant removal of top predators has occurred and this may therefore be another reason for concern.

Awareness on the risks that fisheries pose to sustainability of target species and of the marine ecosystem overall is reflected in a number of international instruments such as UN Convention on the Law of the Sea (UNCLOS), Convention for Biological Diversity (CBD) and the FAO Code of Conduct for Responsible Fisheries (CCRF). In Reykjavik, 2001, FAO member countries pledged to the application of sustainable fisheries in the marine ecosystem, and the WSSD (2002) reinforced this commitment. Despite the difficulty of actually implementing policies and actions consistent with these commitments, and the challenge of reaching to grass-roots level, these international instruments are still a key reference for the development of national policies and remain a moral commitment. Furthermore they have also served as 'stepping stones' for NGOs to acquire greater legitimacy in their conservation efforts. NGOs have also played a key role in sensitizing public opinion that, in turn, more and more requires that fishery products be traded only if they come from sustainably managed fisheries. The increase observed in the number of certification schemes can be considered as an indicator of the growing importance of this aspect. Sustainable use seems to become more and more and obliged path, at least if access to the international markets is sought, and not an option that can easily be chosen away or disregarded.

It seems therefore essential that the development of offshore fisheries is carefully planned. Strategic decisions should be explicitly considered and shared by all relevant stakeholders. This could be achieved through a consultation process leading to a management plan for the fishery based on available knowledge, including clearly stated risks and opportunities in relation to sustainability, to

the social and economic implications, as well as to governance issues. Long-term goals should be shared by the key stakeholders, be consistent with their desires and aspirations, but also with sustainability, precaution and equity.

Plenary discussion

Plenary stressed the importance of offshore fisheries having better management and in providing healthy food. The strengthening of monitoring, control and surveillance (MCS) is fundamental to be able improve management. Concern was also raised on how IOTC will be able to mange such a disparate fishery and how allocation of catch is going to be achieved.

It was felt that global initiatives do not consider regional differences and not really meet the needs of the countries and in some cases just promote confusion. It was agreed that countries need to be more involved in their formulation. A Southeast Asian regional advisory scientific committee is about to be formed but we need to find incentives to collaborate? Just copying global initiatives may not be appropriate. In Asia, shared stocks tend to be small-scale so there is a need to prioritise issues and start from there in the form of a regional road map.

Use of information for management was also discussed and the gap between researchers and policy makers highlighted. This is a difficult task without appropriate infrastructure but needs to addressed.

Some further comments on IOTC and shared stocks were made. It was pointed out that at the grass roots level, fishers and communities are not aware of obligations. It was also reasoned that the resources for Indian Ocean should be for people of Indian Ocean. On participant observed that game theory is interesting but major issue is who is representing the fishers. Actual game is played at a different level.

The need to share information and experiences was re-iterated. Current survey data tended to be just a snapshot – we need time series of data. The main constraints to offshore fishing were the lack of human capacity, and the increasing costs. Moving offshore requires considerable training of fishers. He suggested that we have a consistent definition of “offshore” and develop an action plan.

The apparent paradox of tuna being near MSY and aspirations of developing countries to increase their catches was also discussed. Fleet development plans are being provided by developing countries but there are no fleet reduction plans by non-Indian Ocean countries. The allocation process of future quotas was a cause of concern. In other fisheries, criteria have included historical catches and time stocks spend in a country’s EEZ. It was also pointed out that distant water fishing nations can also claim that they are from the region as they have island/lands in the region.

The reasons for the decline in fish stock in the region were discussed. One presentation suggested that it was a result of low productivity in tropical waters. This view was challenged and it was also stated that the regional differences not as great as stated. Temperate countries also have examples of overfishing e.g. sardines and Atlantic cod.

It was further stressed that the hope and aspirations of moving offshore also has to be realistic and based on facts and information. Tropical stocks are vulnerable and caution is needed in their exploitation.

THEME IV: LOCAL, COUNTRY AND REGIONAL ACTIONS

Working Groups

Three Working Groups were tasked with developing actions and recommendations on steps to implement the actions.

The Working Groups each covered one of the following topics:

1. Status & potential of offshore fisheries
2. Technological challenges & socio-economic benefits
3. Management for sustainable development

Each Working Group was allocated a facilitator and given instructions and preliminary inputs. Each Group was asked to one representative to report back to plenary. Full reports of the Working Groups are at Annex 4.

Working Group 1

The objective for this group was *To identify key actions for improving our knowledge of the status and potential for offshore fishing in South and Southeast Asia.*

The group identified tuna (general), skipjack, billfish (swordfish and marlin), flying squid and offshore scads and horse mackerel as the potentially most important pelagic resources. Snappers/groupers/threadfin bream, orange roughy, squid/cuttlefish, deep-sea lobster, ribbonfish/hairtail, and bigeyes/goatfish/lizardfish were identified as the most important demersal resources. These were selected after ranking the criteria of (i) abundance, (ii) potential yield, (iii) vulnerability, (iv) market price, (v) availability of vessels and gears, (vi) cost of investment, (vii) beneficiaries, (viii) availability of skills for harvesting, (ix) availability of skills for post-harvest and (x) manpower. The group highlighted the important information gaps on:

- abundance;
- biological parameters;
- distribution (particularly for offshore demersals); and
- catch statistics.

Because of these gaps in knowledge, the group recommended a precautionary approach to the development of offshore fisheries, with development increasing as information and data from the fishery and from research (exploratory surveys, development of appropriate fishing techniques, and development of skills). Development should be linked to regular (annual) reviews of the status of fisheries at both national and regional levels.

Working Group 2

The objective for this group was *To prioritize the technological and socio-economic challenges of offshore fishing in South and Southeast Asia and to provide some practical steps on how the constraints can be overcome.*

The group decided to identify the constraints with reference to tuna, oceanic squid, snapper/grouper, small offshore pelagic and deep-sea shrimp. Constraints included:

- availability of appropriate gears;
- vessel technology;

- preservation of harvested fish;
- post-harvest facilities;
- socio-economic data and analysis;
- information on stock status; and
- scope of small, medium and large (>24 m) vessels.

To address the constraints, the group examined the options of (i) joint ventures, (ii) national development, (iii) bilateral/trilateral or regional development, (iv) desk studies and (v) pilot scale operations.

Their recommendations included

- Countries initiate desk studies to evaluate the social and economic;
- Potential of selected offshore resources;
- Where it can be demonstrated that social and economic benefits of fishing exist;
- For yellowfin and bigeye tunas, oceanic squids, snappers and groupers;
- Small pelagic and deep-sea shrimps, the countries should proceed to pilot;
- Scale fisheries projects, before further development of a business plan for investment;
- Priority should be given to fishermen and private sectors within the countries, with the objective of alleviating overcapacity in the inshore areas and to ensure employment opportunity for nationals; and
- Sharing of information and expertise on technology development among countries in the region.

Working Group 3

The objective for working group 3 was *To develop key objectives and strategies to better manage the offshore fishing in South and Southeast Asia*.

The group identified 5 major issues that required addressing in order to improve the management of offshore fisheries. These were:

1. Offshore fisheries offer only a limited scope for additional exploitation in the regions;
2. There is strong competition for some of the offshore resources of the region, especially the highly migratory species like tuna, that are being exploited by both small-scale and large-scale operations in countries from within the region as well as from outside the region;
3. Management of fisheries at the national level needs to be strengthened by moving away from the current de-facto open access system to that of a limited access or rights based system;
4. The current system of collecting and using fishery information is unsatisfactory and its link with management is weak; and
5. Returns to offshore fishing is poor due to weaknesses in post-harvest and marketing

The group recommended that:

- The development of offshore fisheries should be based on the precautionary principles and be used to transfer effort from inshore fisheries to the offshore rather than create additional capacity;
- It is important that the access rights to offshore and high sea resources are determined to take account both small-scale and large-scale operations as well as costal States and distant water nations;

- Fisheries management at the national level require the development an adaptive co-management system with strong participation from fishing communities and the development of appropriate structures at all levels backed by suitable legislation;
- There entire system of fishery information collection, dissemination and use may be revamped. This requires the blending of indigenous and scientific knowledge and the development of appropriate information products for decision making at different levels;
- Regional cooperation needs to be strengthened to ensure that the national management systems are effective and do not clash with that of other nations; and
- Increase the returns to fishing and improve the livelihood of fishers by reducing post-harvest losses and improvement of fish quality to meet market requirement.

The reports of the Working Groups were used to draft a set of conclusions and recommendations that were presented to and agreed by the plenary. These conclusions and recommendations are presented at the start of this workshop report.

ANNEX 1 – WORKSHOP PROGRAMME

Assessment and Management of the Offshore Resources of South and Southeast Asia
Bangkok, Thailand, 17–19 June 2008

Time	Activity
Day 1 – 17 June 2008	
08.30 – 09.00	Registration
09.00 – 09.20	Welcome remarks and opening – **Somying Piumsomboon (DG Fisheries, Thailand)** Address – **Siri Ekmaharaj (SEAFDEC)** Address – **Simon Funge-Smith (APFIC/FAO)**
09.20 – 09.25	Election of chair and rapporteur
09.25 – 09.30	Group photo
09.30 – 10.00	Coffee/Tea
10.00 – 10.10	Introduction to the Workshop – Objectives and outputs **Gabriella Bianchi (FAO)**
THEME I – Status & potential of offshore fishing in Asia	
10.10 – 10.40	Overview of status and potential of offshore fishing in South and Southeast Asia **Derek Staples (FAO Consultant) & Gabriella Bianchi (FAO)**
10.40 – 12.30	Country statements on potential and constraints for offshore fishing **11 participating countries**
12.30 – 14.00	Lunch
14.00 – 14.20	Results of experimental fishing on offshore resources in the region **Somboon Siriraksophon (SEAFDEC)**
14.20 – 14.40	Plenary discussion Theme I
THEME II – Technological challenges, socio-economic benefits and costs of offshore fishing in Asia	
14.40 – 15.00	Technological challenges associated with offshore fishing using case studies **Francis Chopin (FAO)**
15.00 – 15.20	Challenges related to post-harvest and market access issues **S. Subasinghe (INFOFISH)**
15.20 – 15.50	Afternoon tea
15.50 – 16.10	Economics of offshore fishing **Rolf Willmann (FAO)**
16.10 – 16.30	Offshore Fisheries: Opportunities and Threats to Small-Scale Fisheries **V. Vivekanandan (ICSF)**
16.30 – 17.00	Plenary discussion Theme II
17.00 – 17.30	**Wrap-up day 1 – rapporteur**
17.30 – 18.00	***Meeting of "Friends of the Chair"***
18.30 – 20.30	Poster session and reception

Time	Activity
Day 2 – 18 June 2008	
THEME III – Sustainable development, management and precautionary approach	
09.00 – 9.20	Policy directions of SEAFDEC member countries relating to offshore fisheries **Yasuhisa Kato (SEAFDEC)**
09.20 – 09.40	Management issues related to tunas and other large pelagics **Chris O'Brien (IOTC)**
09.40 – 10.00	Management of shared offshore resources: economic and legal aspects **Rolf Willmann (FAO)**
10.00 – 10.30	Coffee/Tea
10.30 – 10.50	Environmental concerns **Gabriella Bianchi (FAO)**
10.50 – 11.15	Plenary discussion Theme III
THEME IV – Local, country & regional actions	
11.15 – 11.30	Short introduction to the working groups **Derek Staples (FAO Consultant)**
11.30 – 12.30	***Working Group 1 Status & potential of offshore fishing*** • What is known and what is not known • Future actions at local, country & regional levels ***Working Group 2 – Technological challenges & socio-economic benefits*** • Future actions at local, country & regional levels ***Working Group 3 – Management for sustainable development*** • Focus on regional/national actions for sustainable development
12.30 – 14.00	Lunch
14.00 – 15.15	Working Groups continue
15.15 – 16.15	Afternoon tea
16.15 – 17.00	Plenary session – Preliminary findings/presentations of the three working groups
17.00 – 17.30	*Meeting of "Friends of the Chair"*
Day 3 – 19 June 2008	
THEME IV *(continued)*	
09.00 – 09.20	Finalized presentation of combined working group outputs
09.20 – 10.00	Discussion
10.00 – 10.30	Coffee/Tea
10.30 – 12.30	FREE
12.30 – 14.00	Lunch
14.00 – 15.30	Workshop recommendations & actions
	Workshop close

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ANNEX 3 – OPENING STATEMENTS

WELCOME REMARKS

By Director-General, Department of Fisheries, Thailand

Distinguished Delegates from the South and Southeast Asian Countries,
Representatives from the Food and Agricultural Organization (FAO), the International Collective in Support of Fishworkers (ICSF), INFOFISH, IOTC, and SEAFDEC.

Ladies and Gentlemen,

It is indeed a great pleasure for me to be here this morning, on behalf of the Department of Fisheries of Thailand, and to warmly welcome you all to this Workshop on Assessment and Management of the Offshore Resources of South and Southeast Asia. Allow me also to thank FAO and specifically the APFIC and SEAFDEC for convening this very important workshop.

Perhaps not too long ago, people working in fisheries either in scientific or non-scientific fields might have considered that the marine resources could not be exhausted. However, with the severe and drastic fisheries development mobilizing advanced technologies, the same people have started to realize that there are not enough fish to support the current fishing practices. Now, people are starting to investigate how fisheries activities could be regulated in order to achieve sustainability of the marine resources and the aquatic environment.

In the case of the South and Southeast Asia, trawl fisheries rapidly expanded in the 70s and having been unregulated, this has resulted in the overexploitation of the fishing grounds and consequently to the depletion of the fishery resources. In fact, many reports have indicated that more than 10 percent of the world's major fishery resources are depleted or may be in some areas, are recovering from depletion. But how can such resources recover when globally there are now over a million commercial boats extracting over 95 million tonnes of fish and shellfish annually?

Distinguished delegates, ladies and gentlemen,

We are all aware that overfishing can affect the whole marine ecological system resulting in the destruction of the marine reefs as well as the spawning and nursing grounds. In addition, the continued overexploitation of the marine resources could also lead to increased catching of non-targeted fishes or by-catch that mostly go to waste. It has been reported that over 27 million tonnes of by-catch has been discarded each year by the fishing industry. It is therefore a great challenge for us to properly manage the exploitation of the fishery resources.

Distinguished delegates, ladies and gentlemen,

Most of the peoples from the South and Southeast Asian countries depend on fish for their daily protein requirements. Thus, it has become very necessary to strike a balance between fish production and exploitation in order to address such concern. Recognizing that most of the coastal areas are overfished, an alternative therefore could be fishing in the deeper offshore waters for both pelagic and demersal fishes. In fact, many countries have already conducted exploratory fishing activities in these waters, which could still be abundant in terms of fishery resources.

This workshop is indeed very significant as this will enable us to focus our sights towards sustainable development and management of offshore fisheries in the so-called untrawlable waters where some fishery resources may still be scarcely exploited. Offshore fisheries could provide us with a possible solution to the need for stable supply of fish for food security and livelihood of the peoples in our region.

In conclusion, ladies and gentlemen, please allow me to reiterate that a strong collective effort is necessary in order to attain the sustainable management of offshore fisheries in the South and Southeast Asian region. This we could easily achieve with your support and your active participation during this workshop. I do hope that during the next three days of hard work, we will come up with a very fruitful outcome. Together, let us make a big leap towards the sustainable future for the offshore fisheries sub-sector in this region. With that, I now officially declare the Workshop open. Thank you.

OPENING REMARKS

Dr Siri Ekmaharaj, SEAFDEC Secretary-General

Distinguished Delegates from Department of Fisheries Thailand,
Representatives from international/regional organizations, Representatives from South Asia and Southeast Asia, Ladies and Gentlemen, Good Morning!

On behalf of SEAFDEC as co-organizer, It gives me great pleasure to welcome you all again to the FAO/APFIC/SEAFDEC workshop on assessment and management of the offshore resources of south and southeast Asia which is held from today to 19 June.

Distinguished guests, Ladies and gentlemen, SEAFDEC has been established since 1967 to promote fisheries development in Southeast Asia and it aims specifically to develop fishery potentials in the region through training, research and information services in order to improve the food supply by the rational utilization of fisheries resource in the region. At present, there are 11 member countries of SEAFDEC, which are all ASEAN Countries plus Japan. For over Forty years, SEAFDEC has fought an on-going campaign against the decline in regional fisheries through a programme of activities having the objective of technical development. Recently, the policy of SEAFDEC has been extended from a wholly technical and training organization to serve as a fisheries policy and guardian of member countries against predicted or existing fisheries problems. The work of SEAFDEC now continues both on specific technical issues and on the more broad concepts of regional codes of conduct, fish trade and environment and coastal fisheries management issues. Many Activities and achievements of SEAFDEC have proved to contribute to the sustainable development of fisheries in the region. Therefore, in the year 2007, SEAFDEC received the Margarita Lizárraga Medal Award for the biennium 2006-2007 from FAO for promoting the implementation of the CCRF in the Southeast Asian region. In response to the current declining of fishery resources in the region due to unsustainable utilization, there has been concern expressed by international society for the need to improve current fisheries management framework and practices. Echoing the international concern, countries in Southeast Asia have over the years discussed ways to strengthen the fisheries management in the region through both individual country's effort and regional cooperation. In line with this, the Regional Advisory Committee (RAC) for Fisheries Management in Southeast Asia was established at the 40th SEAFDEC council Meeting this year with the supported by all councils of SEAFDEC. This initiative is envisaged to signal the seriousness and commitment of the region in improving fisheries management and should be made to move towards long-term establishment of a regional fisheries management mechanism.

Ladies and Gentlemen, to ensure the sustainable fisheries in both inshore and offshore in the region, awareness building on sustainable management need to be discussed based on the available and existing information. SEAFDEC wish to support the workshop based on our practical research works in the region. And we also wish to see the way for developing new offshore fisheries which may be useful to the countries to consider the effective management policy for promoting sustainable fisheries.

Finally, let me wish you every success in your deliberations. I look forward to concrete and specific recommendations that help the countries on the offshore fisheries management policy. At this auspicious moment, I would like to end my remarks. Thank you.

Opening statement of the Secretary, Asia-Pacific Fishery Commission (APFIC) Food and Agriculture Organization (FAO) of the United Nations Regional Office for Asia and the Pacific

Mr Sanchai Tantawanit, representative of Dr Somying Piumsomboon, Director General Department of Fisheries, Thailand
Dr Siri Ekmaharaj, Secretary-General Southeast Asian Fisheries Development Center,
Distinguished participants and colleagues,

On behalf of the Secretariat of the Asia-Pacific Fishery Commission and the FAO Regional Office for Asia and the Pacific, I would like to welcome you to this FAO/SEAFDEC/APFIC regional workshop on "Assessment and management of the offshore resources of South and Southeast Asia".

The fisheries of Asia saw unprecedented growth during the second half of the 20th century. This was largely due to the widespread capacity increase, motorization, huge expansion of trawl fisheries and the shift of fishing effort from temperate waters into the tropical zones. This expansion was largely unregulated, even in many cases promoted, and the different fisheries within the region have seen a trend of expansion and subsequent decline as resources have been sequentially overexploited.

This pattern continues to this day and fisheries still operate in all the waters of the region. However, feedback from the fishers, the increasing numbers of vessels tied up in port and the declining quality of the catch all point to the inevitable conclusion that overfishing is widespread and fishing is becoming increasingly uneconomic in most coastal fisheries. There has been a significant shift of effort into the tropical offshore fisheries, this has seen the movement of effort from temperate waters to the tropics in pursuit of tunas and even across oceans from one side of the pacific to the other as fleets shift their attention as their usual stocks decline.

Overcapacity, declining catch, spiralling fuel price and increasing conflicts between trawlers and larger operators and the small-scale sector is placing pressure on governments to relieve poverty and the crisis in coastal and nearshore fisheries. Alongside subsidies and other temporary measures to alleviate pressure or short term crises, is a general policy trend in the region to look to move part of the nations fishing capacity away from the coastal area. This is being driven by a number of factors. Perhaps the main driver is the assumption that there are abundant fisheries away from the coast which remain open for exploitation. The second driver is that perception that other fishing nations are already exploiting these resources and this represents a lost opportunity to the country to access these valuable resources.

Moving fisheries away from the coast is not a simple matter of larger boats and gears. There must be the fish present to make this profitable, the numbers of fish needed are greater and fishers often lack the skills to exploit the resources cost effectively. There are already experiences of where this policy direction has backfired, resulting in vessel returning to nearshore areas and further pressuring the coastal fishery. In other cases the vessels have moved out of range of the national controls and contributed to illegal fishing.

It is clear that responsible fishing practices will be a key to long term viability of offshore fishery development, inside or outside of a countries EEZ and fisheries agencies, governments and Regional Fisheries Organizations need to adequately plan the check and balances required to ensure this.

This workshop is intended to bring together technical experts from FAO member countries together with Regional Fishery organizations and other institutions to explore the policy and economic implications of moving fisheries away from the coastal zone. The outcomes of the workshop will be communicated into other fora and disseminated within the region to promote awareness as to the potentials and problems of fisheries expansion.

On behalf of FAO and APFIC, we look forward to the concrete conclusions and recommendations which will emerge from this workshop and enable us to disseminate and inform our member countries. I would also like to welcome you to this regional workshop and thank our partners SEAFDEC for their excellent preparations and hosting arrangements.

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ISBN 978-92-5-106359-0

I1014E/1/09.09/200