

private standards such as those for environmental and social purposes which have been endorsed by major retailers; certification of aquaculture in general; concern of exporting countries about the impact on their fish exports due to the introduction in 2010 of new traceability requirements in EU markets; process and margins throughout the fisheries value chain; the need to enhance competitiveness of fish products compared with other food products; and perceived risks and benefits from fish consumption. For some products and in some countries, requirements for traceability systems do exist, because many of these systems are privately adopted and are not all-inclusive. However, there is a need for the varying systems to be harmonized within a country and in the Southeast Asian region. In view of the strengthening of the requirements of retailers for selling fish in developed countries, private standards and certification schemes in fisheries and aquaculture are becoming significant features in the international fish trade and marketing.

Nonetheless, the proliferation of these standards and schemes causes confusion on the part of consumers and producers, therefore, a mechanism for judging the quality of the schemes is necessary. Overall, traceability systems that could be applied to the whole supply chain for the region should be developed and which could include regulations, enforcement systems, and certification management mechanisms.

### **3.2 Challenges and Future Direction**

In summary, a number challenges need to be worked out in order to address the aforementioned issues. These could include the development of training materials, conduct of training programs for trainers, and training of the industry in the implementation of GMP/SSOP; and investigating the ways and means for the industry to access to funds for the incorporation of GMP/SSOP in their activities. In addition, there is also the need to improve the methodology for traceability and capacity to deal with new emerging export requirements by investigating the various traceability systems that currently exist, and develop a mechanism to harmonize such systems at the national and regional levels; and investigating new emerging issues, and finding the ways and means of incorporating these into the harmonized certification management mechanism. There is also the need to harmonize the inspection systems and standards in the region by: investigating the certification and accreditation issues related to Halal and organic products; continuing the promotion of the ASEAN laboratory accreditation system, developing methodologies and mechanisms for proficiency testing, and promoting GLP; continuing the process of harmonizing food/fish inspection systems and standards for common products; building capacity in risk assessment and its implementation; investigating how

private certification schemes could be incorporated into the national or regional certification management mechanisms; and providing a platform for the sharing of information among the countries in the region on the implementation of harmonization activities within the fisheries sector. Lastly, there is also the need to improve internal regulatory control systems and technical manpower by developing National Plans of Action in conjunction with the need for coordination and control of all aspects of fish handling, processing, distribution, and marketing, by all regulatory agencies; and encouraging the recruitment and training of quality management personnel.

## **4. FISHERIES MANAGEMENT**

In the Southeast Asian region, there is a growing problem of overfished fish stocks and excessive fishing capacity, which could be a result of the number of fishing vessels and increased efficiency of fishing technologies. This together with high levels of Illegal, Unreported and Unregulated (IUU) fishing are generally recognized as important factors that obstruct all efforts of the region to conserve and maintain fish habitats and stocks for long term sustainability. MRAG (2009) estimated that the global economic impact due to IUU fishing could be between US\$ 9 billion and US\$ 24 billion annually or about 11 million MT and 26 million MT of fish. Attempts have been seriously made by countries in the Southeast Asian region, in seeking ways to improve fisheries management with the objective of reducing IUU and destructive fishing activities. The number of important international instruments, binding or voluntary that have been developed and agreed upon globally are providing guidance to countries on what measures to take and restrictions to apply in order to achieve sustainability in resource utilization. Such important conventions and other instruments include the 1982 UN Law of the Sea Convention (UNCLOS 1982), the United Nations Fish Stocks Agreement (UNFSA), FAO Compliance Agreement 1993, 1995 FAO Code of Conduct for Responsible Fisheries, and the 2009 FAO Agreement on Port State Measures.

### **4.1 Management of Fishing Capacity and Combating IUU Fishing**

In response to the global requirements and the rapidly increasing regional concerns to enhance sustainable exploitation of fishery resources, senior officials and other decision makers of the ASEAN countries have increasingly strengthened their commitment to improve management of fishing capacity and efforts to combat Illegal, Unreported and Unregulated (IUU) fishing. The issue on management of fishing capacity and combating IUU fishing has been seriously addressed by the ASEAN Sectoral Working Group on Fisheries (ASWGF), the ASEAN Fisheries Consultative Forum (AFCF), the SEAFDEC Council,

and the RPOA initiative to combat IUU fishing (based in Indonesia), as well as in the “Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020” (SEAFDEC, 2011b) recently adopted by the Ministers and Senior Officials during the ASEAN-SEAFDEC Conference in 2011.

In addition to the afore-mentioned regional initiatives, there have also been emerging trade-related measures and requirements aiming to combat IUU Fishing and enhance responsible fishing practices, among which is the the European Council (EC) Regulation No. 1005/2008 which established a community system to prevent, deter and eliminate IUU fishing, and the FAO Legally-binding Instrument on Port State Measures (PSM). The EC Regulation aims to restrict the importation to EU and between EU Member Countries of fish and fish products that originate from IUU fishing, and the requirements are in conformity with the FAO/PSM Agreement. In response, countries in the region have developed their respective regulations and systems/mechanisms not only to combat IUU fishing but also to meet the standards and requirements for trade of their fish and fishery products to these international markets, as well as within the region.

In line with the initiatives in combating IUU fishing, in 2010, SEAFDEC also organized an Expert Consultation on Managing Fishing Capacity to Combat IUU Fishing in Southeast Asia, where the Member Countries identified elements for sustainable fisheries management and controlling fishing efforts to combat IUU fishing in the Southeast Asian region. Some of the specific recommendations included the promotion of vessel record and inventory as inputs to information sharing; fishing vessel registration and fishing license (vessel, gear and people) and institutional and legal responsibilities including safety at sea aspects; catch documentation schemes to register catches (*e.g.* log books); port monitoring to include landings by vessels from neighboring countries; certification schemes to address the range of items that need to be certified by whom and how (*e.g.* catches, landings, environmental, social and labor aspects); development of MCS Networks based on the existing initiatives in the sub-region of Southeast Asia to be linked with the Regional Plan of Action (RPOA) to Promote Responsible Fishing Practices (including Combating IUU Fishing) in the Region as well as with the efforts of the ASEAN and SEAFDEC.

#### **4.1.1 Fishing Vessel Registration and Fishing Licensing**

In order to ensure that the fishing effort be regulated at acceptable level and enhance sustainable exploitation of the fishery resources, the FAO IPOA-IUU specified one of the responsibilities of Flag State and Coastal State

in registering all fishing boats, issuing fishing licenses and collecting data concerning their fishing activities in accordance with the modified method for countries. The SEAFDEC Council during its annual meetings in 2009 and 2010, therefore recommended SEAFDEC to collaborate with FAO and look at the elements needed to improve fisheries management, to control fishing effort and to combat IUU fishing by addressing the issues on fishing capacity, as well as vessel registration and record. It is also envisaged that the establishment of good and systematic schemes for the registration of fishing vessels and issuing of license would allow countries in the region to come up with more reliable data and information on the actual fishing effort, which could further serve as a basis for the development of appropriate policy and management measures to ensure sustainable fisheries in the region.

However, the situation in the Southeast Asian region is very complicate due to the fact that several hundred thousands of boats are small and artisanal fishing boats, and are scattered along the coasts and in villages or landing sites. Furthermore, the fishing gears and practices used by these boats could also be very flexible and change according to the seasonality and abundance of target species. Although most countries in the region have implemented fishing vessel registration and licensing systems, but the degree/methods of registration and licensing could be varied, and the systems mostly focused on large-scale and commercial fisheries. Different countries also apply different definitions/classifications of fishing boats and registration format, which are difficult to change or harmonize among countries.

In addition, note should also be taken that countries in the region have different laws, regulations and agencies that are authorized to undertake vessel registration and fishing licensing. In some countries, *e.g.* Malaysia, Vietnam, only one agency is responsible for registration of fishing vessels and issuance of fishing licenses; while in some other countries, *e.g.* Brunei Darussalam, Cambodia, Indonesia, Lao PDR, Myanmar, Philippines, Singapore, and Thailand, there are more than one agency involved in the process. However, the purpose and mandate of these agencies are generally different, *e.g.* the fisheries-related agency is responsible for regulating and ensuring sustainable fisheries management, while other agencies may focused on other aspects such as safety at sea standards, pollution controls, etc. In some countries, the authority to register smaller vessels even rests with the local government or other local bodies such as the local government unit in the Philippines or the local People’s Committee in the case of Vietnam.

During the Expert Consultation organized in 2010, discussion was also made on the necessity for countries in the region to strengthen their fishing vessel registration

and licensing system. However several countries expressed their difficulties in recording fishing vessels and registering the fishing boats due to the inadequate number of officers, the lack of stakeholder's cooperation, and the insufficient budget and financial support to undertake the required tasks. In addition, there have also been inadequate information and communication from responsible agencies to enhance the understanding and knowledge of fishing boat owners and other stakeholders on fishing vessel registration and licensing and encourage boat owners to register their boats or obtain appropriate licenses. The Consultation therefore recommended that, at the national level, governments should provide various forms of incentives for fishing boat owners and fishers who apply for registration; establish routine mobile units with designated officers for fishing boat registration and fishing licensing especially in the distant areas; and establish national data record center responsible for collecting data from relevant local offices in the country; while stakeholders' participation throughout the processes of fishing boat registration and fishing licensing and awareness raising activities should be enhanced. In addition, at the regional level, a regional network should be established to promote the sharing of knowledge and information on effective fishing boat registration and fishing licensing; and a regional data center should also be established to facilitate compilation and exchange of data collected by the national data record centers.

In line with the above recommendations, attempts had been continuously made by SEAFDEC in collaboration with the Member Countries to strengthen cooperation especially in the development of mechanisms for information sharing among agencies responsible for the registration of fishing vessels and those that grant the licenses to fish. However, it is necessary to make a clear distinction between a "vessel registration" in accordance with the International Maritime Organization (IMO) and international standards, which allow a vessel to fly a certain flag, and a "record of fishing vessels" that have or have not or need not have any fishing license. The existence of such limitation made it difficult for the countries to promote the collection and compilation of information on registration and licenses, especially in countries with divided institutional responsibilities. It is therefore necessary to develop a Regional Standard for vessel inventory, which could include information on safety requirements since such information could be referred to when the need arises especially in the aspect of preventing accidents at sea and implementation of rescue schemes.

In addition, it was also recommended that legal provisions and requirements of the countries should be reviewed to assess their legal and institutional arrangements for providing support towards the development of national systems for registration and licensing. It is also important

to recognize the extent to which the mandates are divided between different agencies to handle fishing vessel registration and the process of issuing licenses to fish, and examine the possibility of having only one agency to handle both systems to simplify the process. Nevertheless, irrespective of the system, linkage and cooperation among the agencies concerned should be strengthened.

In addition to the efforts and initiative as mentioned above, there is also a new global initiative initiated by FAO to combat IUU fishing activities, known as the FAO Global Record (GR) of Fishing Vessels, Refrigerated Transport Vessels and Supply Vessels which was designed to include the provision of unique vessel identification (UVI). The implementation of GR is expected to move ahead in steps, starting with vessels larger than 100 Gross Tonnage (GT) and gradually, to include the smaller vessels. The UVI is aimed to increase transparency making it more difficult and expensive for those who would attempt to operate fishing vessels illegally. Although the implementation of the FAO GR is at this stage on voluntary basis but in the future it could be declared a global requirement in order to monitor IUU fishing activities. It is therefore necessary for countries in this region to improve their respective fishing vessel registration system to be able to comply with the requirements that may emerge in the future including those of the FAO/GR.

#### **4.1.2 Catch Documentation including Logbook Systems**

The increasing concern and awareness of consumers on safety and quality of fish and fishery products led to the growing number of requirements to ensure good food quality standards. The requirements include compulsory measures to verify the good quality and environmental responsibility of the fishery industries and market organizations through various certification schemes to ensure acceptable standards for international and regional trade in support of responsible and sustainable fisheries. The FAO PSM Agreement and the requirements of EC Regulation No. 1005/2008 imply further that the fishery products intended for export especially through international or regional trade should have verifiable catch documentation. Under the requirements, producers should be able to certify the origin, quality, sustainability, legality of production, production methods including treatment of labor force, and social equity among people involved in the fishery production. These requirements are increasingly well recognized among the countries in the region as could be seen in the "Resolution and Plan of Action on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020". The main emphasis in the context of catch documentation is to be able to "validate" that the information contained in the documents are reliable. Since countries should now take

the opportunity and consider market-based measures as tools to promote their products, combating IUU fishing should be continuously pursued including the promotion of certification and labeling schemes including the processes to validate the information provided. The promotion of “branding” could also be initiated as a cost-effective option to promote products that are produced legally based on environmentally and socially sound practices.

The validity of registration documents and licenses including documents on crew members, are among the basic documents to be provided at fishing ports together with the catch documents. These documents will also be scrutinized during port inspection with, among other things, the objective of combating IUU fishing. Considering that some countries in the region are much more far ahead and advanced in initiating the implementation of processes to register fishing vessels and to issue licenses to fish (vessel, gear and people), the September 2010 Expert Consultation suggested that the experiences of such countries could be shared with other countries in support of the efforts to update and modify their respective registration and licensing systems.

#### **4.1.3 Port Monitoring and Port Inspection**

The importance of fishing ports and landing sites to control and monitor catch has been increasingly recognized. All countries involved in marine fisheries need to seriously consider their responsibilities with respect to monitoring of catches at their ports and landing sites as an essential part in support of effective fisheries management. In 2009, the FAO Agreement on Port State Measures to Prevent, Deter and Eliminate Illegal, Unreported and Unregulated Fishing (PSM Agreement) was approved as a legally binding instrument with the main objectives of preventing illegally caught fish from entering international markets through ports and addressing the role of port states in preventing IUU-caught fish at landing sites, in ports and on transshipment vessels which are being considered as first “port”. The PSM Agreement was opened for signature until 21 November 2010 and would enter into force 30 days after depositing the 25<sup>th</sup> instrument of ratification, acceptance, approval or acceptance with FAO. As of 15 August 2011, only 23 states became signatories to the Agreement with Indonesia as the only Southeast Asian country signatory, although Myanmar had acceded to the PSM Agreement based on information from the FAO Legal Office.

The PSM Agreement highlights the role of the port State in the adoption of effective measures through effective port monitoring and stringent inspections as needed from time to time, to control the legality of catches being landed. As an important step towards complying with the EC Regulation, the PSM Agreement could set an example on how the principles could be incorporated in national

legislations. Nevertheless, in order to verify the legal status of fishery products landed in the ports of the region, practices and procedures for port monitoring and port inspections should be developed to ensure that these meet international standards as well as the aspirations of the ASEAN Community development and the development of the ASEAN Economic Community which envisioned to promote increased trade among the ASEAN countries. Therefore, it is crucial for the Southeast Asian region to have efficient and reliable port monitoring/inspection mechanism that would ensure the sustainability of marine resources and maintain sustainable trade as well as combat IUU fishing.

In establishing and enhancing port monitoring mechanisms, it is necessary to strengthen the cooperation among all relevant sectors and institutions, as well as among neighboring countries. It is important to recognize that during port monitoring, local and foreign vessels are monitored to be able to validate and support the increasing requirements for catch traceability and other documentations. In facilitating the process, support should be provided to countries by building upon their existing well-managed ports to be developed as a model for the country and establish protocols relevant to the laws and regulations of each country. Furthermore, landings by vessels in neighboring ports require special consideration in the process of validation of the legal status of landed catches, especially with regards to artisanal fisheries as indicated in the PSM Agreement. Initially, this could be followed up in relation to cross-boundary relations with regards to areas such as in the Gulf of Thailand between Cambodia and Vietnam, Cambodia and Thailand and in the area between Malaysia and Thailand. Similar efforts should be explored for border areas in the Andaman Sea, such as between Myanmar and Thailand and in the southern part between Indonesia, Malaysia and Thailand. Therefore, close cooperation should be enhanced among the countries in the Southeast Asian region and around sub-regional seas where countries share common interest in sustaining the benefits derived from productive fisheries and eventually effectively combat IUU fishing.

Ideally, port monitoring should include all fishing ports and landing sites, district and provincial, bearing in mind the places where fishery products are landed, which are considered as important and critical control points. Good port monitoring and port inspection is not only important to combat IUU fishing but is needed to control the quality of fishery products passing through the ports. In this regard, control of the socio-environmental standards of the ports is necessary since it is through the catch and landing documents provided at the ports and landing sites that the relevant authorities could appropriately assess the country’s earnings in terms of taxes and other revenues. Presently, port monitoring in the Southeast Asian region

is basically or primarily done to monitor the management of ports and landing sites without putting much focus on systematic monitoring and validation of catch documents and documents linked to the operation of the fishing vessels (*e.g.* registration, licenses, crew, other relevant documents) as stipulated in the PSM Agreement.

One critical challenge in port monitoring and inspection is to validate the legal status of catches from traditional small-scale fisheries, which becomes even more “challenging” because verifying the origin of landings especially for the small-scale fishing boats in border fishing ports is a very difficult task to undertake in view of the limited monitoring efforts and no records of their catch. One possible solution could be through the application of “cluster arrangements” whereby authorities at the landing sites can verify and validate the combined landings from a “cluster” of small boats in accordance with national laws and ensure that landings have been fished in a sustainable manner. As an option, cluster arrangements could also be used to certify products from small-scale aquaculture. With regards to artisanal landings across boundaries, Article 3, Para Part b of the PSM Agreement provides the necessary guidance viz: “Each Party shall, in its capacity as a port State, apply this Agreement in respect of vessels not entitled to fly its flag that are seeking entry to its ports or are in one of its ports, except for (a) vessels of a neighbouring State that are engaged in artisanal fishing for subsistence, provided that the port State and the flag State cooperate to ensure that such vessels do not engage in IUU fishing or fishing related activities in support of such fishing”.

Another challenge is to be able to validate the legal status of catches from areas where fishing vessels have two flags and double registration that would allow them to operate in waters of two countries. Recording of such catch becomes an issue because the catch might have been landed in ports which are most convenient for the best price of the day. Furthermore, institutional structures could actually obstruct all attempts to implement good port monitoring since in most instances, a number of agencies are involved with the fish landing and more often than not, cooperation for sharing of information among such agencies is very limited contributing to the hindrance for adequate enforcement.

#### **4.1.4 Monitoring, Control and Surveillance System and Network**

Effective monitoring, control and surveillance (MCS) capability is a fundamental component of fisheries management which could strengthen all efforts to manage fishing capacity and reduce IUU fishing. However, for MCS system to be effective supportive legislation would be necessary. The MCS capacity of the Southeast Asia countries varies depending on the level of technology

and on how advanced the systems used in the country could be. While generally monitoring may not be well developed, in some countries, control has been undertaken through the use of Vessel Monitoring Systems (VMS) for monitoring fishing activities within the respective EEZs. Many countries also attempt to strengthen law enforcement in order to improve fisheries management, but the effectiveness of such initiatives varies among the countries. The high maintenance cost of surveillance assets is a critical factor that contributes to the slowing down of the development of MCS in the Southeast Asian region.

Therefore, as a result of the prevalent ineffectiveness of national governance structures and varying MCS capacity to control fishery activities of national and foreign fishing vessels as well as combat IUU fishing, the efficiency of MCS could differ widely especially that regional structures to coordinate data collection and assessments to guide regional management are also lacking (Morgan *et al.*, 2007). While structures are being developed and/or improved in the respective countries, the varying legal mandates and/or regulatory systems among the countries make it difficult to harmonize policies and legislations in fisheries. Limited efforts in data collection and compilation, and varying levels and quality of existing research also make it difficult for managers to monitor and discern the real status of the fishery resources. Moreover, relevant government agencies, although not directly concerned with fisheries, *e.g.* environment authorities, national defense, coast guard, customs, and immigration, should take part in dialogues on matters relevant to determining priorities, allocating resources and sharing of information for the development of MCS networks (Awwaluddin *et al.*, 2011).

As a regional approach to the development of MCS networks, common understanding should be created including the perspectives on the new “requirements” that highlights the importance of cooperation in MCS activities and efforts to combat IUU fishing. In the Southeast Asian region, establishment of more “sub-regions” could be pursued as these could form basis of cooperation especially in areas where countries have common interests towards the development of MCS networks (SEAFDEC, 2010b). In this connection, the efficiency and effectiveness of fisheries-related MCS activities should be improved through enhanced cooperation and coordination, and improved information collection and exchange among national organizations and institutions responsible for fisheries-related MCS activities. Moreover, cooperation should also be strengthened in the sub-regions involving the ASEAN countries and as applicable, non-ASEAN countries (*e.g.* Arafura-Timor Sea between Indonesia, Timor-Leste, Papua New Guinea, and Australia). A number of regional, sub-regional and bilateral cooperative initiatives on MCS activities already exist in the Southeast Asian region, which could be grouped into two categories,

namely: a) joint patrol, and b) sharing of information, which provide clear contribution to capacity-building in MCS. Countries like Indonesia, Malaysia and Philippines, for example, have been involved in sub-regional initiatives or tri-lateral agreements to combat IUU fishing in the Sulu-Sulawesi Sea. Such initiatives include the “Marine Eco-region Program” of WWF, the RPOA to promote responsible fishing, and the Coral Triangle Initiative.

In addition, Indonesia, Malaysia, and Singapore through trilateral agreement, conduct regular collaborative seaborne patrol activities under the MALSINDO program and the joint “eye in the sky” air reconnaissance program to combat IUU fishing in the Malacca Strait (Poernomo *et al.*, 2011). However, human and financial resources are critical components of any MCS program. Even the capacity of MCS officers who are highly competent with high degree of integrity and professionalism in the implementation of MCS still needs to be strengthened. Moreover, as another means of enhancing MCS, community-based fisheries monitoring systems could be promoted as carried out in Indonesia, where community groups undertake the observation at sea and land, and report to the proper authorities in their communities any suspected fishers and vessels conducting illegal fishing.

#### **4.1.5 Legal and Institutional Matters**

In response to new international and regional instruments, requirements and agreements, *e.g.* FAO PSM Agreement and EC Regulation, safety and working conditions under the IMO and ILO Conventions, and ASEAN “Blueprints” for building the ASEAN Community, it is necessary to review the existing legislations, and the institutional and legal structures of the ASEAN countries as the results could form basis for dialogue and recognition of the opportunities and limitations of such legal structures. Such recognition is an important basis for the enhancement of cooperation among institutions involved in fisheries and maritime-related activities. Since the characteristics of fisheries in Southeast Asia is very complex with commercial, urban-based, a wide range of traditional and small-scale vessels with multi-gear fishing activities considered significant for the regions’ economies, it would be a great challenge to look at the legal and institutional implications of the various instruments, requirements and agreements. It is therefore necessary that the countries should review their existing regulatory frameworks and as needed make certain adjustments to be able to improve their respective fisheries management.

During the 2010 Expert Consultation on Managing Fishing Capacity to Combat IUU Fishing, the need to build up personal and institutional capacity in all aspects especially in terms of improving fisheries management and capacity, including port monitoring and MCS related matters had

been highlighted (SEAFDEC, 2010b). To improve the effective cooperation on M, C and S, a synthesis should be developed on the common needs for each sub-region as basis for the development of MCS networks. The synthesis should take into consideration the legal and institutional opportunities or limitations embedded in the relevant legislations of each country.

The legal and institutional implications in developing an MCS network and in embarking on a regional cooperation would mean increased emphasis on port state responsibilities and further pressure on flag states as basis for cooperation and information sharing. In the process of facilitating consultative dialogue legal officers should be involved in the process of regional cooperation considering that the countries have different laws and regulations.

Lawyers and legal officers should help in assessing the opportunities and limitations of the legal structure of each country to find out the common elements as basis for cooperation, including technical aspects reflected in national legislations. In order to adapt to rapid changes based on new requirements including those required for the building of the ASEAN Community, countries should learn from each other’s experiences and exchange information among countries in the region to facilitate the development of a structure that fits with national regulatory and institutional frameworks that could be adapted to common perspectives. Information-sharing should be enhanced while capacity building should be continuously promoted to improve institutional capacity.

#### **4.1.6 Future Direction**

In the Southeast Asian countries, being major producers of fish and fish products, efforts are continuously made to improve various aspects relevant to the management of fishing capacity including efforts to reduce IUU fishing in the region. Countries should now start looking beyond international agreements and conventions on combating IUU fishing, by taking suitable actions in support of improved management of fishing capacity, *e.g.* fishing vessel registration and licensing system, MCS, port monitoring, catch documents for fisheries management, and control of fishing efforts in the region. However, considering national policies and procedures, there is a need for capacity building and strengthening of relevant institutions to enable the countries to implement the abovementioned measures and requirements.

Furthermore, considering the ASEAN Community building which is envisaged to come into force by 2015, it is important to consider appropriate actions to facilitate cooperation among neighboring countries through bilateral and tri-lateral arrangements. Such arrangements could strengthen and provide basis for more

effective implementation of international instruments and agreements. To boost the regional approach and to facilitate cooperation, options should be explored in finding common ground for the management of fishing capacity and in enhancing efforts to combat IUU fishing in the region. Moreover, cooperation among such organizations as the Association of Southeast Asian Nations (ASEAN), the Asia-Pacific Fisheries Commission (APFIC), Southeast Asian Fisheries Development Center (SEAFDEC), and the Secretariat of the RPOA to Promote Responsible Fishing Practices (including Combating IUU Fishing), should be enhanced in order to improve the working relationship with the countries based on the respective on-going and planned initiatives that would secure benefits for the countries and ensure the sustainable utilization of the fishery resources in the Southeast Asian region.

#### 4.2 By-catch Reduction and Management

At the international level, the term “discards” is frequently synonymous with “by-catch”, even considering that “by-catch” is usually the main source of discarded catch in many fishery activities, especially from industrial fisheries in the temperate countries. Since “discards” are generally regarded as an important result of the negative impact of fisheries, various attempts have been made around the world to minimize “by-catch”. Unfortunately, the term “by-catch” as used in tropical areas including the Southeast Asian region, could result in misunderstandings about fisheries of the region. The major part of fisheries in the Southeast Asian region can be categorized as small-scale coastal operations exploiting a large number of tropical species. Therefore, three factors could differentiate the fisheries in the region from those of the temperate zones. These are: (a) most fishery operations in tropical waters are small-scale and conducted from one to few days, taking into account the economic value of the catch; (b) by the characteristics of tropical ecosystem, individual species in tropical waters have relatively small stock size compared with those in temperate areas; and (c) the inherent flexibility of markets in tropical areas traditionally handle a wide range of catch species each of which is relatively in small volumes.

Therefore, the international definition of “by-catch” could be modified for it to be applicable to fisheries in Southeast Asia, but should not be understood as source of discards. Thus, for the Southeast Asian region, “by-catch” could be associated with the target catch although such term is not used in all fisheries in the region and “by-catch” could be used for industrial fisheries. However, a more appropriate working term for by-catch in the region could be “unwanted catch” or “trash fish” which comprised the low- and no-value species, and under-sized commercially valuable species. Another major issue that should be addressed is the estimation of the scale of discards by fisheries in the

region. For in general, the amount of discards in Southeast Asia could be relatively small, considering the nature of small-scale fishery operations, but the increasing demand for aquaculture feeds encourages fisheries to land non-edible small-sized catch.

The collection of data to estimate the scale of discards might not be a priority issue for the Southeast Asian region. However, since collection of accurate data on discards requires enormous efforts and still might give unreliable results due to the small volume, more practical and useful approach should be developed through the conduct of appropriate research directed towards the development of management actions to reduce discards. The first important step that could be immediately undertaken by the countries is to identify the fisheries with discards problems through research that focuses on the reduction of “by-catch” or “unwanted catch”.

Under the present fishery regime, it may be difficult to convince fishers to be responsible in their operations through the use of selective fishing devices or by-catch reduction devices such as the Turtle Excluder Devices (TEDs), and the Juvenile and Trash Excluder Devices (JTEDs) which have been specifically designed to reduce by-catch. Fishers should also be made aware that such devices are important for the development of practical selective fishing methods which, in conjunction with the implementation of right-based fisheries, will eventually minimize the “unwanted catch”.

Considering that reduction of by-catch is a new initiative in the Southeast Asian region, demonstrations on the use of JTEDs have been conducted in the region through the SEAFDEC and FAO collaborative programs on Responsible Fishing Technologies and Practices, and By-catch Reduction Technologies and Change of Management (REBYC) which exhibit the rationale for the adoption of JTEDs as technical tool and as platform to initiate other management measures. In order that the adoption of JTEDs in the region would be sustainable, the Southeast Asian countries are encouraged to develop their respective national policies on the use of JTEDs and other selective fishing devices or by-catch reduction devices.

#### 4.3 Community-based Fishery Management Approach in the Southeast Asian Region

Fisheries in Southeast Asia are complex and any one single community-based fisheries approach may not be applicable, although it has been recorded that co-management approach has been progressing well in Malaysia, Thailand and Cambodia. The experiences of these countries indicate that effective and well-defined partnerships of NGOs and government take some time to establish, while the fisher groups or community