

Monitoring, Control and Surveillance (MCS) in Southeast Asia: Review of the Establishment of Regional MCS Network

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The advent of Illegal, Unreported and Unregulated (IUU) fishing has been widely recognized as deterrent to the sustainable development and utilization of the fisheries resources in the region. The Resolution on Sustainable Fisheries for Food Security for the ASEAN Region Towards 2020 serves as policy framework for the formulation of national policies to harmonize all efforts in the region. Referring to fisheries management, the Plan of Action specifies the need to take measures to prevent unauthorized fishing and eliminate the use of illegal fishing practices by building the awareness of all stakeholders on the adverse impacts of illegal fishing practices, strengthening law enforcement, developing and promoting responsible and selective fishing gears and practices, enforcing regulations, and encouraging alternative means of livelihoods. Moreover, on marine fisheries, the Plan of Action requires that efforts to combat IUU fishing should as well consider the establishment and strengthening of regional and sub-regional coordination on fisheries management and efforts and should also include the development of regional and sub-regional Monitoring, Control and Surveillance (MCS) Networks. In order to facilitate initial cooperation for the MCS Network, a platform of cooperation must be provided at the sub-regional/ regional level, which should also serve as forum to discuss the perspectives and considerations for the establishment of a Regional MCS Network (e.g. national regulatory framework, understanding limitations of Member Countries, and functions of cooperation).

Fisheries in Southeast Asia have developed rapidly from the 1970s to the early 1990s, the driving force of which had mainly been the increasing accessibility of global markets for fish commodities and the export liberation policies in the region. Fishery resources that include those in the Bay of Bengal, South China Sea and its vicinities, Western Central Pacific and the Indian Ocean are believed to comprise a multitude of marine aquatic species. Although fishing fleets generally fish in their respective EEZs but some also fish in their neighboring EEZs under bilateral agreements. The region's fisheries are dominated by small-scale or artisanal fishers which contribute 60-90% in terms of weight production but only 30-40% in terms of value. Meanwhile, the medium- to large-scale fishers produce mostly shrimps and tuna that are of high value and mostly supplied to export outlets (Martosubroto, 1998). In the midst of this regional fisheries situation and considering the uniqueness and variations of the region's fisheries,

growing concern on Illegal, Unreported and Unregulated (IUU) fishing presses the sector's sustainable management and fair utilization. As widely recognized, IUU fishing contributes to overexploitation of fish stocks and hinders the recovery of fish populations and the ecosystems. In an attempt to determine the losses due to IUU fishing by reviewing the IUU fishing situation in 54 countries and on the high seas, the lower and upper estimates of the current total losses brought about by illegal and unreported fishing worldwide could be between US\$10.0 billion and US\$ 23.5 billion annually, representing 11 to 26 million metric tons of aquatic commodities, where developing countries are considered to be most at risk from illegal fishing. The said figure could represent mostly the countries in the Southeast Asian region where poor governance could not be solely blamed for illegal fishing, but are the most vulnerable to illegal activities of both fishers and vessels from distant water fishing nations (Agnew *et al.*, 2009). The impacts of IUU fishing are beginning to be felt in many countries in the region, which could include reduced economic values, income, and employment (direct and indirect economic losses), and the unsustainability of the stocks of target species and the ecosystem (environmental impacts) as well as reduced livelihood opportunities and uncertain food security (socio-economic impacts).

MCS and Fisheries Management

MCS is a vital and crucial component of fisheries management, where the need for MCS could be easily recognized by assessing the status of fisheries development and management in a country. Fisheries management is bound to the resources, the types of fisheries and the kinds of resource users. In the Southeast Asian region, many factors when taken as a whole, could have significant

Box 1. Elements for the development of sustainable fisheries management

1. **Data Collection and Analysis** - socio-economic aspects, fisheries population, catch and effort, licensing, port-state measures, fish landings, among others (**Monitoring**);
2. **Participatory Management Planning** - fisheries management and strategies, fishing zones and areas which should involve concerned stakeholders/agencies (**Control**);
3. **Legal Instruments** - plans should be supported by appropriate legal instruments to effectively implement such plans (**Control**); and
4. **Implementation** - carrying out the established management measures (**Surveillance**)

implications to the development of fisheries management (Flewwelling, 2001). These factors emanate from the outstanding characteristics of the region's fisheries, such as multi-species resources, multi-gear fisheries and comprising large numbers of fishers. Generally, the development of sustainable fisheries management comprises the various factors as shown in **Box 1**.

Definition of MCS and Elements for a Successful MSC Scheme

FAO organized the Technical Consultation of International Experts in MCS for Fishery Management in 1981 in Rome. The definition of MCS which was agreed upon during the Technical Consultation is shown in **Box 2**. Moreover, the international and legal basis as well as the basic components of an MCS Scheme (**Box 3**) should be well understood. Furthermore, in order to achieve successful MCS scheme, capacity building through appropriate training sessions should be promoted considering that human resources are critical component of any MCS program. MCS staff should become more competent with a high degree of integrity and professionalism, and the same staff should be more proficient as communicators, planners, educators, and implementers of MCS. Information collection, analysis and management are also crucial especially for decision-makers to support their decisions, while effective administration of the information gathered through the MCS system is critical to the success of any MCS scheme. A database of fishery vessels, licenses, catches, and records of infringement should be maintained by agencies, institutes and ministries involved in MCS.

Box 2. Definition of MCS agreed upon during the FAO Technical Consultation in 1981

Monitoring involves the collection, measurement, and analysis of fishing activity data on catch, species composition, effort, discards, area of operations and so on, which is meant to assist fishery managers to arrive at management decisions. This should cover:

- *Monitoring of fish landings and effort data;*
- *Quantities and categories of fish landed;*
- *Monitoring of biological parameters obtained through sampling;*
- *Survey data from research vessels and trawl surveys;*
- *Stock abundance assessments and surveys, spawning, and migrating routes of fish species;*
- *Tagging data; and*
- *Mortality caused by diseases and parasites.*

Control involves the specifications of the terms and conditions under which resources can be harvested, and normally contained in national legislations, and provides basis on which management arrangements are enforced.

Surveillance involves checking and supervision of fishing activity to ensure national legislations and terms of access and management measures are observed. This activity is crucial to ensure that the resources are not overexploited, poaching is minimized and management arrangements are implemented.

Box 3. International and legal basis, and basic components of an MCS Scheme

International and Legal Basis

The international and legal bases for MCS are found in international fisheries instruments such as Article 73 of the United Nations Convention on Law of the Sea (UNCLOS), UN Fish Stock Agreement, FAO Code of Conduct for Responsible Fisheries, and the IPOA-IUU which outline the requirements for States to apply specific MCS-related measures from the start of the fishing activity until landing.

Basic Components of an MCS Scheme

An effective MCS system depends on the capacity of countries to utilize the MCS components depending on their institutional priorities, fisheries and fishing operations of each country, political support for conservation, and the funding available and other factors. FAO recommends that the following framework should be considered in implementing the MCS system:

- *Guided or in observance of the following principles: costs and benefits, symmetry between compliance and deterrence activities, balance between technology and human resources, balance between equity participatory and compulsory approaches, equality and transparency in the treatment of foreign and local fishers, absence of corruption in law enforcement and the MCS processes;*
- *Clear legal framework in accordance with and taking into effect the current international laws while taking into consideration the national and specific needs;*
- *Institutional outline for a cohesive and coordinated MCS operations (Navy, maritime police, airforce, customs);*
- *Guideline of operations and tools for the planning and execution of the MCS;*
- *Information management framework;*
- *Multi-level and comprehensive human resource training and development in all MCS components; and*
- *Periodic evaluation and analysis of the system.*

The abovementioned framework translates to the responsibility of the States to:

- *Enforce legislations and control mechanism;*
- *Establish data collection system (port monitoring, fishery observers, boarding inspections);*
- *Develop a supporting communication system;*
- *Conduct air reconnaissance;*
- *Adopt appropriate technology (VMS, satellite imagery, infra-red-tracking);*
- *Obtain commitment of the industry and fishers;*
- *Promote bilateral, sub regional and regional cooperation with other MCS support systems; and*
- *Employ competent and professional staff to implement above.*

Overview of MCS Programs of Selected Southeast Asian Countries

Box 4 shows the initiatives of some countries in the region to counter IUU fishing. The elements of MCS in these Southeast Asian countries and related activities are also illustrated.

Regional MCS Initiatives in Southeast Asia

Several meetings, workshops and conferences have highlighted the issue on IUU fishing that also raised

much concern among the countries in the Southeast Asian region. In an effort to address such issue, meetings and consultations had been conducted by SEAFDEC with its collaborating partners underscoring MCS as a tool to combat IUU fishing in the region. The ‘First Sub-Regional Meeting on the Gulf of Thailand’ convened in Bangkok, Thailand on 28-29 March 2008 as a follow up of the “RPOA-IUU MCS Meeting in Bali, Indonesia, suggested the establishment of MCS network in the Gulf of Thailand. The importance of developing an MCS network is well recognized to strengthen the MCS function and sustainable fisheries management in the Gulf of Thailand sub-region, but to come up with a regional MCS network would require the development of an “Asian Model” to address

the requirements of the region. Moreover, the specific definition of IUU fishing based on the context of the Gulf of Thailand (**Box 5**) could be used as a reference in the establishment of the regional MCS network. Furthermore, the need to find ways to monitor *non-national* vessels landing catches in neighboring ports was also suggested putting strong emphasis the on need of “Port Monitoring”.

SEAFDEC also organized the ‘Expert Meeting on Fishing Vessel Registration’ in Phuket, Thailand on 30 June-2 July 2008, where it was noted that the system of vessel registration used in by the countries in the Southeast Asian region varies and is unique since in most cases, different authorities/agencies are involved with varying roles/

Box 4. Initiatives of Countries in Southeast Asia to Combat IUU Fishing through Development of MCS Programs

Thailand: The main MCS functions are shared between the Department of Fisheries (DOF) and the Department of Marine and Coastal Resources (DMCR), where DOF maintains and operationalizes its floating assets (patrol boats) for **surveillance**. Both agencies conduct catch, fishing activities, fish stock and ecosystem monitoring. However, for large fishing vessels, registration is undertaken by the Marine Department under the Thai Vessels Act, B.E. 2481. Registration and licensing of small fishing vessels and gears are the responsibility of the Provincial Fisheries Office and reported to DOF annually (**Monitoring**). Conversely, registration of fishers in small-scale fisheries is carried out by the Provincial Office. Likewise, inspections of working conditions of fishery workers onboard fishing vessels, and in harbours and processing plants (waste management) are also carried out by DOF in compliance with the provisions of international conventions and agreements like the IMO and ILO. The Department of Harbours also surveys each vessel annually. As precautionary approach of management, the DOF has ordered the suspension of issuance of new licenses for trawlers and considering the establishment of fishing zones, control on gears and introduction of catch quotas (**Control**).

Indonesia: The key players involved in MCS activities are the Ministry of Marine Affairs and Fisheries (MMAF) through the Director-General of Fisheries, the Navy and Marine Police, and the Air Force. These agencies work not only for the protection and management of the country’s vast waters but also protecting the livelihood of over 5 million fisherfolks as the direct users of the resources. Surveillance activities include the establishment of the Technical Implementation Unit for Fisheries Surveillance (FS-TIU) in areas where rampant fishery violations had been identified. The FS-TIUs were initially established in strategic locations where the Fisheries Surveillance Officers (FSOs) and Fisheries Investigators are stationed. **Control** is implemented in the form of imposition of mesh size control, use of TEDs, banning of trawls, and complying with relevant binding fisheries regulations. Ministerial Decision of Marine Affairs and Fisheries (N. 29/2003) passed the adoption of vessel monitoring system (VMS) in the country (**Monitoring**), which aims at provide real-time information on vessel name, location, activity as well as other relevant and useful fisheries information. The information is compiled in database by MMAF to support the country’s surveillance activities. In addition, the technical cooperation with Australia in MCS resulted in the drastic decrease of illegal fishing activities specifically in Arufara Sea. Likewise, community-based MCS also plays an integral role in fisheries protection, serving as important and economical role in providing information on illegal fishing activities (**Surveillance**) prevalent in their respective localities. At sea surveillance capability has been strengthened through the deployment of Surveillance and Controlling Boats/Crafts and NOMAD light aircrafts for air reconnaissance.

Philippines: MCS is an inter-agency task led by the Department of Agriculture-Bureau of Fisheries and Aquatic Resources (BFAR), where effective functions are carried out in close collaboration with other agencies such as the Philippine Coast Guard (PCG), Philippine Navy, Department of Foreign Affairs, Department of Interior and Local Government, the Maritime Industry Authority, and others. In order to facilitate an effective MCS program, the MCS Coordinating and Operating Center was established at the Navotas Fishport Complex and fifteen (15) Regional Monitoring Centers all over the country (**Monitoring**). The collection of the data on the biological, economic, and social aspect of the fisheries is also vital. The analysis of these data provides the input into the fisheries planning, policy formulation, aid in formulating legislations and basis for decision making. Monitoring tools includes national stock assessments programs (NSAP), resource and ecological studies, hydro-biological studies, fisheries statistics and catch reports, CRM data, issuance of licenses, and HACCP enforcement. (**Control**). The interventions are scientifically based on the data/information generated by the Monitoring Component. The Philippine Fisheries Code of 1998 (Republic Act 8550) provides pertinent laws and concrete basis of fishery rules and regulations. Moreover, the Department of Agriculture through BFAR also passes specific Fisheries Administrative Orders (FAOs) for the management and protection of the country’s fisheries. (**Surveillance**). Effective community-based MCS is carried out by empowering local fishers through law enforcement training and deputizing them under the “Bantay Dagat” (Fish Warden) Program with the active participation of the Fisheries and Aquatic Resource Management Council (FARMC) at the municipal level. Strengthening of law enforcement activities also includes the provision of 118 units Bantay Dagat Patrol Boats, 43 units 24-footer and PL-480 Patrol Boats to priority coastal areas nationwide. The BFAR 14 units MCS Patrol Vessels which are jointly manned and operated by the Philippine Coast Guard (PCG) and BFAR law enforcers, are deployed in offshore waters to deter all forms of illegal fishing activities rampantly recurring in the Country’s EEZ. The research and training vessel, the M.V. DA-BFAR also plays a role in the conduct of surveillance activities. Air reconnaissance capability is carried out in collaboration with the PCG, while a BFAR Fisheries Resource Protection and Law Enforcement Unit Quick Response Team (FRP-LEU QRT) is in place to conduct law enforcement activities. In addition, the VMS system targets the installation of transponders on commercial fishing vessels. An important component of the monitoring activities, the Philippine National Observer Program is well in place, which has been duly certified and authorized by the Regional Observer Programme of the Western and Central Pacific Fisheries Commission (WCPFC).

Box 4. Initiatives of Countries in Southeast Asia to Combat IUU Fishing through Development of MCS Programs (Cont'd)

Malaysia: The country's MCS activities are joint responsibility of the Department of Fisheries (DOF) Malaysia, Fisheries Development Authority of Malaysia (FDAM), and the Department of Environment (DOE). **Monitoring** covers biological and socio-economic aspects of fisheries which includes catch, fishing activities, port monitoring, trade, fish stock, and environmental health monitoring (through the Fisheries Management Information System). The Resource Management Branch on the other hand translates data into plans, policies and regulations. **Control** is supported by effective legislation that includes zoning, catch quotas, fishing units control, and mandatory reporting. Registration and licensing of boats, gear, and people are the responsibility of the DOF, while the identification and listing of important habitats is both under the function of DOF and the Department of Marine Parks (DOMP). **Surveillance** activities are collaborative effort involving various stakeholders (*i.e.* DOF, DOMP, Marine Police, Navy, and the Malaysian Maritime Enforcement Agency), whose tasks include joint seaborne operations, air and sea patrols, and fishing vessel inspection. VMS is in place and operational, which has been supported with 100 patrol vessels and 3 Boston whalers for offshore patrolling.

Vietnam: MCS activities in Vietnam are supervised by the Department of Capture Fisheries and Resources Protection (DECAFIREP). Although surveillance capability may be minimal but the National Network for Fishery Conservation was established to manage and protect the fishery resources. In 2009, an MCS Center was established by DECAFIREP in close collaboration with its local coastal branches to establish a system for statistics collection, and data and information analysis. This activity mainly focuses on capacity building mechanism, organizing training and guiding local officers in setting up plans and analysis methods. Fishing vessel monitoring activities started in the late 1980s in some local provinces and the function was delegated in all coastal provinces in the country in 1995. The monitoring activities/missions were carried out either direct monitoring (on-site through the controlling activities of fisheries enforcers) or indirect monitoring (through the installation of equipment and intermediaries, which could be a form of vessel monitoring).

Cambodia. The Fisheries Administration (FiA) of the Ministry of Agriculture, Forestry and Fisheries is in charge of developing research and drafting laws and policies on fisheries (and aquaculture) and is also vested with inspecting powers. At the local level, fisheries management is a function of the Provincial-Urban Fishery Authorities, which have the necessary powers to ensure compliance with the laws, in the area under their jurisdictions. The concept of MCS as management tool is yet to be developed in Cambodia and human capacity building is found crucial for such development. The country has adopted various fisheries management tools such as control of fishing pressure by issuance of fishing permits/licenses for commercial fishing (foreign and local), gear type and size restrictions, trawling prohibitions (<20 m. water depth) but enforcement of these measures is still considered weak. However, efforts for community-based management had been developed and applied in some coastal communities in recent years.

Myanmar: As with the other countries in the region, Myanmar is yet to develop its MCS system to start with integration of legal framework to support the M, C and S functions. Presently, the Department of Fisheries of Myanmar through its Director-General is responsible for controlling and authorizing fishing vessels to conduct fishing activities, and establishing checkpoints for fishing vessels. On the other hand, fishery inspectors had been designated and authorized to accompany, stop, inspect, board, arrest, and prosecute fishery violators. Infrastructure, manning and other supports to strengthen the activities have been considered and deemed necessary.

responsibilities as provided in the agencies' legal mandates and jurisdiction. The subsequent 'Second Sub-Regional Meeting on the Gulf of Thailand' in Bangkok, Thailand on 24-26 February 2009 proposed to utilize/employ "Monitor, Record and Control", "vessel records and inventory" and "Port Monitoring" to assess and record the status of fisheries in the region and enhance effective management.

Box 5. Elements for Definition of IUU Fishing (First Sub-Regional Meeting on the Gulf of Thailand, 28-29 March 2008)

- Fishing is conducted by national or foreign fishing vessels in waters under the jurisdiction of a State, without the permission of that State, or in contravention of its laws and regulations.
- Fishing activity is in violation of national laws or [relevant international obligation].
- Catch has not been reported, or has been misreported, to the relevant national authority, in contravention of national laws or regulations.
- Fishing is in areas or for fish stocks in relation to which there are no applicable conservation or management measures (and where such fishing activities are conducted in a manner or inconsistent with State responsibilities for the conservation of living marine resources under international laws.

The 'Workshop on Fishing Vessel Record and Inventory in Satun Province, Thailand on 27-29 July 2009 organized by SEAFDEC with funding support from the Swedish International Development Agency (Sida), followed up the recommendations of the 2008 Expert Meeting on Fishing Vessel Registration regarding the possibility of information sharing in the region on records and/or registers of fishing vessels. Thus, the draft "Fishing Vessel Record and Inventory Forms" was agreed upon in order to build up a regional "vessel record and inventory" with the longer term objective of improving registration of fishing vessels and enhancing the regional cooperation on information sharing in the region.

The SEAFDEC-Sida project also organized the 'First Meeting of the Andaman Sea Sub-region' on 20-22 October 2009 in Phuket, Thailand, which encouraged the countries look at the usefulness of agreements established in the region as basis for sub-regional arrangements. Furthermore, the key issues of regional concern, such as addressing fishing capacity, IUU fishing, and vessel registration were also discussed in the context of the Andaman Sea area, and where items and recommendations identified during the March 2008 Gulf of Thailand Meeting could be used

as reference in initiating the Andaman Sea Process for continuing the activities at sub-regional level.

The ‘Expert Consultation on Managing Fishing Capacity to Combat IUU Fishing in Southeast Asia’ convened in September 2010 in Bangkok, Thailand, highlighted the importance of regional approaches to in the development of agreements at sub-regional level including the development of MCS networks. This was further underlined by the need to develop a common understanding of the new “requirements” to combat IUU fishing. The need to follow up with the requirements of RPOA on the inclusion of countries to be involved in established sub-regional groupings was highlighted, including considerations to establish more “sub-regions” where there are common needs to implement MCS-networks among concerned countries such as the area around South West South China Sea and Southern Malacca Straits.

In terms of regional, sub-regional and bilateral cooperative MCS activities, a number of initiatives exist in the region. These initiatives may be categorised into joint patrolling and sharing of information which contribute largely to capacity-building in MCS. Countries like Indonesia, Malaysia and the Philippines for example, are involved in the regional initiatives or tri-lateral agreements to combat IUU fishing in the Sulu-Sulawesi Sea Marine Eco-region Programme of the WWF as well as in the RPOA to promote responsible fishing. Bilateral agreements have also been forged to adopt collaborative measures to combat IUU fishing. In addition, Indonesia, Malaysia, and Singapore (tri-lateral agreements) have regular collaborative seaborne patrol activities under the MALSINDO program and the joint “eye in the sky” air reconnaissance to combat IUU fishing in Malacca Strait (Poernomo *et al.*, 2011).

Gearing towards a Regional MCS System

Several issues have been identified which should be addressed in initialization MCS network in the region. The MCS capacity in the region varies among the countries, while some countries may have advance MCS technology or system but others may have no MCS program at all. Some countries may just utilize other forms of fishery law enforcement with various effectiveness and strength. The high cost of maintenance of surveillance facilities is another factor that should be considered in the development of regional MCS system. The countries also have different legal mandates or systems which make it difficult to harmonize policies and legislations in fisheries. Data collection systems and research levels also differ making it difficult for managers to monitor the status of the fishery resources. Nevertheless, the RPOA-IUU provides a framework for cooperation among countries in the region

to collaborate in the implementation of MCS measures. In order to strengthen the MCS capabilities/systems in the region, the RPOA-IUU also requires the development of a regional network to quickly share information on vessels name, ports used (home and unloading port), target species, and other relevant information and encourages member countries to: enter into appropriate sub-regional MCS arrangements/collaborations to eliminate IUU fishing activities; develop a regional MCS network for sharing information and coordinate collaborative regional activities to enhance sustainable fisheries management to combat IUU fishing; promote knowledge and understanding among neighbouring countries; develop or strengthen existing observers program in compliance with regional and international requirements and adhere to inspection requirements of fishery management organizations (FMOs).

Way Forward

The establishment of a regional MCS network is crucial to strengthen MCS capabilities in participating countries through coordination and cooperation with the goal of deterring, reducing, and eliminating IUU fishing and other destructive activities that affect the sustainability of the marine resources. The network should therefore be designed to satisfy obligations arising from international agreements and their national responsibilities in performing MCS functions. Regional cooperation in adopting MCS is



BFAR Bantay Dagat Patrol Boat (above); and BFAR 30-meter MCS Patrol Vessel (below)

imperative for effective fisheries management particularly of shared stocks. Bilateral, sub-regional and regional cooperation on MCS can yield the exchange of fisheries data for MCS for fisheries management purposes, and thus, should be pursued. In the establishment of a regional MCS system it would be necessary to harmonize legislations and extradition agreements, as this would result in cost saving and increased negotiating power especially in the implementation of flag and port State control agreements, and combined measures to address IUU fishing.

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BFAR Research Vessel M.V. DA-BFAR (above); and BFAR staff conducting measurement of fish sizes using a Fish Ruler (below)

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