

FISHCODE

MCS

FISHERIES MANAGEMENT AND MCS IN SOUTH ASIA: COMPARATIVE ANALYSIS

**PREPARED BY
PETER FLEWWELLING**



**FOOD AND AGRICULTURE ORGANIZATION
OF THE UNITED NATIONS**

ROME, JANUARY 2001

FISHCODE

MCS

**FAO/NORWAY PROGRAMME OF ASSISTANCE TO DEVELOPING
COUNTRIES FOR THE IMPLEMENTATION OF THE CODE OF CONDUCT
FOR
RESPONSIBLE FISHERIES**

**Sub-Programme C:
Assistance To Developing Countries For Upgrading Their Capabilities In
Monitoring, Control And Surveillance**

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ABSTRACT

This document is the result of country review and assessment missions to eleven Asian countries under the Norwegian funded FISHCODE Project GCP/INT/648/NOR) undertaken during January 1999 and October 2000. It focuses on the MCS component of fisheries in Bangladesh, Cambodia, India, Indonesia, Malaysia, Maldives, Myanmar, Philippines, Sri Lanka, Thailand and Vietnam. The intent of the missions was threefold:

- 1) assess fisheries management and MCS capability;
- 2) assist where possible in advice for immediate MCS steps to enhance current systems, and finally,
- 3) assess potential regional or sub-regional mechanisms for cooperation in fisheries management, including the MCS component.

The report first provides a comparative analysis of the findings of the missions, presents a synopsis of potential regional cooperation and then provides more detailed information and suggestions to enhance MCS on a regional basis.

Author's Note:

The recommended options for vessel marking and identification are the FAO system, or as modified in the Malaysian system, the former available from FAO and the latter being described in the Malaysia mission report.

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ACRONYMS

ADB	Asian Development Bank
APFC	Asia-Pacific Fishery Commission
AusAID	Australian Aid Programme
BFAR	Bureau of Fisheries and Aquatic Resources – Philippines
BIMP-EAGA	Brunei, Indonesia, Malaysia, Philippines – East Asia Growth Area
BOI	Sri Lanka Board of Investment
CBFM	Community Based Fisheries Management
CBM	Community Based Management
CCRF	Code of Conduct for Responsible Fisheries
CIDA	Canadian International Development Agency
COREMAP	Coral Reef Rehabilitation and Management Project, funded by World Bank, Asian Development Bank, Australian Assistance and Japanese Grant Aid
CRM	Coastal Resources Management
CRMP	USAID Coastal Resources Management Project – Philippines
EEZ	Exclusive Economic Zone
EU	European Union
FAO	Food and Agriculture Organization of the United Nations
FFA	South Pacific Forum Fisheries Agency
FRMP	ADB Fisheries Resources Management Project – Philippines
FSP	Fisheries Sector Project of the ADB/OECF – Philippines
GIS	Geographic Information System
GMDSS	Global Maritime Distress and Safety-at-Sea System – IMO
HF	High Frequency Radio
IEC	Information, Education, Communications Campaign
IMO	International Maritime Organization of the United Nations
IOTC	Indian Ocean Tuna Commission
ISO 9000	International Organization for Standardization – 9000 series for quality management and quality assurance standards
JICA	Japanese International Cooperation Agency
LGC	Local Government Code of the Philippines (1991)
MCS	Monitoring, Control and Surveillance
MECC	Maritime Enforcement Coordinating Committee (Malaysian)
MHLC	Multi Lateral High Level Commission (Fisheries Asia Pacific)
NGO	Non-Government Organization
OECF	Japanese Aid – Loan
PA	Public Awareness Campaign/Program
SAMs	Special Area Management Zones
SAR	Search and Rescue

SEAFDEC	Southeast Asian Fisheries Development Center
UNDP	United Nations Development Programme
USAID	United States Agency for International Development
US DEA	United States Drug Enforcement Agency
VHF	Very High Frequency Radio
VMS	Vessel Monitoring System
WB	World Bank

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The author wishes to sincerely thank all those involved in these missions, the presentations during the missions, and the resource persons who assisted in the subsequent Regional (6 countries) MCS training session in Songkhla, Thailand in July 2000. It is hoped that the missions were helpful to the countries visited, and that these visits and ideas become first steps towards closer regional cooperation for the implementation of sustainable, joint management and conservation measures for our marine resources.

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PART ONE

REGIONAL COMPARATIVE ANALYSIS

CHAPTER ONE

INTRODUCTION TO FISHERIES MANAGEMENT AND MONITORING, CONTROL AND SURVEILLANCE

1. INTRODUCTION TO PROJECT

The Norwegian Assistance to Developing Countries for the Implementation of the Code of Conduct for Responsible Fisheries in Fisheries Monitoring Control and Surveillance (MCS) and, in Improving the Provision of the Scientific Advice to Fisheries Management (FISHCODE) Project currently had two areas of focus, the first being the applied research component to enhance the tropical fish stock assessment capability in participating countries. The second focus, the monitoring, control and surveillance (MCS) component, is now regarded as the “executive arm”, or implementing mechanism for fisheries management. This report concentrates on the second component, the assessment and suggestions for the enhancement of the MCS capability in the countries that have participated in the Project in South Asia.

The MCS component of FISHCODE commenced in 1998 with a Regional MCS Conference in Kuala Lumpur, Malaysia, and a second such MCS initiative for the Middle East countries in Muscat, Oman in October 1999. This report is intended to revisit the Kuala Lumpur MCS workshop, and the visits that followed at the request of the participating countries to assist officials in addressing their current MCS situations. The intent of the missions was also to assess common concerns and activities that had the potential for regional cooperation and assistance.

The MCS country missions commenced in January at the FAO Regional Office in Thailand in January 1999 and continued until September 2000 to cover Bangladesh¹, Cambodia², India³, Indonesia⁴, Malaysia⁵, Maldives⁶, Myanmar⁷, Philippines⁸, Sri Lanka⁹, Thailand¹⁰ and Vietnam¹¹. At one interval in Rome, it

¹ Flewwelling, P., *Report of travel to Bangladesh (21-28 March, 1999)*, FISHCODE Mission Report No. 14: 25p.

² Flewwelling, P., *Report of travel to Cambodia (4-15 July, 1999)*, FISHCODE Mission Report No. 25: 43p.

³ Flewwelling, P., *Report of travel to India (28 March – 8 April, 1999)*, FISHCODE Mission Report No. 15: 28p.

⁴ Flewwelling, P., *Report of travel to Indonesia (10-22 October, 1999)*, FISHCODE Mission Report No. 31: 94 p.

⁵ Flewwelling, P., *Report of travel to Malaysia (9-21 April, 2000)*, FISHCODE Mission Report No. 42: 52p. (unpublished)

⁶ Flewwelling, P., *Report of travel to Maldives (4-10 September, 2000)*, FISHCODE Mission Report No. 62: 55 p.

⁷ Flewwelling, P., *Report of travel to Myanmar (11-20 March, 1999)*, FISHCODE Mission Report No. 13: 24p.

⁸ Flewwelling, P., *Report of travel to Philippines (2-17 August, 1999)*, FISHCODE Mission Report No. 28: 19p.

⁹ Flewwelling, P., *Report of travel to Sri Lanka (21-30 April, 2000)*, FISHCODE Mission Report No. 43: 46p. (unpublished)

¹⁰ Flewwelling, P., *Report of travel to Thailand (12-24 January, 1999)*, FISHCODE Mission Report No. 11: 31p. and

was decided that a comparative analysis of the findings from the country visits could provide a tool for countries to share the benefits of each others' MCS systems development and experiences.

It must be noted that this report is best utilized if it is considered in the full context of fisheries management from data collection and analysis, through the participatory management planning exercise, the development and enactment of supporting legislative instruments, and the implementation mechanism for fisheries management. It should also be read in conjunction with the individual country reports from each mission.

MCS and Fisheries Management

For the purposes of this report, it would be helpful if the terms “MCS” and “fisheries management¹²” are clarified and put in context.

“What is MCS?” A meeting of fisheries experts at FAO in 1981, first defined the terms “monitoring”, “control” and “surveillance”. The definitions established then are still the official definitions today (Annex B). Enhancements to these definitions have been to clarify them and to reflect the emerging trend that MCS is more than just fisheries enforcement - it is an integral, key component for the implementation of fisheries management plans. It encompasses the development and establishment of supporting legislative instruments and the actual implementation of management plans through participatory techniques and strategies, including “preventative” MCS and “deterrent” MCS activities.

Fisheries management in its simplest terms is comprised of the following activities:

1. *Data collection and analysis* – data from socio-economic studies, rural development studies, fisheries population studies, fisheries research cruises, licensing (national, provincial and district), catch and effort/logbooks, onboard observers (if established as a program), dockside monitoring/landings, VMS, satellite imaging, at-sea and port inspections, etc.
2. *Participatory Management Planning* – the general planning of fisheries management policies and strategies, and detailed planning for management zones or areas with input from stakeholders (provinces, districts and fishers). This participatory input can assist in reducing costs of MCS enforcement as it encourages understanding and “ownership” of the plan resulting in voluntary compliance by the participants. *This exercise results in the approved management plans for fisheries.*

Report of travel to Thailand (30 April – 15 May, 2000), FISHCODE Mission Report No. 46: 84p.

¹¹ Flewelling, P., *Report of travel to Vietnam (20 June – 4 July, 1999)*, FISHCODE Mission Report No. 24: 41p.

¹² Fisheries Management is not defined specifically in this paper, but reference is directed to Article 7 – Fisheries Management, in the *Code of Conduct for Responsible Fisheries*, FAO, Rome, 1995

3. *Legal Instruments* – The management plans need to be supported by appropriate legal instruments to be able to implement the plan. These legal instruments detail all the control mechanisms available for fisheries management including, but not limited to:

Input Controls (usually legislated)

- Limited Access (# fishers, # vessels by fishery)
- Licenses
- Closed Seasons
- Gear restrictions
- Vessel limitations
- Area restrictions (Protected Areas)
- VMS requirements
- Vessel identification

Operational and Output Controls

- Species and Catch Limits
- By Catch Limits
- Reporting verification
- Air Surveillance
- Sea Patrols/Inspections
- Boardings
- Logbooks verification
- Dockside monitoring
- Observers
- Port Inspections

4. *Implementation* – This activity involves the carrying out of established management measures, controls and ensuring compliance with such measures and includes the participatory community-based management (CBM); “preventative MCS” to encourage voluntary compliance; public awareness and education campaigns; assistance to small scale fishers through the middleman/entrepreneur and rural fishers for supplemental livelihood development to reduce coastal area pressures; and finally, the “deterrent MCS”, or enforcement to ensure compliance by those minority of fishers that persist in ignoring the law.

A second question often asked is: “Where do fisheries management and MCS merge?”, so in parallel, one can look at MCS as including:

- data collection and analyses for both operational planning and execution as well as management planning, defined as **monitoring (M)**;

- *involvement in the participatory management planning to include discussions on appropriate implementing mechanisms;*
- development and approval of appropriate and enforceable legislative instruments and control mechanisms such as licenses, permitted fishing gear, seasons, vessel sizes, fish sizes, species, catch limits, by-catch limits, and area controls, or other restrictions to support the management plan, referred to as the **control mechanisms (C)**; and
- the implementation of the plan through “preventative” and “deterrent” MCS techniques, included in the idea of **surveillance (S)**.

Finally, one should note that there is an emerging trend to MCS in the past few years. MCS has often been viewed as only enforcement without the realization that there are monitoring and control components, including the preventative elements that are required before one should have to resort to full deterrent enforcement activities. Unfortunately, not all fisheries personnel understand MCS, or its critical role as an implementing mechanism for fisheries management. These individuals also see arrests as the only indicator¹³. The real indicator for MCS is the level of compliance. Compliance is governed by many factors, e.g., # fishers; # vessels; effort and area against hours and area coverage of patrols; results of patrols, increase in voluntary compliance, etc. As noted earlier, MCS involves a two-pronged, parallel approach, the **preventative approach** and the **deterrent/enforcement approach**. The *preventative approach* is to encourage “voluntary compliance” through understanding and support for the management strategies and this includes:

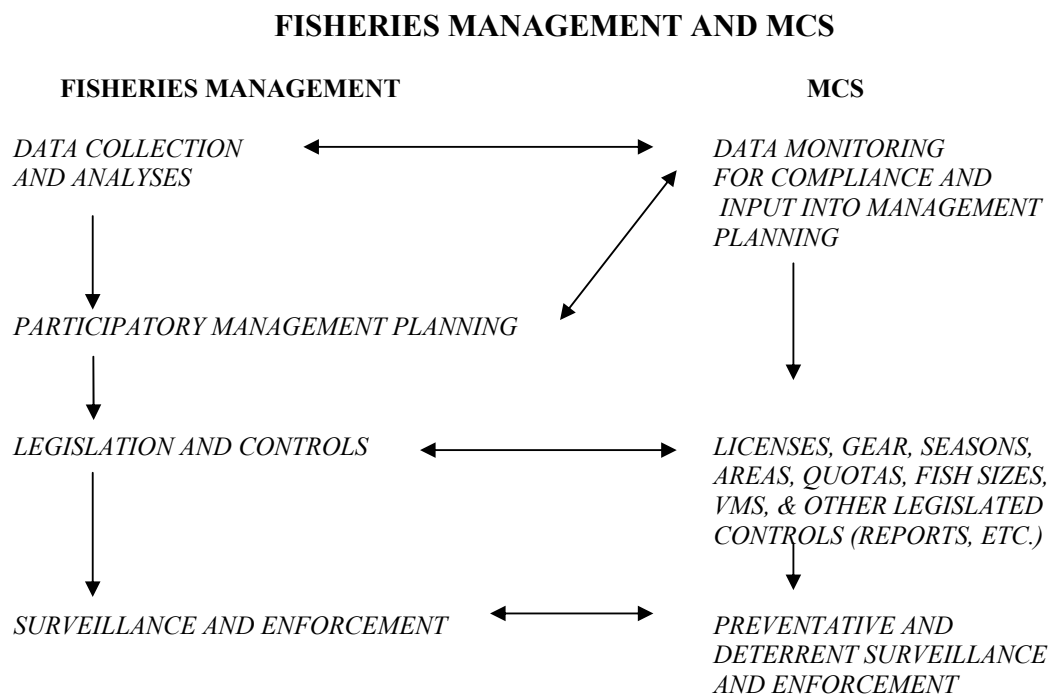
- community/fishers awareness and understanding of management practices through seminars, public awareness (PA) and Information Education, and Communication campaigns (IEC);
- participatory management development to promote ownership of the management regime and input into the regulatory/control aspect of management (laws and regulations) in preparation for acceptance by the fishers of their joint “stewardship” role for the management of *their* fisheries, in partnership with Government;
- peer pressure towards voluntary compliance and support for the management regime;
- the institution of accurate and verifiable data collection regimes; and
- surveillance and verification for compliance.

Finally, it should be understood that it is difficult to gain acceptance for cancellation of a fishery in any society. This becomes especially difficult in an artisanal, subsistence fishery, without providing other options or alternative livelihood opportunities for those on whom the decision will have severe negative

¹³ There is still the mistaken perception that MCS is “unproductive” if it does not result in arrests. This does not follow the emerging idea of MCS as a key tool for the implementation of the Code of Conduct for Responsible Fisheries, nor the concept of *preventative MCS* and *deterrent MCS* activities operating in parallel for successful and cost-effective fisheries and coastal resource management.

impact, the poorest of the poor - the rural fishers. It is for this reason that for coastal fisheries management, the participatory approach of involving the stakeholders is essential to gain support for the plan, and for any success in implementation of the program.

The second and parallel approach for MCS implementation is the *deterrent/enforcement* approach that is necessary to ensure compliance by fishers who resist the regulatory regime to the detriment of both the fishery and the economic returns to their brother and sister fishers. This includes the inspection, investigation, prevention and court activities to enforce the law. Voluntary compliance will fail if stakeholders see non-compliant fishers successfully evading the law and thereby gaining illegal returns to the detriment of the compliant fishers.



CHAPTER TWO

FISHERIES IN ELEVEN COUNTRIES OF SOUTH EAST ASIA

1. GENERAL BACKGROUND OF FISHERIES IN THE REGION

The following is a comparative summary of statistics for the countries visited and where data is unavailable the latest data from the FAO Atlas was used. It must be noted that where these statistics are taken from the FAO Fisheries Atlas, they come from the countries themselves, so there may be inaccuracies in the figures as FAO, understandably does not have resources to enable it to verify all statistics submitted. Further, on questioning officials in the countries visited, there was recognition that the statistics may not be as accurate as they should, or possibly could be, due to several internal and extraneous pressures including, but not limited to:

- lack of personnel to accurately collect, cross check or verify statistics, and hence these come from fishers themselves whose other agenda, e.g., taxes, benefits for increased production, etc., may result in deliberate or unintentional errors;
- bonuses for officials for demonstrations of increased fisheries/food production that promote misreporting;
- lack of any collection system; etc.

One can only assume that in many instances these statistics are best estimates, except perhaps for Malaysia. The licensing and statistics systems in Malaysia for all fishers, vessels and fishing gears is very complete and an example for the region. It is to a level that they expect to receive the International Standards of Operations 9000 (ISO 9000) certification standards for the licensing program in year 2000.

Table 1 REGIONAL FISHERIES DATA FROM COUNTRY VISITS

COUNTRY	EEZ SIZE (in 000s of sq km) ¹⁴	FISH PRODUCTION ¹⁵	VALUE (in millions US\$)	FISHERS ¹⁶	FISHING VESSELS ¹⁷
BANGLADESH	166	1.3 million mt (270,000 mt = marine)	1,000 with 325.11 in exports	1.2 million with estimated 580,000+ full time fishers	27,000-30,000
CAMBODIA	55.6	500,000 mt (60,000 mt marine)	80 ex-vessel with 143 in exports plus 130-200 in inland fisheries	350,000 + in primary sector (some estimates as high as 3 million gaining	4000 marine (inland is not known – excludes all subsistence fishers)

¹⁴ Country mission reports, *ibid* footnotes 1-11, p.1.

¹⁵ May or may not include estimates of the subsistence fishers catches, combined FAO country papers and on site discussions in mission reports, *ibid* footnotes 1-11, p.1.

¹⁶ Open access is the regime in most countries with no registration or licensing required for subsistence fishers, vessels and gear, *ibid* country missions, footnotes 1-11, p.1.

¹⁷ Does not always include subsistence fishers except where noted, nor in some cases does it include mobile gear or fishing vessels that fish outside EEZs, country mission reports, *ibid*. footnotes 1-11, p.1.

				from fisheries)	
COUNTRY	EEZ SIZE (in 000s of sq km)	FISH PRODUCTION	VALUE (in millions US\$)	FISHERS	FISHING VESSELS
INDIA	2,020	2.7 million mt (marine fisheries only)	4,845 ex-vessel and 1,200 in exports	5.96 million (2.4 million are full time)	220,903 traditional/39,444 traditional motorized and 51,744 mechanized (incl. 180 shrimpers)
INDONESIA	3,100	3.7 million mt estimated	4,200 ex-vessel and 1,640 in exports	2.087 million (508,626 capture fishers) Estimated as high as 50% of the 120 million coastal residents partake in fishing = 60 million part time and full time	334,202 total vessels – 50% traditional and only 154,302 for open water fisheries with 70.6% <5GRT
MALAYSIA	475.6	1.2 million mt (1998)	2,000	78,989 fishers (8,437 foreign)	34,000 vessels
MALDIVES	1,000	124 million mt (1999)	44 ex vessel but 56 in export value	22,098 estimated	1443 vessels
MYANMAR	560	830,000 mt total with 525,600 mt from marine fishery	673.8 ex-vessel and 167.1 in exports	2 million (440,000 are full time)	21,000 vessels for offshore
PHILIPPINES	2,200	2 million mt	1,800 ex-vessel with 530 in exports	1 million in the industry 57,000 large vessels, 259,000 culture fisheries and the rest municipal fishers (rough estimate as no figures available.	Estimated 300,000 small boats – no figures available – approximately 3,200 commercial fishing vessels licensed
SRI LANKA ¹⁸	517	228,000 mt	341.1 ex-vessel and 64.9 in exports	150,000 fishers	26,600 vessels
THAILAND	514	2.9 million mt (2.6 million = capture fisheries) and 4,100 in export value	2,515.6 (ex- vessel prices – 1996) 1,200 mariculture and aquaculture and 1,250 in shrimp	530,401 total in primary fisheries sector (161,667 in capture fisheries)	54,700 (DoF only licenses mobile gear, thus only 17,657 licenses issued)
VIETNAM	1,000	1.1 million mt	500 million	3 million (1.1 million in the primary sector)	88,000 + (incl. 20,000 offshore vessels, but only 100 are large vessels with BHP > 400)

One can see that Indonesia has the largest EEZ and numbers of fishers, with the Philippines, India, Maldives and Vietnam following in order. The importance of the fisheries is not directly related to numbers of fishers and size of EEZ however, as one can see from Thailand. The fisheries for Thailand with its comparatively small EEZ (514,000 sq km) takes on a high priority for food security and export

¹⁸ Fisheries statistics may be inaccurate in the zone of conflict in the country, the north and east coasts.

value and is second only to Indonesia (3.7 million mt) in production with 2.9 million mt/annum and third in value behind India and Indonesia. Much of the Thailand catch is from the fisheries outside Thailand waters. It is noteworthy that Thailand has the largest offshore fishing capability, with the Malaysian, Sri Lankan, Myanmar and Philippine fleets now starting to fish further from their shores and building up a larger offshore capacity.

2. FISHERIES MANAGEMENT PRINCIPLES AND GENERAL RECOMMENDATIONS

Key management principles that are causing concern include:

- The predominance of “open access” as a management principle, thus limiting the ability to reduce pressure on fisheries, especially in the coastal areas;
- Lack of political support for fisheries management as it is a lower priority in the government, the exception being Malaysia;
- Multi-agency overlaps in the marine sector with a lack of leadership for fisheries management;
- Lack of an effective inter-agency mechanism for fisheries management and a more holistic approach to integrated management of the marine sector.

General recommendations

1. *Political commitment and support for the fisheries management plans and objectives is imperative for the success of any fisheries management scheme.* This is normally demonstrated through:
 - the existence of legislation that is current and which reflects international and national trends and obligations;
 - appropriate levels of funding for operations; and
 - ongoing input and support for fisheries plans and objectives.
2. *Fisheries Departments need to look at the offshore and marine coastal area in total as its management area* with the recommended two-pronged MCS approach, preventative and deterrent MCS, and a more holistic approach to management. The *holistic approach* should note the totality of impacts of management decisions on the fishers and the resources, and whether they can be absorbed, e.g., the socio-economic, bio-diversity, and the conservation impact of the proposed management plan. A fisher surviving day-to-day for food cannot accept that his only fishing gear will be eliminated or the fishery closed without other options for food security.

3. *Licensing of fishing vessels and fishers is more effectively carried out by one agency.* Licensing by two different agencies always creates difficulties, and opportunities for errors that fishers will utilize to their benefit with accompanying negative impacts on the marine resources. It is recommended that fisheries licenses for vessels, safety, gear and fishers rest with one agency, and the information be shared appropriately with other agencies as required. Alternatively, if this is not possible, consideration for the establishment of a “one-stop shopping” concept for fishers to get their licenses from one office jointly staffed by all involved agencies as joint licensing authorities.
4. *The political and international sensitivities created by the arrest of foreign fishing vessels fishing illegally are issues that can be addressed through the use of internationally accepted agreements and conventions and this would further promote the concept of regional cooperation.*

3. FISHERIES MANAGEMENT CONCERNS

Discussions with Fisheries Department Officials during, and at final debriefing sessions for the missions resulted in the following list regarding fisheries and MCS concerns. This summary of findings is more detailed in individual country mission reports.

1. A general lack of awareness of the principles, requirement and benefits of sustainable fisheries management in government agencies, including fisheries staff; the public and fishers; supporting agencies; and within the judiciary;
2. Lack of pro-active fisheries management planning in most countries with the focus being on re-active approaches to issues as they occurred;
3. Lack of appropriate legislative instruments and control mechanisms – licensing; vessel marking; landing requirements; reporting requirements; powers of inspectors/fishery officers; clear limitations on areas and gear; and deterrence mechanisms; etc., and, neither the ability nor political commitment/budgets and trained personnel to implement measures already in place was found in most of the lesser developed countries, while almost all countries required assistance for legislative updates to meet international agreements to which they are parties, or the principles of the Code of Conduct for Responsible Fisheries to which many voluntarily agreed;
4. Lack of attention to international legal obligations, agreements, and principles of responsible fisheries, but this is possibly related to government priorities respecting fisheries and budgets which are low in many countries;
5. The possible benefits from the introduction of an administrative penalty system or civil offence-based penalty system, depending on the particular

- legal system of the country in question, and its appropriateness in light of any legal policies operating in a particular country;
6. Lack of appropriate inter-agency mechanisms for conflict resolution and sustainable management of marine resources between agencies when conflicts in mandates become evident, e.g., revenue generation priorities versus licensing for conservation purposes, etc.;
 7. Minimal attention to commercial and offshore compliance except for occasional border issues, e.g. inspection re species, gear checks, estimates of catch on board, and transshipments are largely ignored in most countries due in part to a lack of a comprehensive system and training;
 8. Lack of budgets and the impact of very low salaries on professionalism of the MCS cadre resulting in financial pressures from illegal fishers for MCS officers to ignore infractions;
 9. Lack of trained and professional staff in the field;
 10. Lack of safety, patrol equipment, telecommunications and data collection and verification networks, etc.;
 11. Increased fishing vessel size and range of domestic vessels without appropriate attention to safety equipment, training and certification for the “growing” national fishing fleet (size and scope of operations) and also for fish quality;
 12. Lack of capacity and capability for controlling illegal and destructive fishing practices in both coastal and offshore areas with only three Asian countries now establishing schemes to counter this critical problem;
 13. Inappropriate organizational structures to address the implementation of sustainable fisheries management with either top heavy structures, focused structures on one sector in fisheries while ignoring the other, e.g., aquaculture versus coastal and marine fisheries;
 14. Lack of stakeholder/fishers and community involvement in management planning and implementation; and
 15. Lack of political support or peoples’ representatives to implement the law¹⁹ due in many cases to involvement of these individuals in the fishing industry.

¹⁹ Unfortunately, corruption, collusion and nepotism were still very apparent in many countries visited and this had severe negative impacts on the potential success of donor-funded marine conservation programs.

CHAPTER THREE

COUNTRY COMPARISONS

1. FISHERIES MANAGEMENT – GENERAL COMPARISONS

The fisheries management capability varied greatly between the countries. It is noteworthy that, at the time of the missions²⁰, only Malaysia and Thailand had their own Fisheries Department MCS Fleet of vessels and equipment. Cambodia and Myanmar had a few very small, old patrol vessels, while all other countries depended largely on the Coast Guard and Navy vessels to implement fisheries laws, especially in the offshore waters.

Generally, the fisheries management concerns noted above were not being addressed well in the region, however, *Malaysia* was the exception. Malaysia had a very complete grasp of fisheries management, had tight control of, and were implementing tools for management including legislation, licensing, identification of vessels and inspection procedures. It was however, still addressing concerns regarding the use of NGOs in participatory coastal management; developing details for port and sea inspections, including gear inspections; implementation of international agreements, with a request to FAO for assistance on the high seas legislation; use of port state control mechanisms, and general updating of fisheries legislation. The Malaysian inter-agency mechanism and general fisheries management and MCS system was the most progressive in the region, and could be a model for other countries.

The *Philippines* was the second most prepared country *on paper* for responsible and sustainable fisheries management. It had all the tools, management and MCS systems already developed and approved, and had the trained personnel. On paper, the management and MCS system appeared very good, but the will to implement the system was not evident, the legislative instruments did not incorporate all the international agreements and principles approved or agreed by the Government, nor were the supporting regulatory measures yet in place. Politically - responsible and sustainable fisheries management did not enjoy a high priority in government, nor did the government or the Bureau of Fisheries and Aquatic Resources have an active inter-agency co-operation mechanism to fully address the offshore commercial and illegal foreign fishing²¹. The government fisheries bureaucracy has endured four changes in Secretaries, two changes in Under-Secretaries for Fisheries and four Directors of Fisheries in the past five years thus making consistency in approach a factor. Further,

²⁰ Indonesia is starting to build a small fisheries MCS fleet, but it is not yet determined if it will fall under the Ministry for Marine Affairs and Fisheries, or under the local government units under the new Autonomy Law devolving authority to the provinces and districts.

²¹ During the design of the MCS System under the ADB FSP in 94/95, the Government established an Inter-Agency Technical Committee for Undersecretaries chaired by Foreign Affairs reporting to a Committee of Secretaries, but the meeting of these committees were infrequent, usually attended by lower designated officials with no decision-making authority, and consequently were inconclusive on key management issues.

considerable work was still required to educate managers and the judiciary at all levels to accommodate the implementation of the devolution of fisheries authority to the municipalities under the 1991 Local Government Code. This is required to promote sustainable and responsible management practices. These points are again being addressed in the ADB Fisheries Resource Management Project (FRMP). The Philippines does however, have the most progressive programs for public awareness and introduction of participatory management for the coastal areas in the region. The Philippines has all the tools to be a model in Asia, but continuity and political will appear to be absent in the system.

The *Maldives* had the progressive technical approach from the surveillance aspect (VMS plus satellite imagery) albeit the system has not been fully functional since it was implemented due to funding, posting of trained operators and interference with other electronic equipment due to location. The need for closer inter-agency cooperative mechanisms was noted (Customs, Environment, Coast Guard, Tourism, Ministry of Trade and Industry, and the Ministry of Atoll Management) to meet the myriad of interests in the fisheries and tourism sectors, the major export earners for the country. Further, pro-active management planning for integrated small island tourism and fisheries management was becoming a development issue between agencies due to mandates and conflicting interests. The same lack of priority problems was noted for MCS training in the field, and also for at-sea inspections as these were done by different agencies as a second, or lower priority task. The legislative instruments also needed updating, and the Government is already addressing this matter. The changing trend in national fishing to the use of much larger vessels (dhoni) with multi-day fishing capability, without a parallel increase with respect to standards for safety and training, may create a management and safety concern that will need to be addressed by the government. Increased safety requirements will be required to minimize search and rescue (SAR) pressures on the country, and also address the issue of the domestic fleet displacing the foreign licensed fleet in the outer EEZ area. Further, the dramatic increase in the reef fishery and its importance to tourism and fisheries will require timely, pro-active management planning approaches to ensure the sustainability of the reef resources. The requirement for regional cooperation for sustainable management and MCS activities was fully supported in the Maldives noting:

- its dependence on the highly migratory fish stocks;
- the lack of alternate employment options in the country other than fishing and tourism; and
- the increased pressures of foreign fleets on its EEZ border areas, and the licensing of foreign vessels to fish inside the Maldivean EEZ.

Thailand has considerable fisheries MCS infrastructure and organization, but the need for more pro-active fisheries management planning, coupled with the need for revised legislation was noted. Thai fishers are recognized as some of the better fishers in the region, as evidenced by the Malaysian fishing companies

hiring preferences for Thai fishers to meet their crewing requirements. This reputation could be further enhanced through acceptance and implementation of the international concepts of responsible fishing, and port state and flag state control mechanisms for the Thai fishing fleet that fishes outside its EEZ. The commitment of many officials for sustainable and responsible fisheries management and MCS practices is high, but the overall priority for employment and food security often takes precedence for the offshore fleet evidenced by the current minimal controls on this fleet. The offshore, outside EEZ, priority is highlighted in the National Development Plan expectations of 1.8 million tonnes of fish per year to be landed by the fishing fleet from outside the Thai EEZ. The most urgent need is completion and implementation of the current legislative review; further management and MCS training; and a commitment for responsible fishing practices and Flag State control mechanisms for its offshore international fishing fleet.

India has a very comprehensive and competent Coast Guard that supports the MCS system for offshore and foreign fisheries border control. The coastal areas are controlled and regulated by the States. With almost 9 million fishers, some 2.4 million being full time in the coastal areas, this is an onerous task. Some of the most important States for fisheries do not yet have any fisheries legislation in place, and little or no management planning processes. There are no legislative mechanisms in place to control Indian fishing vessels outside the territorial seas. The key MCS activities focused on EEZ violations and conflict resolution within States, but there was an urgent need for pro-active planning, and inter-agency and inter-state coordination and control mechanisms. Further, the need for fisheries management and MCS training for state officials to enhance the awareness and importance of sustainable/responsible fisheries management was also recognized. Many state officials still believed that since the overall recommended total allowable catch had not been exceeded nationally that there was room in the coastal areas for increased fishing. This belief is erroneous as Indian scientific advice indicates that the inshore/coastal area is currently overfished. Scientific advice is not always included in management decisions as the inter-agency mechanisms are weak.

Indonesia has the largest area for management, has recently set a high priority on fisheries management, as evidenced by its new government structure with a Ministry of Marine Affairs and Fisheries, and is rapidly advancing in the development of its fisheries management scheme. The Autonomy Law No. 22/99 will be a challenge in the devolution of authority for the coastal areas to the provinces and districts and the management of local fishers in the offshore areas. International joint venture agreements will pose their own challenges with respect to the legality of these ventures, but at present, the government priority and political will for fisheries and marine resource management have never been higher.

Area management, coral reef rehabilitation and management, and community based management schemes are being pilot tested in various areas of the country. This is not without difficulties due to the transition to a new democratic government and resistance to change from some sectors, coupled with the new interest, albeit somewhat focused on the potential fiscal benefits, of the provinces and districts targeted for devolution and increased authority. Many donor agencies are assisting in this process including ADB for coastal community development and fisheries management; World Bank/ADB/AusAID and JICA for coral reef rehabilitation and management, and FAO for a legislative review, training in applied science for stock assessment, and monitoring of the area management authority exercise in the Bali Straits. Inter-agency mechanisms are being enhanced through the National Maritime Council. Considerable training is being conducted in coastal fisheries management at the local levels. The offshore management and control mechanisms for border areas are being addressed nationally with the proposed introduction of both tighter controls on joint venture agreements and of a vessel monitoring system (VMS). The Navy and Marine Police are being trained for fisheries MCS activities.

Bangladesh and Myanmar have little pro-active fisheries management, but both have tight inter-agency port state controls for vessels entering and leaving their ports. Their at-sea capability in both cases is very limited and further MCS training is required. The lack of infrastructure for fisheries management and lack of trained personnel are also limiting factors. Internal departmental interest to address these issues is high, but unfortunately higher than the government priority for the sector. *Bangladesh* has considerable data and information from the Bay of Bengal project and hence should be able to manage its coastal fisheries, but the priority at present is for aquaculture for food security as opposed to management of its coastal and offshore resources. The fishing industry is however, becoming more aware and interested in promoting sustainable coastal resource management practices, if for no other reason than to protect the wild fish stocks as seed stocks for further expansion of the aquaculture industry. *Myanmar*, requires considerable assistance in planning, infrastructure, updating of its legislation to meet international practices and agreements, and appropriate implementation of sustainable fisheries management practices, as well as enhancing the public and government awareness and priority for this sector.

Cambodia is still recovering from internal strife and its management thrust is almost totally on the inland fisheries in the Mekong River and Tonle Sap area. The inland management scheme fosters very tight controls that, unfortunately, appear to benefit only a select few in the industry with limited overall benefits to the general fishers. This is done through auctioning of fishing lots, a system of licensing very much in favor of the rich. Cambodia has a very limited coastal, and negligible offshore fisheries management focus and MCS capability. Pro-active management planning to maximize the benefits to the fishers, enhance management and MCS training, public and fishers' awareness, education, and infrastructure are required to assist Cambodia in its recovery from several years of internal conflict.

Sri Lanka is in a difficult situation in that a considerable portion of its coastal area is still under internal conflict with the Tamils, and consequently the government has considerable difficulty in controlling its fleet in these areas. A new re-organization of the Department of Fisheries will streamline the organization. The innovative approach for the emphasis on inter-agency mechanisms to address common coastal and lagoon concerns through the Special Area Management (SAMs) zones is an example for other countries. These committees address fisheries issues in a very holistic development approach that looks at the needs of all sectors in development, including the priority for fisheries. The current legislation is dated and would benefit from review and revision. The authority for the Board of Investment (BOI) international joint venture vessels to land their fish in Sri Lanka may encounter future management difficulties as the parallel increase in the local multi-day vessels that are operating much further a field creates internal competition between these foreign vessels and the national vessels. The BOI vessels are thought to be using Sri Lanka as a port of convenience with minimal benefits to Sri Lanka. The idea of implementing VMS for these BOI vessels is considered positive, but could perhaps be enhanced to include all offshore vessels, and thus address the implementation of Flag State control. As with the Maldives, safety for the larger vessels operating further offshore may also be a consideration for management. Regional cooperation for fisheries management and MCS is also a growing issue for Sri Lanka as its fleet travels further offshore and interacts with other fishing nations.

Vietnam is a country with a large fishing sector that is increasing its influence offshore. Considerable effort is being made to enhance the capability of the fishing fleet, but the government management capability and control mechanisms do not appear to be expanding at the same rate. Vietnam's management and MCS capability is focused on the coastal areas with the offshore areas being monitored, mainly for border incursions, and not for sustainable management purposes. Training in sustainable management and MCS techniques and supporting legislation appear to be areas of greatest need and interest in Vietnam.

2. LEGISLATION

It is unfortunate that the project did not have funding to allow a team assessment of the fisheries management and MCS capability of each country would enable a formal assessment of fisheries laws. The team approach has been successful in the past, but schedules and funding did not permit this for FISHCODE. However, the Consultant noted that all countries could benefit from legal assistance to update their legislation to meet the requirements of international agreements and principles of the Code of Conduct for of Responsible Fisheries and facilitate the adoption of emerging or proven management approaches. This would include even those countries that had recently enacted new legislation, e.g., the Philippines that needed assistance in developing its implementing regulations.

Details of legislative needs for each country are best left to formal legal reviews. It is noted however, that legal assistance is being provided by FAO as a result of the missions and FISHCODE to Thailand, Malaysia and Indonesia. It is suggested that assistance be offered to all other countries visited save Cambodia where an ongoing World Bank project is rewriting their fisheries legislation. Priority for assistance would be best for those countries that are currently amending their fisheries, and related legislation, e.g., Maldives, Philippines, and Sri Lanka, the latter with its new fisheries department restructuring. Bangladesh, India, Myanmar, and Vietnam are also in need of legislative assistance to update their marine resource laws. One example of concerns in legislation includes the following: India has no national legislation for national vessels fishing outside the state 12nm limits. Each state is responsible for enacting state fisheries law for fishing in state (territorial) waters, but the largest fishing state, Gujarat, has no such law and hence vessels from Gujarat are without fisheries controls either in their waters or outside the territorial waters.

3. LICENSING AND VESSEL MARKING

Table 2 LICENSING AND VESSEL MARKING

COUNTRY	LICENSING				VESSEL MARKING
	OPEN ACCESS (Y/N)	SINGLE AGENCY LICENSING	NATIONAL/PROVINCE-STATE LICENSING	FOREIGN FISHING/JOINT VENTURES	
BANGLADESH	Open access	Multi – agency	National/region for artisanal, but not licensed	No foreign vessels	Complex other authority
CAMBODIA	Open access for offshore vessels/limited access for inland fisheries	Multi-agency	National/State for smaller vessels	No foreign vessels	Other authority – not enforced
INDIA	Open access under state authority	Multi-agency	State – national for outside 12 nm for leased foreign or JV, but no laws for domestic outside 12 nm	No direct foreign vessels, joint ventures permitted	Fisheries and other authority – difficult and complex

INDONESIA	Some areas of regulated access, but most are unregulated with open access	Multi-agency	National and moving to province and district under Autonomy Law	No foreign vessels, but joint ventures and dual flagging permitted	Other authority
MALAYSIA	Limited access	Fisheries licensing and vessel identification	National for large vessels and re-licensing by state	No foreign vessels, but foreign crews permitted to 90%	FAO + - best system in Asia and being certified for ISO 9000 (recommend the Malaysian Mission report for details)
MALDIVES	Limited access for foreign vessels by TAC, but not being set by Fisheries; open access for Maldivian vessels	Multi-agency Trade and Industry (MTI) for foreign; Transport and Fisheries for domestic vessels	National	Foreign vessels permitted under license	Foreign – FAO; local is other authority, but designates fisheries by code
MYANMAR	Limited in law but not exercised	Multi-agency	National for large vessels – re-licensing by state; state for smaller vessels	No foreign vessels	Color coding/name/port authority #; fisheries #; state ID – complex
PHILIPPINES	Limited access in law but not implemented	Multi-Agency – Maritime Authority and Fisheries	National for large vessels, regions for re-licensing; municipalities for small vessels < 3GRT	No foreign vessels, joint ventures permitted	Other agency – Marine Authority
SRI LANKA	Open access domestic; limited BOI and limited areas	Multi-agency – Fisheries, Fish Port Authority	National for larger vessels; provinces for smaller vessels	No foreign vessels, BOI foreign vessels permitted to land fish in Sri Lanka	Fisheries - District and number codes
THAILAND	Open access except for mobile gear	Multi-agency – Harbours and Fisheries	National	No foreign vessels	Harbors – yr of registration/province/name then registration #
VIETNAM	Open access	Multi-agency	National > 75hp; provinces < 75 hp	No foreign Vessels, looking for Joint Ventures	For >100bhp hull blue; provincial ID; registration #; vessel type ID

Most countries still have an “open access” fisheries management system and some with limited access legal capability have chosen not to exercise this option. Vessel identification systems vary considerably with the FAO system being utilized in Maldives for the foreign vessels and a modified system with the addition of color-coding; zonation marking and vessel type added for ease of identification at sea and from the air for Malaysia. *The Malaysian licensing and vessel identification system is detailed in the Malaysian mission report and is believed to be the model system for the region.* Malaysia is seeking ISO 9000 approval for its system in year 2000.

4. INTER-AGENCY MECHANISMS

Table 3 INTER-AGENCY MECHANISMS

COUNTRY	INTER-AGENCY MECHANISMS
BANGLADESH	None at present, but needed with the six most involved agencies
CAMBODIA	12 agencies involved plus provinces but no formal inter-agency capability, hence overlapping mandates and Ministerial decisions

INDIA	Close liaison with Coast Guard for training, but not with Research for management, nor with the States for consistency in approach
INDONESIA	Revived National Maritime Council (DKN) is assuming a greater prominence
MALAYSIA	Maritime Enforcement Coordinating Committee (MECC) of Fisheries, Marine Police and Navy is effective, and can become more effective with greater direct authority for deployment of inter-agency resources to priority fisheries areas. This can be a model for coastal and offshore deterrent MCS.
MALDIVES	High Level Inter-Ministerial Policy Committee, but no formal inter-agency operations coordinating committee – the latter idea received positive response
MYANMAR	Formal port entry and departure inspection coordination, but no other mechanism for joint operations
PHILIPPINES	High Level Policy Committee, but seldom meets and with reduced representation; no formal inter-agency operational mechanism
SRI LANKA	Special Area Management (SAMs) Committees were seen to have considerable potential to address inter-agency issues effectively – a model for participatory coastal area management
THAILAND	High Level policy committees – Cmtee for Policy and Restoration of the Thai Seas (chair – Prime Minister) & National Fisheries Policy Cmtee. (Chair – Deputy Prime Minister) – no formal inter-agency operational mechanisms, but suggested and received positively
VIETNAM	10 agencies involved, but no formal operational inter-agency mechanism was seen.

Two excellent examples of inter-agency mechanisms for MCS operations were noted during the missions; the MECC in Malaysia for inter-agency MCS operations and the SAMs in Sri Lanka for coastal community and area management issues. These could be models for future consideration.

5. DATA SYSTEMS

Most systems viewed were manual and data verification was non-existent. Data reliability was very weak as noted by the Fisheries staff themselves. Malaysia has a computerized data management system that is being fine tuned and linked to the states. The Philippines is updating its former system and is expected to have a working system to meet its management needs for both the national needs and those at the municipal level by the end of the current ADB Fisheries Resources Management Project noting that management authority for 15 km is devolved to each coastal municipality. Indonesia is currently developing a computerized licensing and data management system from both the national perspective and also to address devolution to the provinces and districts. The Maldives has a computerized data system based on catch reports with cross-checking, where possible, with landing reports, but it is not covering the entire country. In principle it can be effective for the area covered. Maldives also has in regulations the requirement for all foreign vessels to report to port for an exit inspection, a very effective tool, but this is not being enforced. India has a national system for control of the foreign joint venture/leased vessel fleet with daily reports, but the fisheries data system for the national fleet from the states is weak. Cambodia's manual system has been updated and computerized by a Danish project with the result that actual catch estimates were found to be approximately 10 times that initially reported to FAO. The other countries visited have manual systems that

need considerable time and outside assistance before they will meet management needs.

6. EQUIPMENT AND OPERATIONS

Only Malaysia and Thailand have their own fisheries fleets with both a coastal and offshore capability. The Malaysian patrol fleet (approximately 60+ vessels with rented air surveillance) covers the marine parks, boundary areas and foreign incursions. The Thailand fleet (approximately 100 vessels with part time air surveillance) covers boundary and closed areas and general prohibitions for trawlers and seiners. Other countries rely almost entirely on their marine police, coast guard or navies for fisheries patrols and these cover only boundary surveillance. In many countries, this results in almost no surveillance monitoring of the domestic fleets. The Philippines is an exception in “active” municipalities that have established their own “Bantay Dagat or Save the Seas” programs with municipalities deputizing local staff units for municipal fisheries and coastal marine enforcement. Indonesia through the COREMAP initiative is developing a coastal MCS capability with the use of vessels, land based personnel and coastal radar for local area coverage and threat assessment. It is to be noted however, that no country was seen to complete boarding or inspection reports; conduct fishing gear inspections; conduct port inspections; or fish catch estimates to cross check logbooks or catch reports. These are critical activities for MCS officers to enhance the data management system for future management decisions. Training in these areas is required. Further notes on MCS equipment are address later in this paper

7. VESSEL MONITORING SYSTEMS

Satellite tracking/vessel monitoring systems (VMS), and satellite imagery are two newer technologies that are becoming more affordable and effective for fisheries MCS. It must be noted that VMS is a tool for management in that it permits tracking of licensed vessels, **but it does not track unlicensed vessels**. The VMS with another tool, such as satellite imagery that provides a snapshot of all vessels can then identify which vessels do not carry tracking transponders, and hence should be identified and possibly inspected. The systems under trial in the region are interesting and will provide a wealth of knowledge for the region for future MCS operations.

Indonesia is actively testing many VMS systems and considering implementation for all fishing vessels in the very near future. The FAO guidelines have been provided to authorities, but it is not yet determined if they have been considered. Legislation is still not in place for implementation of such a system.

Malaysia has a pilot system that is tracking approximately 25 “problem” vessels. The legislation for VMS is not yet enacted in Malaysian Fisheries Law.

Sri Lanka is considering VMS for the monitoring of the Board of Investment (BOI) vessels offloading in its ports, an activity considered highly suspect by many in that the benefits to Sri Lanka are minimal for this activity. Testing of a VMS system is expected in year 2000.

The Maldives has the “Rolls Royce” of the MCS electronic systems in that it has both VMS and satellite imagery, but the systems do not appear to have worked effectively to date to provide Fisheries with timely position and tracking data for management and operational decisions. Reasons for the systems failure seem to stem from lack of ongoing operational funding, posting of trained staff to other areas of work, and lack of shielding/interference from other electronic equipment operating in the vicinity. The system does however, have the potential to be an effective tool for management planning and operations.

8. MONITORING, CONTROL AND SURVEILLANCE CAPABILITY

The attached table, at the end of this section, is a comparative rating of the MCS capability in each of the countries visited. The ratings were conceived to demonstrate whether:

- there is no system, or one considered very inadequate for MCS purposes, rated as a (1);
- a partial, but inadequate system in place, rated as a (2);
- or if it can be considered to be at an appropriate level of capability, but possibly in need of minor additions or refinements, rated as a (3).

It must be noted that these ratings are subjective with respect to whether the legislation can support appropriate management and MCS activities. *As noted earlier in the paper, in almost all cases countries were in need of legislative updates to address international agreements and obligations. This applied even in some cases where new fisheries legislation had just been enacted.*

The MCS capability of Malaysia is far superior to all the other countries visited and could be an example for other countries. The devolution of authority and efforts to heighten awareness of officials and fishers at the community level for community-based management can best be seen in the Philippines. These awareness and information, education and communications techniques practiced in the Philippines can also assist in promoting preventative MCS ideas and activities. The Special Area Management (SAMs) zones and inter-agency, multi-sector committees chaired by Fisheries in Sri Lanka are also an example of progressive, participatory community-based management that can serve to assist in promoting preventative MCS activities. The VMS and satellite imagery system in the Maldives could be a regional example of appropriate technology to monitor

the fisheries, if it could be made to function appropriately, and timely information sharing was practiced between agencies. The new legislative instruments being put in place in Thailand, Malaysia and Indonesia can assist other countries in the region in addressing their national and international obligations and agreements of the principles in the Code of Conduct for Responsible Fisheries. The aforementioned ongoing positive initiatives, coupled with additional assistance for marine resource management training and assistance in management and MCS cooperative mechanisms could greatly reduce resource conflicts and promote sustainable management for the region.

IN SUMMARY

It can be noted that Malaysia, Maldives and India rank 1-3 respectively and have progressed further in the overall (all categories) and traditional (legislation, licensing, vessel identification, at-sea capacity and inspection procedures) MCS activities. The newer thrusts of training, observer programs, data collection, and VMS have not yet taken root as essential MCS requirements in most countries. These results for the traditional base activities, and newer components, can now be addressed with each country to determine their needs, priorities, and internal capacity for implementation as their individual MCS system is developed.

A. Most countries that were visited noted a need for:

- pro-active and regular fisheries management planning activities, and training in such activities;
- stronger inter-agency cooperative mechanisms for planning and operations to resolve potentially conflicting mandates and establish priorities for licensing, inspection, data collection and other MCS operations;
- infrastructure; and
- a higher government priority fisheries and marine sector management²².

B. All countries visited require a review and updating of their fisheries and related legislative instruments, to meet new international agreements and fisheries management principles of the Code of Conduct for Responsible Fisheries. Other common legislative issues included:

- geographic designation of areas instead of using depth restrictions
- administrative penalties, or civil offence-based penalty system as appropriate, and the low penalties in general²³
- authorities for special management areas (marine parks)

²² It must be noted that this is not the case in all countries, (e.g. Maldives) but for most in the region.

²³ In the South Pacific, consideration is now being given to allocation of penalty units to offences, e.g. fishing without a license could be equivalent to 6-8 penalty units (depending on circumstances), the cash value of a penalty unit then being identified in regulations. In this manner the financial aspects of fines can be updated to meet inflation through regulations as opposed to the Act.

- VMS and other MCS technology, e.g., satellite imagery, etc.
- vessel identification
- control of access
- problems of proof, including in some countries, the need for either a change to strict liability legislative instruments or clarification of proof of intent of actions, e.g., the individual by carrying explosives or other deleterious substances onboard the vessel demonstrated intent for use, hence illegal fishing, or more difficult, the possession of fish caught with cyanide or explosives, were both issues of concern expressed in at least three of the countries visited. Assistance from FAO in the clarification as to “issues of proof” in these cases was requested
- license and data systems
- procedures for vessel inspection, fisheries official identification, stopping vessels, protection of officials involved in fisheries MCS, etc.

C. *All countries noted the requirement for training* in a whole range of subjects including:

- fisheries and coastal management;
- data collection and verification systems;
- MCS planning and operations to support management planning and implementation, recognizing emerging trends for preventative MCS techniques to foster voluntary compliance; and
- available and appropriate MCS technology

D. A rapidly growing issue of importance to many countries as their fleets expand and become more mobile, is the requirement for greater emphasis on safety-at-sea in both construction, dockside training in equipment operations and maintenance, and at-sea operations. Without attention to this matter, the countries and the region will experience an even more significant increase in SAR incidents, with their associated costs.

E. Value of Fisheries Study

An often forgotten factor in the assessment of the contribution of fisheries to the national economies is the inclusion of the additional social and economic costs to government if the fisheries collapse in the coastal areas, or as the case of Sri Lanka, internal civil unrest has resulted in a major migration and relocation of fishers. There are no available studies regarding the impacts of such calamities and the cost to the state in the economic and social fields as these rural coastal peoples become “wards of the state” in their migration to the urban areas, or other areas in search of sustenance and livelihood. The negative impacts on peace and security and welfare are not yet factored into the value of the fisheries to the country. This is in fact happening in Sri Lanka at the moment, due to the civil unrest, hence an opportunity to place a value on this exercise.

There appears to be a need for a resource economic study on the real contribution of fisheries to the government. This should include the direct benefits from the fisheries and employment, and also the risks and potential increased costs to the government if a coastal or offshore fishery collapsed, or is largely dislocated due to other factors. The study would be in terms of social welfare costs, increased urbanization to already-stressed areas and the impact on peace and security. Such a study could be considered with Sri Lanka, or even Canada, as a model to determine the additional costs of such a situation, and hence highlight the real value of, or loss of fisheries potential to a country.

Table 4 MCS CAPABILITY BY COUNTRY

MCS CAPABILITY	BANGLADESH	CAMBODIA	INDIA	INDONESIA	MALAYSIA	MALDIVES	MYANMAR	PHILIPPINES	SRI LANKA	THAILAND	VIETNAM
Legislation ²⁴	2	2	2	2	3	2	2	2	2	1	2
Licensing ²⁵	2	1	2	2	3	1 ²⁶	2	2	2 ²⁷	1	2
At-Sea Capacity ²⁸	1	1	2	1	3	3	1	2	1	3	2
Air Surveillance for Fisheries	1	1	2	1	2	2	1	1	1	3	1
Vessel Identification ²⁹	1	1	2	2	3	3	2	2	2	2	2
Inter-Agency Coordination	1	1	2	2	2	2	2	1	2	1	1
Boarding and Inspection Procedures ³⁰	1	2	3	1	3	2	2	2	1	3	2
MCS Training ³¹	2	2	2	2	2	2	2	2	2	2	2
Observer Program	1	1	1	1	1	1	1	1	1	1	1
Fisheries Data System – Planning & MCS ³²	1	1	1	1	2	1	1	1	1	1	1
Boarding Reports	1	1	1	1	2	1	1	1	1	1	1
Movement Reports	1	1	1	1	1	2	1	1	1	1	1
VMS Use ³³	1	1	1	1	2	2 ³⁴	1	1	1 ³⁵	1	1
TOTALS	16	16	22	18	29	24	19	19	18	21	19

²⁴ All legislative instruments are in need of updating to incorporate the international agreements and principles of the 1990s – Code of Conduct for Responsible Fisheries; UN Fish Stocks Agreement; FAO Compliance Agreement, etc.

²⁵ Most management systems are still “open access” and do not license or register sustenance fishers (the latter, if done would be assumed to be without cost), consequently the catch and effort data information is very incomplete, e.g., Cambodia where catches were reported to FAO as approximately 50,000 – 60,000 mt per year and the ongoing DANIDA project for inland waters (now in Phase II after the first five year period) has reported a very conservative annual assessment of inland catches at approximately 4-500,000 mt from inland fisheries alone.

²⁶ Maldives requires licenses for all foreign vessels and registration for all Maldivian fishing vessels, but not for fishers. The incentive for fishers to register their vessels (no fee) is the benefit of no fee for the transport registration and no port fees if they fish in excess of 120 days per year. If they do not meet the fishing requirement, they receive a fine and may or may not lose this fishery registration for the following year, depending on whether it is a vessel on the government credit scheme or not. If on the credit scheme the fine is double the norm, but no loss of fishing registration for the following year.

²⁷ The Sri Lankan licensing system only appears to apply to those fishing vessels in the government-controlled area and thus has gaps for almost ½ the country. Licensing is done by province for the smaller vessels with little verification. The commercial, joint venture/Board of Investment (BOI) vessels, and the larger multi-day vessels are licensed in a manual system by the Department of Fisheries. Controls are weak and duplication of licenses by Fisheries and Wildlife appears to be a concern.

²⁸ None of the countries, except perhaps Malaysia and Thailand has a fisheries offshore inspection capability, and hence most countries rely on the military for these purposes, when it is carried out at all.

²⁹ None of the Countries utilize the FAO Guidelines for Vessel Identification and Marking except Maldives for foreign vessels, and Malaysia whose system expands on the FAO system and is the best licensing and vessel identification system seen in any country. Most countries do not require special markings for fisheries (Maldives, Malaysia and Vietnam being the exceptions), and use only a system developed by another maritime agency (Harbors, Transport or Coast Guard), hence there is little coordination with respect to the needs for fisheries, or search and rescue (SAR) for vessel identification.

³⁰ Some countries do not have an at-sea boarding and inspection capability and use only port inspections, e.g., Myanmar and Bangladesh, and further, none of the countries appears to formalize the procedure with inspection reports for the data management system and cross checks on catches and landings.

³¹ Most countries have on-the-job training and no formal course or after-course reference materials for standardization and consistency in MCS operations.

³² Data for fisheries was normally comprised of catch landing data only and was compiled periodically, but in most cases it was found to be very inaccurate, not verified or cross-checked (except for a partial cross check in the Maldives), and seldom was the data used for fisheries operational planning.

³³ VMS has considerable potential for all countries to control the larger offshore vessels and to control international fishing fleets, but as it is still expensive and the basic MCS equipment is lacking in most countries, funding priorities will be directed to the procurement of the basic equipment first. Malaysia is currently building up its VMS capability, Maldives has VMS and satellite imagery, Sri Lanka is considering VMS for the BOI vessels, and Indonesia is pilot testing VMS systems. **On a regional basis, VMS would be an excellent tool for a regional fisheries organization to encourage and enhance co-operation and information sharing between countries, meet the flag state obligations to control one's own fishing fleets, and bring a regional perspective to the implementation of fisheries management planning.**

³⁴ Maldives is the only country that has full VMS coverage for the vessels in the outer EEZ area (greater than the 75 nm exclusive Maldivian zone) and a satellite imagery system, but unfortunately these have not been fine tuned and training has not resulted in their maximum use and benefits to all maritime agencies.

³⁵ There is an intention to utilize VMS for the BOI vessels to control their movements. The full capability of the use of this system is not yet fully realized in Sri Lanka.

9. IMMEDIATE REGIONAL REQUIREMENTS FOR MCS

Noting the commonality of the summarized needs above, it is difficult not to reiterate these as needs for the region to promote cooperation between the individual countries. Fisheries resource assessments are still essential to sustainable management and must be matched to internal capabilities. Some issues are essential to gaining control of resource management, and this returns us to the requirement for external assistance in setting up viable data collection systems.

Marine resource management planning is critical for sustainable resource management consequently, the requirement for the development of marine resource management plans could be a consideration for legislation³⁶. This could also include the introduction of the concept of limited entry fishing as a key principle of management.

Noting the above, a second priority would then be the assistance to the senior country fisheries management officials in the region to develop appropriate *draft management policies and plans* based on existing data and/or utilizing the precautionary approach³⁷.

Legislation review and refinement for some countries is urgently required to update current instruments and address changing fisheries management strategies, and international agreements and principles, e.g., the Code of Conduct for Responsible Fisheries, FAO Compliance Agreement, UN Fish Stocks Agreement, etc.³⁸;

Licensing is the third most important requirement for fisheries management in the region, complete with consideration for zonation, vessel identification and marking, and terms and conditions for fishing activities in accordance with the legislative instruments. This would need to incorporate inter-agency cooperation and conflict resolution mechanisms to address inter-agency mandates, information sharing, etc. The emerging suggestions from the FAO-sponsored Illegal, Unreported and Unregulated studies will assist countries in MCS activities in the future, and hence it is suggested that reports on these developments be monitored closely for new ideas.³⁹

Essential behind preparation of legislation and licensing is the urgent need in all countries for accurate and verifiable data collection and analysis systems for both management and operations purposes.

MCS Operational Training The range of MCS training requirements requested within the region was considerable and shows an interest and commitment to address these activities with assistance from appropriate agencies wherever possible. Requests from the countries to FAO following the missions is evidence of this interest which includes the following:

³⁶ Kuemlangan (pers. com.)

³⁷ Fisheries Management planning was undertaken as part of a practical exercise in an “Analytical Approach to MCS System Development” at the FAO Regional MCS Training Course for six countries in Songkhla, Thailand in June 2000. This received positive comments and considerable interest from all participants, who were senior fisheries officials.

³⁸ FAO legal initiatives resulting from country visits include: Malaysia, Thailand and Indonesia with further requests during missions from Sri Lanka, Maldives, and the Philippines for supporting regulations, and interest was also noted from Vietnam at the Songkhla course.

³⁹ FAO/Australia, *Report on the expert consultation on illegal, unreported and unregulated fishing*, May 2000; William Edeson, *Tools to address IUU fishing – the current legal situation*, FAO, Rome, Italy; Blaise Kuemlangan, *National legislative options to combat IUU fishing*, FAO, Rome, Italy.

1. Orientation and General Fisheries Management, to include:

- inter-agency MCS familiarization and fisheries management training for senior management of involved agencies;
- orientation training for fisheries officials, local government officials, and fishers as part of community fisheries management awareness to foster the partnership of fishers and government and the participatory approach for fisheries management. This would stress benefits to fishers and their children, the destructive nature of some fishing gears, etc., the latter as initial preparation of the need for phasing out of these destructive fishing apparatus.

2. Training of Trainers in MCS operations, to include:

- training for inspectors in basic fish identification and biology;
- training to establish data collection systems for fisheries management planning and MCS operations;
- training in preventative enforcement techniques through community/public awareness activities to solicit fishers support for the management plan and hence, voluntary compliance and seek their involvement in the process;
- training in standard MCS techniques for boarding; regular inspection of fish, gear and vessels; investigative data collection, evidence gathering and preservation; arrest and court preparation; court processes; post court activities; safety at sea; coastal navigation, vessel and equipment operations and maintenance; radio use and international SAR procedures for distress radio watches;
- training to establish an observer program, as appropriate for some countries;
- training for Fisheries Officers in current and new regulatory measures;
- training in the recognition and testing of fish for destructive fishing practices;
- training in habitat monitoring;
- training for aquaculture/mariculture standards development and implementation;

3. Legal Training to include:

- seminars for prosecutors and the judiciary to enhance their awareness and priority for sustainable fisheries management;
- regional and national legal seminars of the regional countries' fisheries legal staff representatives on fisheries management, their national legislation and the appropriate linkages with international agreements and obligations.

4. Cross Regional Training

- Senior Fisheries Chiefs international study tour of other country MCS mechanisms to encourage regional information sharing;
- Participation in regional MCS seminars to gain regional experience and information exchanges.

MCS operations manuals must be developed in parallel with the regional training courses for reference and then later revision and updating by the countries to meet their particular situations;

MCS equipment use and maintenance (vessels, safety equipment, and minor MCS equipment – cameras, binoculars, compasses, etc.); and

Feasibility studies for the introduction of appropriate new technologies and programs, e.g., observers, VMS, satellite imagery, over-the-horizon radars, telecommunications, etc.

10. OPTIONS FOR CONSIDERATION FOR REGIONAL CO-OPERATION

There are several options that one may consider to address the above development needs. These include, but are not limited to:

- Continued applied science for stock assessment assistance to countries of the region;
- Continued regional MCS seminars to exchange experiences;
- Build on and enhance the Regional MCS Training Course in Songkhla, Thailand as a course for trainers for individual countries as a first step in possible regional MCS cooperation;
- Commence general fisheries management training for senior managers in the region, either through regional ad hoc courses, or by formalizing training modules for presentation through existing university mechanisms as a diploma or degree course⁴⁰ for current and future fisheries managers;
- Develop regional/sub-regional project(s) to further foster cooperative regional fisheries management and MCS initiatives that will benefit all countries and promote regional harmonization of approaches, legislative instruments and cooperative management implementation/MCS operations. This could be adjusted to fit the mandate of an existing regional body to implement their fisheries management strategies.

..... all of the above.

11. COSTS FOR MCS EQUIPMENT

This is a special section of the paper resulting from queries as to costs of systems. There is no one answer as each MCS system must adjust to the needs of the country and its fisheries priorities, hence the answers vary according to the intent and degree of commitment of the country involved, its geography, its fisheries, the extent of external threats, etc. One can however provide estimates of various equipment and operating costs on a per unit basis for planning and budgetary purposes, noting that costs are subject

⁴⁰ Many fisheries institutes and agencies claim to provide fisheries management training, however, it was noted that this is usually directed to industry, mariculture and aquaculture management of business enterprises, but formal fisheries and marine management for government officials appears to be falling behind industry training, and generally lacking within the region.

to change due to demand and changing technology. Countries will need to determine the system best suited for them, and hence the number of units and combination of tools to develop an appropriate cost-effective MCS System for their country and fisheries. Inter-agency linkages and information sharing to benefit other agencies will always assist in justification of the costs of system development. It is suggested that a country assess its current infrastructure and marine resource situation prior to making commitments for new equipment, as MCS equipment is often expensive, both in procurement, and in maintenance and operations. The following are presented as examples of equipment in use today in many countries with associated cost estimates.

The attached list assumes that country MCS staff members are familiar with the advantages and use of the various equipments noted below. If this is not the case, and a recommended practice even if staff members are partially familiar with the equipment, is a feasibility study prior to procurement to assess need, cost effectiveness and viability for the system and resource conservation in each country.

The attached Annex C provides estimates for MCS equipment including:

Air Surveillance options;

Radar for coastal areas;

Patrol vessels – coastal, and offshore (7-9, 17, 22, 27 m vessels)

Safety equipment: Communications, Global Positioning Systems, Binoculars and Night Vision equipment; Cameras – still and video; Flashlights, Vessel Safety Flares; and even including solar systems and generators for isolated locations;

Office equipment;

Staff;

New technology: Vessel Monitoring Systems; Satellite Imagery and integrated GIS

PART TWO

CONCLUSIONS AND OPTIONS

1. GENERAL FISHERIES MANAGEMENT NEEDS

The intent of this chapter is to enhance the points raised in the previous chapter regarding the regional findings and needs and to provide more detail for future options.

1.1 REGIONAL

A summary of common needs of the countries in the region includes assistance for:

- Pro-active fisheries management planning training;
- Development of closer inter-agency mechanisms to address all aspects of management planning and MCS implementation;
- Infrastructure;
- Legislative reviews and updates;
- Training of local trainers in fisheries management; MCS control mechanisms (licensing, etc.); data collection and verification; MCS planning and operations; and procurement, use and maintenance of MCS technology;
- Mechanisms to foster regional cooperation and information sharing; and
- Implementation of safety requirements for fishing vessels.

These needs are further amplified in the previous chapter, but the focus of this chapter is to expand on the options for progress and regional cooperation. These included:

- applied science training;
- regional MCS seminars;
- enhancement of the Regional MCS Training;
- general fisheries management training for senior managers in the region;
- sub-regional fisheries management/MCS institutional strengthening.

2. OPTIONS FOR REGIONAL COOPERATION

2.1 FISHERIES MANAGEMENT PROPOSAL

The FISHCODE Project addressed two facets of fisheries management: training in tropical fish stock assessment techniques; and monitoring, control and surveillance (MCS).

2.1.1 REGIONAL FISHERIES MANAGEMENT PLAN

Noting the commonality of the needs of the individual countries and also the interest in a system where regional cooperation and information sharing would benefit all

countries, it is now proposed that future initiatives might best serve the countries if they encompassed the holistic approach to fisheries management for the countries and promoted regional cooperation and information sharing. The holistic approach to management would include data collection and analyses, management planning, the MCS legislative instruments (laws and controls) and MCS control mechanisms, planning and operations as the implementing mechanism for the fisheries management plans. A second and parallel approach would be to ensure that all initiatives at least contributed to, or linked to an agreed, general fisheries development and management framework for the region and the participating countries.

The development of the suggested regional fisheries management framework could hopefully build on the findings of this document for consideration by the participating countries under the umbrella of whichever regional fisheries agency had the interest and mandate for regional fisheries management implementation. Other more industrialized regional members could be welcomed into the initiative as they linked their needs and requirements to others in the region. Such an initiative would of necessity also need to link with ongoing regional initiatives that would impact on the area, e.g., Indian Ocean Tuna Commission (IOTC), Multi-Lateral High Level Commission (MHLC), Brunei, Indonesia, Malaysia and Philippines – East Asian Growth Area (BIMP-EAGA), Asia-Pacific Fishery Commission (APFC), Southeast Asian Fisheries Development Center (SEAFDEC), etc.

2.1.2 FISHERIES MANAGEMENT TRAINING

Closely linked to the aforementioned development of a regional fisheries management framework could be an initiative to address the lack of fisheries management planning capacity in the countries, and the accompanying dearth of formal training for fisheries managers in the region.

It is recognized that there are several agencies in the region that have provided ad hoc training sessions on fisheries management. Further, there are also several institutions and agencies that claim they provide this service. The missions to the countries did not see this capacity, but noted that several agencies focus on fisheries management from the business sense for the fishing industry (capture fisheries and mariculture), and not specifically for the government fisheries manager trying to manage the resource for the benefit of all stakeholders. This is an opportunity to select an appropriate agency or university and establish a formal fisheries management study curriculum that could possibly receive recognition as a diploma or degree status. This could be achieved through linkages with outside universities and institutions that provide a mix of theoretical and practical management training. It could also serve as an exchange mechanism to attract high-level international professionals for teaching during certain phases of the courses. A draft concept paper has been prepared and is under consideration by FAO. The intent is to enhance the training opportunities for government managers, or those considering such a career in fisheries and coastal resource management. The link with outside institutions, while creating a

sustainable, regional capability in the special field of fisheries and coastal resource management⁴¹ will assist to create this capacity.

This regional facility could also provide a venue for donor and technical assistance agencies for their courses, and hence provide the facilities and infrastructure to continue initiatives for:

- applied science for stock assessment assistance to countries of the region;
- regional MCS seminars to exchange experiences;
- legal seminars and assistance for legislative reviews as case studies for the courses;
- the general fisheries management training for senior managers in the region;
- a conduit to provide information and training on changing trends and practices in fisheries management as a regional advisory mechanism (community based fisheries management [CBFM], coastal resource management [CRM], the two pronged MCS approach, etc.);
- a facility to enhance the Regional MCS Training Course in Songkhla, Thailand as a course for management and MCS trainers for individual countries; and
- additional donor-funded initiatives on community based management techniques, and coral reef management and fisheries resource research, etc.

Alternatively; donor and technical assistance agencies can continue the current ad hoc training at the country and regional level, hopefully endorsing the earlier proposed expansion of the current initiatives to include all aspects of fisheries management: legal, socio-economics assessments, stakeholder involvement, community based management techniques, planning and MCS, etc.

2.1.3 MCS TRAINING

The option, with a focus on MCS that may merit consideration is the enhancement of the MCS training provided for six regional countries in Songkhla, Thailand in July 2000. This course was well received by all countries and requests were received for such training in the individual countries with a focus on their specific concerns in fisheries management and MCS.

It is proposed that as an interim measure, and one that could link with the above noted regional fisheries management model, consideration could be given for an expansion of the Songkhla MCS Training into a more formal course for senior and middle level fisheries and marine resource managers in the region. This course currently has the following objectives and outline over an eight-day period⁴².

⁴¹ An example – the Fisheries University in Nha Trang, Vietnam has excellent facilities and has an enrolment of approximately 10,000 students for its industrial fisheries training courses, but there is not one course on resource management and conservation. Such a course structure could be developed and linked with the industrial courses, thus providing more choice to students for either a career in the industry or the fishing industry, and it would also provide more awareness to those entering the government and the fishing industry of the partnership required between industry and government to manage their resources in a sustainable manner. Alternatively, the Philippines, Thailand and Indonesia also have excellent facilities of a similar nature.

⁴² The course has been recommended to be extended to ten working days.

The **Objectives** of the course included:

1. To train selected staff engaged in MCS activities by:
 - reviewing MCS procedures in the context of fisheries management and fisheries law in specific countries and regions, e.g., Namibia; Malaysia and Indonesia.
 - providing understanding on MCS systems: required elements, implications, and suitability for specific situations.
 - undertaking practical experiences in at-sea and port inspections, reporting and prosecution matters (e.g. detection of violations, prosecution, rules of evidence through role playing).
2. To build up sets of lecture material that can be used in similar regional and national courses, and
3. To utilize an analytical approach to develop an appropriate MCS system.

The Course **Programme** included:

The course first examined the context in which MCS is a component of fisheries management and fisheries law. Different fisheries obviously call for different approaches to the design of management systems, including the implementing component, the “preventative” and “deterrent” MCS activities. Operational methodologies were discussed, and participatory practical demonstrations were given. The legal background and international initiatives and agreements for fisheries legislation were presented with examples from other parts of the world as well as the ongoing work on the Thailand fisheries legislative revisions. Prosecution procedures were explained, and practical exercises were given at sea. In addition, an analytical approach to MCS design was provided for participants using examples.

Subjects covered included:

1. Fisheries Management and MCS
2. Legal aspects of MCS
3. Elements of MCS
4. MCS and practical inspection procedures; on shore and at sea
5. Prosecution matters
6. An analytical approach to the design of an MCS System

Course **Outputs** included:

1. a model MCS plan considering all MCS elements against which countries can measure their current MCS programmes;
2. legislative knowledge of the newest international agreements, rights, privileges and obligations;

3. practical experience of “deterrent” approaches to MCS to maximize the effectiveness and efficiency of patrols and inspections; and
4. training materials for national and regional MCS officials.

Course Participants included four senior fisheries officials from each of: Cambodia; Indonesia; Malaysia; Philippines; Thailand and Vietnam.

Recommendations

1. It was recommended that a full assessment of the course be made through a short two day meeting of key resource persons to discuss course enhancements and finalize the course schedule for the next two “fine tuning” courses.
2. Develop final modules into teaching tools for trainers – trainers manuals; participants manuals; and an accompanying video compact disk for use by the trainers in each country for their “home” training.
3. Consideration be given to extending the course to 10 working days.
4. The same resource team be kept together, if possible, to complete the next two training sessions prior to formalizing the training package for manuals and for development of the final training compact disk.

2.1.4 SUB-REGIONAL FISHERIES MANAGEMENT AND MCS PROJECTS

Another option for consideration is the establishment of sub-regional or regional fisheries management projects to assist the regional member countries to address their concerns and shortfalls. The proposal would build on successful initiatives of the Caribbean and South Pacific where structures were established and linked to existing regional organizations as projects with the intent of them becoming institutionalized as the countries develop their capacity and realize the benefits of continued regional cooperation.

Key to sustainable assistance for the countries of the region for MCS⁴³ would be the establishment of a regional fisheries body that extends its mandate beyond discussions on fisheries management planning and focuses on assistance to countries for *implementation of the fisheries management plans*. A project to establish a regional fisheries MCS assistance mechanism and capability would:

- contribute to regional co-operation in this sector;
- permit countries, through co-operation and information, to jointly focus their MCS resources on high priority concerns, e.g., border incursions and third party illegal fishing activities;
- reduce unnecessary fishing pressures in disputed areas;
- reduce the political sensitivities in these areas;
- promote regional inter-action and co-operation at the operational level;
- contribute to conservation of fisheries in the region;

⁴³ MCS is defined as the implementation mechanism for fisheries management plans in this document.

- contribute to safety of fishers on the seas; and
- contribute to sustainable marine resource availability for trade.

In light of the aforementioned suggestion, the Sub-Regional Fisheries Management/MCS Project, draft concept papers for both the South China Sea, and for the Bay of Bengal have been developed. The Proposed initiative is for a three phase, 15-year project. Although costs initially may appear large, one must note that it is far less than the value of reported illegal fishing in each country. There are up-front funds required for infrastructure, the total cost for assistance for fisheries management and MCS in the countries to establish cooperative and sustainable fisheries management planning practices, reduce pressures in border areas, stimulate trade, and ensure both safe seas and conservation of marine resources. These costs could be recovered through a modest increase in license fees in most countries from the average fees of about 1/5th of 1% of the landed value, to a new value of 1% of the landed value and a streamlining of fees into one fee system, split internally within the government to the various agencies and levels of government.

The **goals** of these initiatives would be: *Sustainable fisheries and habitat management in South Asia, and safety of fishers on the seas.*

Objectives proposed included:

1. To enhance the regional capability for implementation of core regional fisheries management principles using the MCS mechanisms;
2. To strengthen the individual country capacity for development and implementation of fisheries management plans (data collection and analysis, management planning and MCS mechanisms);
3. To enhance the professionalism of the fisheries management and MCS activities in the region; and
4. To develop a core regional and inter-regional mechanism for networking on management and MCS issues.

Two proposals are under review with FAO. More important than dotting the “Is” and crossing the “Ts”, might be the proposed process to address these proposals.

Steps to the Future:

1. Internal review and revision of the proposals by FAO;
2. Meeting of the executive fisheries and country planning officials of the countries to be involved for their input, comments, and revisions as well as expressions of interest in pursuing the initiatives;
3. Individual meetings with appropriate regional organizations to present the proposals and seek input and comments; and
4. Forward the final revised documents to donor agencies in advance of a prepared donors’ conference to discuss the potential funding agencies, or groups of agencies, for these initiatives for the region.

2.1.5 CONTINUE INDIVIDUAL COUNTRY SUPPORT FOR FISHERIES MANAGEMENT AND MCS

This is another option that is really the status quo, the country that requests assistance is provided it in accordance with the need expressed. It is a reactive approach to development and, depending on interest in the other options from the countries, it may be the one preferred at this time due to the current funding squeezes in donor agencies. Examples of this approach include that for Indonesia from FAO for legal assistance, stock assessment assistance and a monitoring of the pilot management authority initiative, but it is noted that Indonesia has expressed an interest in a more holistic approach to fisheries management assistance to help the new Ministry.

ANNEXES

ANNEX A

REFERENCES

ANNEX B

**1981 DEFINITIONS OF MCS, AND THE 1993 FURTHER
AMPLIFICATION OF PRINCIPLES**

ANNEX C

MCS EQUIPMENT COSTS

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ANNEX B

1981 DEFINITIONS OF MCS, AND THE 1993 FURTHER AMPLIFICATION OF PRINCIPLES

Monitoring, Control and Surveillance in its simplest terms from the FAO 1981 definitions, includes:

MONITORING- the continuous requirement for the measurement of fishing effort characteristics and resource yields

CONTROL – the regulatory conditions under which the exploitation of the resources can be conducted

SURVEILLANCE – the degree and types of observations required to maintain compliance with regulatory controls imposed on fishing activities

The 1993 clarification and amplification of MCS definitions in Ghana sought to note the consequences of not including some of the activities in MCS. These stated:

“‘**Monitoring**’ includes the collection, measurement and analysis of fishing activity including, but not limited to: catches, species composition, fishing effort, discards, area of operations, etc. *This information is primary data that fisheries managers use to arrive at management decisions. If this information is unavailable, inaccurate or incomplete, managers will be handicapped in developing and implementing management measures.*

‘**Control**’ involves the specification of the terms and conditions under which resources can be harvested. These specifications are normally contained in national fisheries legislation and other arrangements that might be nationally, sub-regionally, or regionally agreed. *The legislation provides the basis for which fisheries management arrangements, via MCS are implemented. For maximum effect, legislation should be flexible (to cater for different and changing circumstances) and easily enforceable, and*

‘**Surveillance**’ involves the checking and supervision of fishing activity to ensure that national legislation and terms, conditions of access, and management measures are observed. *This activity is critical to ensure that resources are not over exploited, poaching is minimized and management arrangements are implemented.*⁴⁵”

⁴⁵ Doulman, D., *Fisheries Management, Monitoring, Control and Surveillance and Economic Considerations*, Report of a Regional Workshop on Monitoring, Control and Surveillance for African States Bordering the Atlantic Ocean, Fisheries Management and Law Advisory Programme, Accra, Ghana , 2-5 November 1992, Rome, November 1992.

The next few paragraphs summarize these concepts and graphically show the link between fisheries management and MCS.

SUMMARY OF FISHERIES MANAGEMENT AND MCS PRINCIPLES

1. *The basic principles of fisheries management include:*
 - *data collection and analyses for fisheries management planning;*
 - *decisions and approval for the management strategy/plan through participatory processes with stakeholders;*
 - *legislative support mechanisms and controls (licensing, gear, area, seasons, and catch limits, etc.) for the management plan; and*
 - *field implementation of the plan within these legislative parameters.*
2. *MCS is the mechanism that contributes to:*
 - *data collection of operational information;*
 - *assessment of the feasibility of management options;*
 - *establishment of control mechanisms through information sharing and other activities (licensing, season, gear, catch, and area restrictions, etc.); and*
 - *field implementation through surveillance, promotion of voluntary compliance and, where appropriate, full enforcement of the fisheries laws.*
3. *Emerging MCS trends emphasize a changing focus and attitude towards the greater use of “preventative” MCS mechanisms, the fostering of voluntary compliance through participatory and educational approaches; and “deterrent” MCS operations for enforcement of the law as the two key parallel activities that are required for effective implementation of fisheries and coastal resource management strategies.*
4. *Fisheries management without attention to the implementing mechanism, e.g., the MCS activities, can result in a paper tiger – management planning without an implementing capability – a paper plan with no teeth.*

MCS TODAY IS:

- *PARTICIPATORY*
- *INTEGRATED WITH FISHERIES MANAGEMENT AS ITS EXECUTIVE ARM*
- *PREVENTATIVE = VOLUNTARY COMPLIANCE*
DETERRENT = TRADITIONAL ENFORCEMENT

Data collection from MCS activities feeds into the data collection and analysis component of fisheries management for both longer term management planning (warehousing data) and MCS trends for MCS planning, and more timely data for MCS day-to-day operations (time constrained data).

The MCS operations must be taken into consideration during the *management planning* stage as to what is feasible and enforceable; what will have acceptance of the majority of stakeholders; and what can be implemented with the political, socio-economic and infrastructure available.

The *legislative instruments* are common to both exercises as they are the legal support for implementation of the management plan as well as the base for MCS

activities – one can cajole and encourage fishers to follow policies, but one cannot “enforce” policy without a legal instrument.

The *surveillance*, enforcement and educational processes of fisheries management/MCS are the actual activities to implement the management plan with the stakeholders.

ANNEX C

MCS EQUIPMENT COSTS

Air Surveillance: This is an expensive undertaking and dependent upon geographical area of coverage, but it can be cost effective for large areas. Many countries rely on their Air Force for these services and pay a retainer for this service, which can be as low as US\$400/hour to US\$3000/air hour depending on the aircraft, patrol time and equipment.

The countries of the South Pacific Forum rely on the Air Forces of Australia and New Zealand for these services in their area.

The countries of West Africa share air surveillance costs of an aircraft out of the Gambia.

Aircraft costs vary with size, propulsion and equipment from a Defender type aircraft equipped for air surveillance at US\$4 million, to a fully equipped night surveillance capable aircraft such as the Beechcraft King Air turbo prop at US\$6.2 million as used in Canada and the US DEA.

Countries often rely on institutional aircraft – air force or other services, or contract out the service to the private sector to reduce long term costs of crew, maintenance, etc. A few countries have their own fisheries surveillance aircraft, but these are expensive to procure, maintain and operate. The lease option is recommended. It can vary considerably from a small Cessna at US\$350-\$400/air hour to the Canadian leased service at a cost of approximately US\$1400/air hour for a Beechcraft King Air turbo prop aircraft with three navigating systems, HF and VHF radio, integrated computer technology to link the air navigation systems with the day/night photography system, the Litton V5 Side Looking, Single Aperture Radar (SLAR) radar and forward looking infrared tracking.

Radar: In coastal areas where air surveillance is difficult and expensive some countries have opted for small low cost radar systems, e.g., Senegal's linked coastal radar system; the Indonesia trial system for two marine parks in Take Bone Rate, South Sulawesi and Padaido, Irian Jaya. These are small short range radar systems 24-48 miles at a cost of approximately US\$ 9,000 – \$10,000/unit including solar panels and tower for the antenna. These are low technology units that can be used by operators after approximately one day of training.

Patrol Vessels: These come in various sizes in Asia including the very large naval vessels (for which operational costs are unavailable) for offshore and high seas patrols. Nearshore and coastal patrols utilize the more well-known vessels of the sizes ranging from 26 m and 17 m steel hull vessels, 22 meter

fiberglass and 7-9 m fiberglass. Also, from an Indonesian MCS model we will present costs for small local fishers-type vessels for reef watch/coast watch duties.

Table 5 VESSEL COSTS PER UNIT

VESSEL TYPE	PROCUREMENT/UNIT	COST/DAY		COST/MONTH	
		L/HR AND HR/DAY	COST	DAYS/MO	COST
27 M Steel Hull (twin 500 hp engines)	US\$ 3 million	10 hr x 300 ltr @ US\$ 0.20/ltr	US\$ 609/day	12	US\$7308
17 M Steel (aluminum) (twin 500 hp engines)	US \$ 1.1 million (US\$1.25 million)	10 hr x 600 ltr @ \$0.20/ltr	US\$ 1218/day	12	US\$ 1416
22 M Fiberglass (twin 680 hp engines)	US\$ 560,000	12 hr x 240L x \$0.20	US\$ 576/day	12	US\$6912
7-9 M Fiberglass (twin 150 hp gasoline engines)	US\$ 68,000	5 hr x 36 l @ \$ 0.25	US\$45/day	20	US\$900
Local boats 40 hp diesel	US\$ 4,350	8 hr x 40 l average @ \$0.20	US\$ 64/day	20	US\$1280

Notes:

1. One must add docking costs for each of the larger vessels at approximately US\$80-100,000/year and 5% maintenance costs after year two.
2. Maintenance costs of 2-5%/year should be added to the small speed boats and the local boats.
3. Maintenance costs are based on operational usage costs.

Safety Equipment: This is a package that can also vary, but using the Indonesian model for COREMAP this could include:

SSB/HF radios @ US\$29/unit
VHF Base radios @ US\$ 430/unit
VHF Hand held radios @ US\$500/unit
GPS hand held @ US\$ 590/unit
Binoculars @ US\$ 220/unit
Binoculars – night vision @ US\$ 1700/unit
Loud Hailers @ US\$ 100
Signal flares and ID Jackets @ US\$ 500/unit
Heavy Duty Flashlights/Flood lights for the boats @ US\$400/unit
Digital cameras @ US\$ 800/unit
Video Cameras @ US\$ 1,400/unit
Solar panels for radio at remote locations @ US\$ 1,000/unit
Diesel generators for remote locations @ US\$2,000/unit

Office Equipment: @ an average of US\$ 3,000/unit space for computers etc. plus \$5,000 for the photocopier

Enforcement Staff and Observers/Dockside Monitors: costs depend on local wages, but it is suggested that to ensure integrity of staff that these should be at a

reasonable level. The observers and dockside monitors are usually not granted enforcement powers. Training costs to develop the professionalism for MCS are additional and very dependent upon the tasks expected of the staff, e.g. IT staff training/person would be more expensive than dockside monitoring courses.

New Technology: VMS is being utilized in greater frequency as a tool for MCS in many countries. Some countries that have VMSs include: Argentina; Australia; Canada; European Union (EU); Iceland; Japan; Malaysia; Maldives; New Zealand; Norway; Peru; South Africa; United States and several regional organizations (Commission for the Conservation of Antarctic Marine Living Resources; South Pacific Forum Fisheries Agency; International Commission for the Conservation of Atlantic Tunas; Northwest Atlantic Fisheries Organization; North-East Atlantic Fisheries Commission; and the Central Bering Sea). Some of these are being used in conjunction with other tools such as radar, forward looking infrared systems and satellite imagery.

VMSs are becoming more sophisticated, but costs range in the area of US\$200,000- 300,000 for the base station and US\$3-5000/unit onboard the vessel. VMS is only a tool and must be used in conjunction with one of the other systems noted above to provide coverage of all vessels in an area. The combination of two systems will assist in rapid identification of non-VMS vessels. These non-VMS contacts should automatically be targets for further investigation.

Satellite imagery and use of integrated GIS costs for MCS are not available at this time as they are subject to the satellite systems used, frequency of access and communications costs for integration with national systems. It is suggested that as each system is developed the parameters for the operational demands be carefully identified so that the most appropriate mix of technologies can be selected.

There are several legalities which are emerging with the use of new technology and it is recommended that the FAO Code of Conduct for Responsible Fisheries (CCRF) guidelines, and other FAO legal publications be consulted prior to procurement to ensure that one can maximize the benefits from such equipment.⁴⁶

⁴⁶ Erik Jaap Molenaar & Martin Tsamenyi, *Satellite-based vessel monitoring systems international legal aspects and development in state practice*, FAO Legal Papers, FAO, Rome, April 2000, 44 pp; Philippe Cacaud, *Legal issues relating to vessel monitoring systems*, FAO Legal Papers, FAO, Rome, 1999, 40pp.