PRESENT STATUS OF FISHERIES MANAGEMENT IN RELATION TO FISHING CONTROL IN INDONESIA

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1. INTRODUCTION

Indonesia is an archipelagic state comprising about 17 000 islands. The country spreads more than 4 800 km along the equator, and 2 000 km from north to south. Its total land area is about 1.9 million km^2 with a coastline of around 81 000 km. The sea area itself consist of the territorial waters of 3.4 million km^2 and the Indonesia EEZ of 2.7 million km^2.

The country also has numerous freshwater lakes, with a total surface area of 1.7 million ha, and freshwater reservoirs with a total area of 27 000 ha.

With this very huge area, Indonesia is endowed with considerable potential fisheries resources. Various species of fish of economic value, including shrimp, skipjack tuna, giant perch, eastern little tuna, narrow barred king mackerel, squid, coral fishes (groupers, streaked spinefoot, spiny lobster), ornamental fishes, shellfish (including pearl oyster) and seaweed, can be found in Indonesian waters. In addition, the coastal area offers potential for mariculture development with species such as coral fish, oyster and seaweed.

Based on the potential of the fisheries resources mentioned above, Indonesia established its National Development Plan, implemented through Long-Term Development Plans, and broken down into a series of Five-Year Development Plans. The growth of the Indonesian fisheries sector during the First Long-Term Development Plan (1968-1993) was impressive. The fisheries subsector, as part of the agriculture sector, has steadily contributed to the national economy. It is important for three main reasons: (i) it is a major source of animal protein for about 200 million people, (ii) it provides jobs for almost 5 million fisherfolk and their families, and (iii) it is a source of about $US 2 000 million in foreign exchange earnings.

This was achieved through a programme directed toward increasing production by improving extension services, establishing infrastructure, developing packages of technology, and upgrading post-harvest and marketing activities. At presently Indonesia is in the Second Long-Term Development Plan (1993-2018) and the Sixth Five-Year Development Plan.

In addition, fisheries development orientation is *inter alia* focused on efficiency and the benefit of increased manpower productivity, value-added of fish processing, fisheries product quality, and regional development.

The success of that programme has significance for the implementation of principles of responsible fisheries management. Indonesia has therefore set out some management measures concerning fisheries resources utilization, reservation and protection. However, these regulations are not yet properly established. In accordance with recent international accords, all parties have to respect and commit themselves to implementing responsible fisheries principles, and Indonesia of course will increase and improve its fisheries management, reflecting the *Code of Conduct for Responsible Fisheries*.

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2. PRESENT STATUS OF INDONESIAN FISHERIES IN GENERAL

The fisheries industry of Indonesia uses a large workforce, which increased noticeably during the 1990s. Based on 1996 figures, total manpower directly engaged in primary production of fisheries in Indonesia was 4.7 million, comprising 2.5 million fishermen and 2.2 million fish farmers in culture activities.

Total fish production of Indonesia rose steadily from 3.8 million t in 1993 (the end of the First Long-Term Development Plan) to 4.5 million t in 1996, with an average growth rate of 6.0% per year. Production in 1996 was 3.5 million t (77.5%) from marine fisheries and 1 million t (22.5%) from inland capture and culture fisheries. During 1993-1996, the growth rate of marine capture fisheries was significantly higher than that of the inland capture fisheries, about 6.7%/year as compared to 3.8%/year for inland capture fisheries. During the same period, the growth rate of aquaculture production was estimated to be around 5.5% per year.

Of the total aquaculture production of 700 000 t in 1996, 382 000 t (56%) came from by brackish-water pond culture; 173 000 t (26%) from freshwater pond culture; 80 000 t (12%) from paddy field culture; and 65 000 t (9%) from cage culture and other types of aquaculture.

Indonesia has a positive trade balance in the export and import of fish and fishery products. Total exports rose from 529 213 t, valued at $US 1 504 million in 1993 to 596 200 t, valued at $US 1 893 million in 1996, with an average growth rate of 4.1% in volume per year, and 8.0% in value per year during this period. Shrimps, tunas and other food fish constituted the major export commodities in 1996. Although shrimp contributed only 16% to the total export volume, it contributed about 56% of the total export value. Hence, the above mentioned commodities contributed about 90% of the total export value in 1996.

There was an increase in the import of fish and fishery products during 1993-1996 at an average annual rate of 14.3% in volume and 12.6% in value. The total import volume rose from 177 200 t valued at $US 109.2 million in 1993 to 209 000 t, valued at $US 148 million, in 1996. The imported commodities were mainly non-food, comprising fat and fish oil; crustacean and mollusc meal, fish feed and others, of which fish meal was a major commodity (80% by volume and 64% by value in 1996)

The fleet consists of over 350 000 boats, ranging in size from dugout canoes to industrial fishing boats over 400 GT. The fishery is predominantly small-scale, as 65% of the boats are non-motorized and over 95% are less than 5 GT. Over 30 different types of gear are used and 20 species groups account for over 25 000 t each. There are also industrial fisheries made up of state and private fishing companies, which operate their own boats or charter foreign-registered fishing boats. Much of their fishing occurs in Indonesians EEZ waters.

The number of foreign vessels has increased rapidly in recent years and there were 1 378 vessels in 1992. Of particular note is the large increase (over 50%) in purse seiners in the Pacific Ocean and Sulawesi area, and an equivalent increase in longliners in the same areas and in the Indian Ocean. This reflects a considerable increase in effort for tuna and skipjack. The activities of these foreign vessels are poorly monitored, and the reported catch is probably considerably underestimated as some land their catches in foreign ports or transship at sea.

3. FISHERIES RESOURCES MANAGEMENT

The objectives of resources management are to achieve optimum utilization and sustainability. Management strategies of Indonesian fisheries have addressed elements such as regulatory

measures on fishing gears and fishing areas, and methods to be used in Indonesian waters, *inter alia* by:

- determining type of fishing gear;
- determining technical condition (specifications) of fishing vessels;
- regularly conducting of stock assessment studies and effort allocation in certain fishing areas;
- determining the type and size of fishing vessel for different fishing grounds;
- zoning areas for fishing depending on size of fishing vessel; and
- environmental protection and rehabilitation.

3.1 Fisheries management actions

To effect its management purposes, the Government of the Republic of Indonesia has issued a number of fisheries regulations, such as:

- Law No. 5/1983 on Indonesian EEZ waters, and Government Regulation No.15/1984 regarding fisheries regulation in the EEZ of Indonesia. These regulations also cover control measures for access of foreign fishing vessels, taking into consideration the conservation of resources and other regulations relating to UNCLOS 1982.
- Law No. 9/1985 on fisheries, which regulates all principle measures of fisheries management, including fish processing, handling and marketing, and also relations with other institution concerned.
- Ministerial Decree No 815/1990 for implementation of fisheries law authorizes/delegates the Central Government (Directorate General of Fisheries) and the Provincial Fisheries Service responsibility for issuing fishing licences. Fishing licences for small-scale fisheries are issued by the provincial fisheries services, while large-scale fishing licences are issued by the Directorate General of Fisheries. In order to implement the fishery regulations, the Government of Indonesia applies MCS systems.
- Ministerial Decree No. 607/1976 established the fishing zonation policy. This regulation is principally to protect small-scale fisheries from intrusions by large-scale fisheries in their fishing grounds by dividing the fishing ground into several zones, with each zone to be utilized by a certain size class of fishing vessel. Respecting sustainability principles, this regulation also applies provisions regulating mesh size of fishing gear, whereby mesh size less than 2.5 cm are prohibited, and purse seines which target species such as tuna and skipjack may not use mesh less than 6 cm.
- An important policy is that trawling has been banned in all Indonesian waters, except in some parts of the EEZ, e.g., the Arafura Sea, since 1980. This Policy has at least three purposes, namely to protect and keep fisheries resources sustainable; to protect small-scale fisheries from intrusion by large-scale fisheries; and to attempt to improve the welfare of fisherman.
- In support of fisheries allocation decisions, the Directorate General of Fisheries carries out regular fisheries resources evaluations. These evaluations provide information on fisheries utilization, fisheries resources allocation (as a basis for fishing licensing), potential yield as a whole, etc.
- Regulation of the operation of fishing vessels by adjusting licensing to maintain effort in balance with potential resource size.
- Requiring the shrimp companies to maximize benefits from by-catch. This is regulated by Ministerial Decree No. 561/1973.

- Requiring the shrimpers to install a by-catch excluder device in shrimp trawls, under regulation of Director General of Fisheries Decree No. 1K.010/S3. 8075/1982. This decree was a consequence of Presidential Decree No. 85/1982 which designated the shrimp trawl operations authorized in certain areas of eastern Indonesian waters, including the Indonesian EEZ.
- Management of fish aggregation devices. For a long time, fishermen have understood the use of such devices, known locally as *rumpon*. Use of these aggregation devices has been increasing with time. Rumpons fall into three categories: bottom rumpons; shallow-water rumpons, and deep-sea rumpons. At present these aggregation devices are managed under Ministerial Decree No. 5/1997, which designates selected locations allowed for rumpon sites, spacing or distance between units, number of units that may be allowed in certain locations, etc.
- Respecting local community conventions regarding fisheries management, which exist in certain areas. Basically, they are considered to have particular rights over the sea surrounding their community.
- Pearl culture companies are required to provide a certain buffer zone area, ensuring and keeping the natural environment and biodiversity, so as to guarantee that recruitment species survive properly.

3.2 Conservation and protection

There are several other management actions in support of principles of conservation and protection of the natural resource base:

- Explosives and toxins are prohibited for fishing. These measures were implemented long ago, and strengthened in the Fisheries Law, 1985.
- Establishing green belts in particular areas to protect coastlines from sea erosion. This affects fish farmers wishing to construct brackish-water ponds and encourages people (particularly those living in coastal areas) to replant and take care of mangrove populations.
- Establishment of artificial reefs in certain areas is currently a pilot project, that is expected to be taken up by fishermen and others interested. It is very costly when established by government because of the wide reef areas in Indonesian waters.
- For biodiversity protection and preservation several measures has been taken, such as protecting Trochus (*Trochus niloticus*), Turtle (several species) and Kima (*Pinctata* sp.), certain species of Arwana (*Schlerophagus* spp.), Dugong, and complying with the measures of CITES.
- Other measures, under the responsibility of institutions outside of fisheries (by the Department of Sea Transportation and Communication), address protection from pollution and safety at sea, such as provisions in the MARPOL convention, ensuring safety at sea, etc.

3.3 Coordination of fisheries management

The geographical characteristics of Indonesia – mostly consisting of sea – and its administration divided into local, provincial and national, with their own authorities for local fisheries management, means that a characteristic model is required for fisheries management. This model has not only to achieve optimum utilization of fisheries resource, but also has to minimize potential conflict among fishers operating in the same area (fishing ground), which in season can get very crowded, with real potential for conflict.

This fisheries management model is called the Coordination Forum for Fisheries Management. Members of the Forum are all Local Fisheries Services, under guidance of central government (Directorate General of Fisheries). Participation extends to other institutions as needed, usually including navy, fishing company associations and fishermen's organization.

In view of the diversity of the region, particularly taking into account the potential fisheries resources as reflected by the nature of the various fishing grounds, there are nine fisheries management groups: 1) Malacca Strait; 2) Western Sumatra; 3) Natuna Sea and South China Sea; 4) Java Sea; 5) Southern Java, Bali and Nusa Tenggara (Indian Ocean); 6) Maluku Sea; 7) Sulawesi Sea and Pacific Ocean; 8) Banda Sea; and 9) Arafura Sea.

The activities of each forum are principally to discuss matters of fisheries management, talk over problem raised among them, and take measures in relation to fishing movement, resources allocation, fishing control and enforcement. Meetings are annual, moving between provinces.

3.4 Implementation of MCS in fisheries management

MCS is an integral part of fisheries resources management. This concept was discussed by relevant experts in 1981 in Rome and resulted in definition of MCS as follow:

- **Monitoring** The continuous requirement for the measurement of fishing efforts characteristic and resources yield.
- **Control** The regulation condition under which the exploitation of the resource may be conducted.
- **Surveillance** The degree and types of observations required to maintain compliance with the regulation control imposed on fishing activities.

Basically, this system has become established to comply with the new regime of EEZ waters under jurisdiction of coastal states. However in broad terms, this system is relevant to dealing with fisheries resources management as a whole.

States, including Indonesia, have adopted this system and gradually the concept and its implementation has been improved, according to country's capacities, in terms of institutional requirements, manpower, coordination, etc.

Particularly in relation to surveillance and enforcement, in Indonesia there are a number of institutions involved, including the Directorate General of Fisheries, Navy, Department of Sea Communication, etc. Therefore, coordination among them is necessary in order ensure successful implementation of MCS.

3.4.1 Monitoring

As mentioned above, monitoring stresses the resource approach, particularly for understanding the level of exploitation or yield. For this, collecting reliable data is important, and this can be

obtained from the fishing vessel reports. Fisheries observers have an important role for this purpose. Indonesia so far has recruited 247 persons as observers, and most of them have qualified with the legal status of a Fisheries Inspector. For data collection purposes, the fishing base (fishing port) is the centre for monitoring activity, facilitated by an office for fishing control.

To implement the monitoring system the government is preparing and implementing a logbook system that covers the necessary data needed in relation with fisheries management. At present it focuses on monitoring fishing vessels greater than 30 GT.

Bases for fisheries control have been established in 13 key locations, and supplied with communications facilities, including single side-band (SSB) radios, fax machines and computers. The scope of activity is expected to be extended to include fishing vessel movements in order to monitor their activities and thus identify where there are possible violations.

3.4.2 Control

As an instrument for fisheries management, Indonesia has enacted several laws and subsidiary regulations, as described above, namely regulations regarding mesh sizes, zoning of fishing grounds to facilitate access by small-scale fishers, licensing conditions, including use of turtle-excluder devices in shrimp trawls and the maximum use of by-catch, and banning trawls in territorial waters to protect the small-scale fisheries.

Recently, the control programme has come under review to ascertain how it might be enhanced to better comply with the provisions of the FAO *Code of Conduct for Responsible Fisheries*.

3.4.3 Surveillance

In Indonesia there are a number of institutions concerned in sea-related surveillance activities, including the Directorate General of Fisheries, Navy, Directorate for Sea Communication, etc., each with their own mandated responsibilities, sometimes overlapping, and yet without a single government administration structure.

The Navy has both defence and constabulary functions. It is therefore at the forefront of practical control and surveillance activities, with the Directorate General of Fisheries providing coordination with other institutions involved.

For control and surveillance, at headquarters level there is the Coordination Board for Law Enforcement. At local government or provincial level, enforcement at sea is by local units coordinated by the Navy.

When any fisheries violation cases are suspected, a fishery official (usually a Fisheries Inspector) may initiate the field operation for fishing inspection, and the follow-up process relating to law enforcement if necessary.

3.5 MCS implementation and related problems

3.5.1 Fisheries conditions in relation to MCS

There are over 1.5 million fishermen, and 350 000 boats ranging in size from dugout canoes to industrial fishing boats over 400 GT. The fisheries are predominantly small scale, as 65% of the boats are non-motorized and over 95% are less than 5 GT. Over 30 different types of gear are used. In addition, there are industrial fisheries operated by state and private fishing companies, which operate their own boats or charter foreign-registered fishing vessels to fish in Indonesia's EEZ Waters.

The number of foreign vessels has increased rapidly in recent years, and there were 1 378 vessels licensed in 1992. The activities of these foreign vessels are poorly monitored and the reported catch – particularly from the purse seiners and longliners, which have increased by over 50% in recent years, reflecting a considerable increase in effort for tuna and skipjack – is probably considerably underestimated because some of the catch is landed in foreign ports or transshipped at sea.

Indonesian marine fisheries have shown an impressive expansion over the past 20 years. However, recent studies on the fisheries potential suggest that additional increases would be difficult to achieve. The shrimp fishery is considered to have reached its maximum sustainable yield level, with little scope for expansion. The demersal fishery may have some scope for increase, but will require careful resource assessment, and new fishing and processing techniques.

There is conflicting evidence on the scope for increase in the tuna and skipjack fisheries. A conservative expansion in parts of eastern Indonesian may be possible. There is, however, an urgent need for a reappraisal of the resources, including detailed catch data on the EEZ fishery, to assist in the assessment of future potential. The small pelagic fishery offers the greatest potential for increase, in both eastern Indonesia and Sumatra. It is difficult to generalize the present and future situations, and each fishery has to be examined on a case-by-case basis.

The Government of Indonesia has attempted to manage the EEZ to maximize benefits from foreign boats licensed to fish in this area, through the measures noted earlier.

Recent surveys indicate extensive illegal fishing by foreign boats taking demersals in the South China Sea and surrounding area, and skipjack in the eastern area. These illegal efforts obviously increase the potential for conflict of interest with local fishermen.

There is a need for improvement in coordination between all the various bodies involved in licensing and consequent MCS.

The loss to Indonesian fishermen, processors and the Government of Indonesia as a result of illegal fisheries activities and under-reporting, etc., is probably considerable. The 1 378 foreign vessels licensed in 1992 represented a very large potential catch and it was estimated by the government that the loss might be equivalent to about 23% of the current Indonesian reported marine capture. Prevention of the loss through improved management is a high priority area to be pursued.

MCS is a conceptual system in fisheries management and its implementation has to be supported by many components, including capable personnel, proper institutional framework and coordination, shore and sea facilities, adequate budget, etc.

However, as this system is a new venture in Indonesian fisheries management, some teething problems have arisen:

- The legal aspects of the MCS system are not yet fully ready, thus hampering effective MCS implementation.
- Because MCS is new, most of the officials and people concerned have only a limited understanding of the system.
- There is a lack of trained staff capable of implementing the system.
- There is a lack of facilities, particularly at sea, such as fisheries inspection vessels, and operating budget.

3.5.2 Activities needing to be undertaken at government level

In the light of the task and the current capabilities, considerable improvement is justified in order to establish efficient and effective operational MCS. Appropriate actions include, but are not limited to, the following:

- Assess the potential of marine fishery resources.
- Evaluate the problems and constraints with respect to licensing policy for foreign fleets and prepare operational approaches for management measures which include determination of allocation of access and licenses among fleets, and reporting systems for national vessels, covering catches taken in the EEZ and transshipped to foreign vessels.
- Strengthen the capabilities of the Directorate General of Fisheries, particularly in respect of fishery management, enforcement of fisheries laws and regulations – particularly in offshore and EEZ fisheries – and upgrade the fisheries management capability of provincial fisheries administration with regard to management systems and the enforcement of fisheries laws and regulations.
- Clarify the interrelationships among institutions dealing with MCS. At present this system is informal and lacks proper basis in law, so aspects of MCS are poorly applied.
- Improve the practical framework and coordination with other institutions concerned by setting up general guidelines for MCS, broken down by category, such as fisheries management aspects, control and law enforcement aspects, and field-level coordination.
- Improve staff capabilities through training and recruitment so as to be able to implement MCS. For Indonesia, it is estimated that some 5 000 persons will be required, as against the 247 at present.
- Systematically improve inshore facilities for MCS, including properly equipped offices and vessels, with modern communications technology such as SSB radio, fax and electronic mail. A gradual introduction should be foreseen of modern computer-based information technology methods, including use of satellite and other remote sensing imagery.
- Introduce an extension programme for improving understanding among fishers and others affected by MCS, enlightening them as to the purpose of MCS and the benefits they can expect in the short and medium terms.
- Strengthen MCS of fishing operations, particularly in EEZ waters.
- Establish a logbook programme for large-scale fisheries, particularly tuna purse seiners and longliners.

However, it is being increasingly realized that the best prospect for strengthening the MCS capacity of developing countries lies in regional cooperation. Indeed, given the scarcity of resources with which to support national MCS programmes and the variable results achieved from these programmes, developing countries (with common fisheries and fishing interests) have demonstrated that significant progress towards enhancing fisheries conservation and management can be attained through regional MCS initiatives. Developing countries are therefore urged to assess and address MCS not only in terms of national programmes, but also through regional cooperative networks.

Good, annual, joint regional MCS meetings involving the respective bordering countries in order to overcome resource management problems is probably one of solution to be applied in the near future.

4. CONCLUSION

- Fisheries have an important role in Indonesia because of its geophysical nature: 75% sea. Currently a very large number of people are engaged directly in fisheries, with many others involved in post-harvest activities.
- Indonesia has great potential fisheries resources with many economically valuable species, but in general the rate of exploitation is still low (not exceeding 50% of potential yield).
- The policy in utilizing the fisheries resources – as set out in The National Development Plan – is that of optimizing benefits for the nation as a whole, while paying special attention to the small-scale fisheries sector's needs in order to improve the quality of life for fishermen and fish farmers while having a positive impact on the national economy.
- Indonesia's 2.5 million fishermen may be great in number but in general have a low economic status, with poor technical knowledge.
- Total production in 1996 was 3.5 million t (77.5%) from marine and 1 million t (22.5%) from inland fisheries.
- Total exports of fish product increased between 1993 and 1996: from 529 213 t (valued at $US 1 504 million) to 596 200 t ($US 1 893 million).
- Fisheries management has the target of achieving both optimum utilization and sustainability. For this purpose, Indonesia introduced legislation to promote responsible fisheries principles. One such measure is the implementation of MCS.
- At present, implementation of MCS is still inadequate and lacks support infrastructure – both human and physical – so there is a need to enhance supporting components, including staffing, facilities and budget, and also to introduce a systematic framework or mechanism for coordination, etc.
- Good coordination must be established with the Navy and other institutions involved in order to be able to implement the law enforcement aspects of MCS.
- Good joint regional MCS between the respective bordering countries should be encouraged and supported through yearly meetings to overcome problems.