

INDONESIAN FISHERIES PHENOMENA: Development, Enhancement and Management

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ABSTRACT

Indonesia has a great endeavor in fisheries resources. However, most of the resources remain underutilized in some extents. At the same time, resource disparity is occurred in Indonesian fisheries. Tight competition among the resource users happen in fisheries with dense population. In such situation, thereafter, tragedy of common phenomena will happen. Managing fisheries resource in the condition which constitutes thousands of islands like Indonesia is not an easy task and should be quite costly in expenses. One of strategies that requires less in cost and could promise a better achievement is through reviving the potency which belongs to the community (such as traditions, customs, beliefs, habits, etc.) and with empowering the community to manage the fisheries resources.

Keywords: *fisheries, utilization, strategy, traditions, empowering, community.*

ABSTRAK

Potensi perikanan Indonesia adalah relatif besar namun pemanfaatannya secara riil masih sedikit di samping sebarannya yang masih belum merata. Persaingan yang ketat diantara nelayan di daerah yang padat penduduknya dapat mendorong timbulnya gejala 'tragedy of the common'. Untuk mengatur pengelolaan perikanan pada negara kepulauan yang padat penduduknya seperti Indonesia merupakan tugas yang tidak ringan dan perlu biaya yang mahal. Oleh karena itu perlu diambil strategi yang tidak memerlukan biaya yang relatif tinggi tapi dapat menjanjikan hasil yang lumayan, yaitu dengan cara menghidupkan kembali potensi yang dimiliki oleh masyarakat (seperti: tradisi, adat, budaya, kebiasaan, dll) dan memberdayakan masyarakat itu sendiri dalam mengatur/ mengelola sumberdaya perikanan.

Kata kunci: *perikanan, pemanfaatan, strategi, tradisi, pemberdayaan, masyarakat.*

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I. INTRODUCTION

Indonesia covers a vast archipelagic area consisting of more than 17,000 islands stretching about 5,000 km from East to West and about 2,000 km from North to South with a coastline of 80,000 km. The Indonesian archipelago and territorial sea covers an area of about 3.1 million sq.km, excluding 2.7 million sq.km area of marine waters which is under the Exclusive Economic Zone (EEZ) (Anon, 1983). Therefore, Indonesia has large marine resources with various stocks of fish and other marine animals (Costa, 1988). The total area of Indonesia is about 1,919,317 sq. km with a total population of about 205 millions in 1998 (BPS, 1998). Beside marine fisheries resource, Indonesia has a great resource assets in open-waters fisheries such as river, lake, pond, swamp, brackish water and other resources like forest, mine, etc. The potential fisheries resource promises for food security of the people, employment and generating income for the country or regions. The mega biodiversity of Indonesia among other is composed by 10% of flowering plant, 12% of mammals, 16% of reptiles and amphibians, 17% of aves and 25% of fishes in the world. A high number of populations and economic and political activities bring about a severe pressure and conflict among the interested parties to the environment and natural resources.

In some extents, Indonesia, which is composed by many islands with diverse of tribes has, brought various traditions and customs. Some of the traditions, beliefs and taboos which live in the community

encourage for a better resource management including in fisheries. These could be considered as a great endeavor for managing fisheries resource in Indonesia.

Indonesia consists of 27 provinces, 60 municipalities, 243 regencies, 3,836 sub-districts and 65,554 villages. The climate of Indonesia is similar to the other countries of Southeast Asia like Malaysia, Singapore, Thailand, and the Philippines. The surface currents in Indonesian waters are strongly influenced by currents from the Pacific Ocean and the Indian Ocean (Bailey et. al., 1987). The Southeast monsoon is relatively milder than the Northwest monsoon as described by several authors (Wyrcki, 1961; Soegiarto and Birowo, 1975; Salm and Halim, 1984 and Bailey et. al., 1987).

In overall, the objective of this study aims to show the importance of fisheries sector in Indonesia. The roles of fisheries to the economy, employment, community development and resource management in Indonesia will be described in this study.

II. FRAMEWORK

The basic framework used to analyse the study is descriptive statistics and descriptive qualitative. The study brings together the diverse literatures and experience of the previous studies (e.g. Susilowati, 1991; Susilowati, 1997; Susilowati, 1998a and 1998b; and Susilowati, 1999) to advocate the importance of fisheries for Indonesia.

III. FISHERIES PROFILE

3.1. Fisheries Resource and Output

Agriculture plays an important role in the Indonesian economy. Fisheries contribution to the Gross Domestic Products (GDP) was 1.4% in 1987 and has grown to 2.0% in 1992 (Putro, 1995). The allocation of development expenditure for agriculture sector declined from 19.7% in 1991 to

18.5% in 1993 as presented in Table 1. Currently the manufacturing industries and trading sectors are considered as the key component of the Indonesian GDP and they contributed about 21.7% and 16.4%, respectively in 1992. Although the role of the agricultural sector is decreasing in the Indonesian economy, the government is trying to sustain and encourage this sector in order to balance the growth of the secondary and tertiary sectors.

Table 1. Role of Agriculture in the Indonesian Economy

Description	1991/1992	1992/1993	1993/1994
* GDP Composition:			
(1) Agriculture, Livestock, Forestry, Fisheries (in billions Rp)	2,817	2,955	3,082
(2) Total GDP	19,998	22,912	25,227
(3) Percentage: (1):(2)	14.1%	12.9%	12.2%
* Development Expenditure for:			
(1) Agriculture & Irrigation (in billions Rp)	44,720.8	50,733.1	55,745.5
(2) Total	227,450.2	259,884.5	302,017.8
(3) Percentage: (1):(2)	19.7%	19.5%	18.5%

Source: *Statistics Pocket Book of Indonesia 1994, 1995.*

A marine fishery of Indonesia is a multispecies and multigear fishery. Most Indonesian fishers harvest a number of different species depending on weather conditions and seasonal variability. Medium and large scale^{1/} fishers are able to fish

throughout the year. With a total fish production of 3.3 million metric tons in 1991, Indonesia is the world's eighth largest fish producer, contributing around 3.3% of the world's total fish production. Captured fisheries accounted for 76% of total

^{1/} Medium- and large-scale fisheries are defined in terms of investments on boats and facilities such as powered inboard engines (DGF, 1975; Bailey et. al., 1987).

production, while the share from aquaculture was 15% and inland-capture was 9%. Over the period from 1981-1991, fisheries production increased from 1.9 to 3.3 million tons, with an annual growth rate of 5.8%. During the Sixth Five-Year Plan (REPELITA VI) the marine fisheries production is projected to increase with an annual growth rate of 4.6% for marine and 5.7% for inland fisheries. Overall, the national production target for Indonesian fisheries outlined by the Directorate General of Fisheries of Indonesia (DGF) is about 4.9% per annum during Repelita VI as

shown in Table 2.

The total fisheries production of Indonesia in 1992 (4,013,831 tons) was greater than the projected figure in 1994 as shown in Table 2 (3,907,000 tons). The marine sub-sector plays a significant role in Indonesian fisheries. The three biggest fish producers among the provinces in Indonesia are Java (29.2%), Sumatra (27.0%) and Sulawesi (17.0%), while the smaller producers are the province of Bali, Nusa Tenggara and Timor (7.1%) as shown in Table 3.

Table 2. Projected Fisheries Production in REPELITA VI (thousand metric tones)

Category	1994	1995	1996	1997	1998	Average Annual Rate
1.MARINE FISHERIES	2859.1 (73.2%)	3004.9 (73.3%)	3140.5 (73.0%)	3276 (72.7%)	3416.4 (73.3%)	4.6
- Capture	2724.4	2857.9	2980.2	3101.1	3255.6	4.3
- Culture	134.7	147	160.3	174.9	190.8	9.1
2.INLAND FISHERIES	1047.9 (26.8%)	1094.2 (26.7%)	1159.1 (27.0%)	1229.3 (27.3%)	1305.6 (27.7%)	5.7
- Capture	318.3	318.9	319.6	320.2	320.9	0.2
- Aquaculture	929.6	775.3	839.5	909.1	984.7	7.8
o Brackish	430	454.7	494.8	538.5	585.9	8.0
o Fresh Water	169.3	179.4	191.3	203.9	217.4	6.5
o Cage	9.2	10	11.4	12.9	14.8	12.6
o Paddy Field	121.1	131.2	142	153.8	166.6	8.3
TOTAL	3907	4099.1	4299.6	4505.3	4722	4.9

Source: Department of Agriculture of Indonesia, 1994.

Table 3. Fisheries Production by Islands, 1992 (in tons)

Area	Marine		Inland		Total	
	% c	% r	% c	% r	Units	% c
1. Sumatra	28.3	80.6	22.5	19.4	1,082,375	27.0
2. Java	25.0	65.8	42.8	34.2	1,170,008	29.2
- Central Java	10.1	84.9	5.9	15.1	365,286	9.1
3. Bali & Nusa Tenggara	8.9	95.1	1.5	4.9	286,710	7.1
4. Kalimantan	8.2	58.3	19.4	41.7	434,351	10.8
5. Sulawesi	18.0	81.6	13.5	18.5	681,295	17.0
6. Maluku & Irian Jaya	11.6	99.1	0.3	0.9	359,092	9.0
Indonesia	3,080,168	76.7	933,663	24.8	4,013,831	100.0

Note:

% c : percentage by column

% r : percentage by row

Source: Fisheries Statistics of Indonesia 1994, 1995.

3.2. Level of Utilisation

Indonesian marine fisheries and under-sea resources have not been explored optimally. Exploration and utilisation for such potential resources should be undertaken with wise and high responsibility to maintain the sustainability of the resources. Only about 45% or 3.2 million tons of the maximum sustainable yield (MSY) of marine fisheries have been utilised which comprises for pelagic of 60%, 25% of demersal fish, 70% of tunas, 2.5% of squits, 1.5% of shrimps and others fishes for about 4% (Suara Merdeka, 1 November 1999). Nowadays, the main problem of resource utilisation in Indonesia is due to high disparity of resource used. These problems are found in marine and inland fisheries. The empirical evidence of imbalanced resource exploitation is significantly exhibited for marine fisheries in Indonesia. Many of

fishing grounds have been over-fished, like in Malacca straits, Java Sea, South Kalimantan and South Sulawesi Sea. However, most of waters in eastern Indonesian are remain under-exploited. The inequality of resource utilisation might be due to high-pressures from large numbers of population like in Java Island. On the other hand, the carrying capacity of resources is limited to accommodate the efforts spent by the fishers. Thereafter, many of them are doing expansion to fish in the southern part of Kalimantan and Sulawesi and even up to southern part of Maluku and/ or going toward Natuna Island in South China Sea. Moreover, from different direction Sumatran fishers are moving toward eastern direction to find out the lucrative stock of fish approaching to Java Sea. Consequently, conflicts among Sumatran, Javanese and fishers from other parts of Indonesia can not be avoided.

3.3. Fishing Gears

The use of fishing devices and fishing gears depends mostly on cultural habits, seabed configuration and constitution and coastline conditions where fishing activities take place (Potier et. al., 1995). Indonesian marine fisheries are structured around three scales, namely small, medium and large. However, in practice people usually differentiate into small- and large-scales for the purpose of simplicity. A clear distinction based on investment cost separates the small-scale from the other two. However, the classification of fisheries in Indonesia can not be viewed only on the basis of investment level but also by the technology used by the fishing operator. All boats powered by sail or outboard engines are defined as small-scale (DGF, 1975). While, boats powered by inboard engines are either classified as medium- or large-scale (Bailey et. al., 1987) The types of gear commonly employed without the use of a boat, such as cast nets, push nets and other various static gears, are also included under small-scale category.

Common types of small-scale gears employed in Indonesian fisheries are seines, gillnets, fish traps, lift nets, guiding barriers and hand lines. These gears are also widely found in other Southeast Asian countries. In the 1960's Indonesian fisheries was dominated by the small-scales gears, which accounted for about 98.99% of all fishing boats operated without engines. A decade later, the number of inboard and outboard powered boats entering Indonesian fisheries increased. In 1982, almost two-thirds of all

powered boats comprised of outboard boats (Bailey et. al., 1987). Currently, almost all boats are equipped by at least an outboard engine and the unpowered boats are rarely found in fishing areas.

The five major fishing gears in Central Java in 1993 were composed of trammel net (32.40%), floating gillnet (14.46%), fixed gillnet (11.53%), klitik net (7.59%) and dogol (4.03%). The operators of these dominant gears are categorised as small-scale operators (Fisheries Statistics of Central Java 1994).

3.4. Employment

Putro (1995) noted that fisheries provide sizeable employment opportunities to over 4.0 million fishers and fish farmers, representing some 5% of the total labour force. About 46% of this portion are engaged in aquaculture; 42% in marine fishing and 12% in inland open waters fishing. Moreover, Kusumaatmadja and Purwaka (1996) estimated that two million families depend on coastal fishing for their livelihood. In 1992, there were 1,743,662 fishing households dependent on marine (23.3%) and inland fisheries (76.7%). They are mainly concentrated in Java (53.2%) and Sumatra (21.8%) while the remainders are spread all over the islands. Fishers in Java are mostly active in inland fisheries (91.1% from its total), particularly in fresh water culture. The complete distribution of fisheries households by province in Indonesia can be seen in Table 4.

Table 4. Fisheries Households by Island, 1992 (in persons)

Area	Marine		Inland		Total	
	% c	% r	% c	% r	Units	% c
1. Sumatra	25.7	27.5	20.5	72.5	379189	21.8
2. Java	20.3	8.9	63.2	91.1	927690	53.2
- Central Java	.4.9	7.1	19.5	92.9	280972	16.1
3. Bali & Nusa Tenggara	12.9	46.8	4.5	53.2	111831	6.4
4. Kalimantan	6.0	21.4	6.6	78.6	112928	6.5
5. Sulawesi	22.3	58.5	4.8	41.5	154371	8.9
6. Maluku & Irian Jaya	12.9	90.9	0.4	9.2	57653	3.3
Indonesia	405708	23.3	1337954	76.7	1743662	100.0

Note:

% c : percentage by column

% r : percentage by row

Source: Statistics Pocket Book of Indonesia 1994, 1995

IV. TRAGEDY OF THE COMMON

In many countries, fisheries management policies tend to be ad hoc in nature and to a large extent have been a political exercise. As such, the fisheries management regimes in many Asian countries evolved a round the nature of fisheries exploitation itself (Nik Mustapha and Kuperan, 1997). In Indonesia, conflicts of interest and resource utilisation among fishers in 'heavy-duty' resources are quite tough. The tight competition among the fishers is mostly due to over-capital of investment in the fisheries sector. The paradox of capitalisation with higher technology commonly happens in the fisheries industry. This could spear the traditional fishers adversely. This kind of dilemma often performs as a chain in the fisheries. Without high-technology being employed, low catch will be earned. In fact

fishers need to seek high catch for high income, thus they tend to invest more capital for modernising their fishing fleets. However, with higher level of capital invested the resources' capacity can not sustain for higher fishing efforts due to over-fishing. Advanced capture technologies have become pressures on fisheries resource. Hence, the tragedy of the common mechanism will help to regulate the fisheries exploitation. Unless the resource rents earned by fishers are dissipated, the over-capitalisation will remain occur in the fisheries sub-sector. This tragedy can adverse the poverty levels for marginal fishers. This is why, many experts suggest cutting the cycle of tragedy of the common phenomena before the massive situation happens. Generally, fishers do not listen to the experts' advices for not to invest too much in the fisheries unless they have not incurred for some losses. It usually happens,

that fishers do not realise that over-capitalisation can cause a boomerang for them until they are aware they can not resist bad debts.

The 1980's and early 1990's were a time of ambitious industrialisation programs in many of the developing countries of Asia – this included an industrialisation of fisheries. The emphasis of national fishery policy in all Asian countries has been to increase fish production for domestic consumption and export. This has been sought through various devices such as motorisation, port development and providing new boats and fishing gear. Beside that the growth in fishing effort has also been the role of fishing as an employment of last resort (Nik Mustapha and Kuperan, 1997). Therefore, funding to the fisheries sub-sector, both inland and marine, was substantial with a major emphasis in fisheries development and investment in catching and processing capacity (Insull and Orzeszko, 1991). One of the ways forward in fisheries management is to avoid falling deeper into the capital trap.

V. FISHERIES RESOURCE MANAGEMENT

Fisheries Regulations and Policies

Marine fisheries in Indonesia are almost exclusively small-scale fisheries. To protect the small-scale fishers from unfair competition from large-scale operators, the government introduced several regulations to manage the Indonesian fisheries. The first evidence of official concern came in 1973 when the Minister of Agriculture issued

decree 561 calling for the “rational” exploitation of fisheries resources. Subsequently, in 1974, the Minister of Agriculture issued Decree No. 40, which stated that trawlers by catch device must be fully utilised rather than cast overboard. In 1976, the authority expanded the regulatory measures by issuing Ministerial Decree No. 607 to establish a series of parallel coastal zones commencing 3 miles, 4 miles, and 5 miles from the shore line and its subsequent layer to the shore. This zoning policy is limited to the heavily fished areas, mainly in the western part of Indonesia and prohibits various types of boats. The rationale for imposing these zones strongly suggested that the Decree was issued as a means of controlling trawlers and other large scale gears operation. The main purpose of the zoning regulation among others is for resource conservation and protection of the small-scale fishers. The zoning regulation is expected to ensure the sustainability of inshore waters environment, which serve as breeding and nursery grounds for fish. In addition, many small-scale fishers depend on fishing inshore due to the limited productivity of their gear (Bailey et. al., 1987). This decree was immediately followed by Decree No.609, which further restricts the trawlers to operate within the area for which they were designated. This decree was issued in response to the haphazard movement of trawlers from the Malacca straits to the coasts of North and South Java.

Prior to 1966, capture fisheries in Indonesia were operated small-scale in nature, depending on gear with limited efficiency to exploit nearshore waters. However, with the introduction of new fishing gears and the expansion of existing medium and/ or large-scale fisheries, the

sustainability of the resource has tended to deteriorate. Consequently, there has been competition among fishers groups (Susilowati, 1991). To protect the small-scale fishers from unfair competition from the large-scale operators the government of Indonesia has put on a lot of efforts.

The implementation of these regulations inevitably requires an effective enforcement and controlling mechanism. The fishing situation could get worse if these regulations are violated. This was exactly what happened in terms of management and control of trawl fishery, when physical clashes took place between traditional and trawler fishers (Sardjono, 1980). As a solution to the problem, the government banned the use of trawlers in the western waters of Indonesia on July 1, 1980 through the issuance of Presidential Decree No.39/ 1980. The government of Indonesia gave special attention to fairly 'distributed' zoning for coastal and offshore fisheries. The ban of all trawler operations in waters off Sumatra, Java and Bali was effective in 1981 and the trawler ban was extended throughout Indonesia by the beginning of 1983. These were the most recent action taken in a series of management policy measures designed to protect coastal fisheries resources.

Surveillance and enforcement operations are critical to the success of any system of fisheries management. Goodreau (1987) believed that without enforcement, fisheries regulations will be ineffective. Only effective enforcement can prevent fisheries from deterioration (Sutinen and Kuperan, 1994). Incomplete enforcement could result in the non achievement of the expected objectives of fisheries management for the targetted fishery. In the contrary, the

government budget available to underdo monitoring, controlling and surveillance (MCS) activities for Indonesian fisheries - which in nature is quite dispersed with long coastline and are made up of many islands - is very limited. Thereafter, to cope that situation we could proceed with one of the good efforts, i.e. by empowering fishers and the related stakeholders to cooperate in managing fisheries resource. Moreover, efforts should also be given to empower many traditions, beliefs and traditional systems used in managing fisheries. However only few traditional systems remain revived till now in Indonesia such as "Sasi" in Maluku, "Panglima Laut" in Aceh, "Lubuk Larangan" in North Sumatra, "Ikan Larangan" in West Sumatra, "Rumpon" in South Lampung, and some other beliefs and taboo practiced by Javanese fishers, especially in Central Java like *Jum'at Kliwonan*, *Badhan* (*Idhul Fitri* and *Idhul Adha*), *terang bulan*, *sedekah laut* (*baritan*, *suronan*, *lomban*), *orang tua* (*dukun* and *kyai*). These traditional systems mostly involved restrictions on some kind of fishery. Thus, it is important to investigate what are the 'value added' contributed by the traditional systems surviving. Thus we can transplant some elements of the revived system in designing the acceptable fisheries management scheme. Of course, it is not a simple task but somehow we have to try it.

VI. CONCLUDING REMARKS

It is found that resource utilisation in Indonesia has not been explored optimally and facing imbalanced in level of exploitation. Resources nearby populated

island tend to be over-fished due to the fast growth in fishing efforts and fisheries as the last destination for employment seekers. Over-capitalisation commonly happen in fisheries industry in Indonesia like nowadays. This situation induces the occurrence of the tragedy of common phenomena. Moreover, this is adversed by some policies and regulation of fisheries that may no longer applicable as they are out of the contexts. Therefore, There is indeed the need for reformation and refreshment in all of the related aspects and components.

Indonesia as an archipelagic country is rich with marine and inland fisheries resources. The fisheries of Indonesia have multispecies and multigears characters. This resource provides people for food, employment and welfare. Since Indonesia is composed of thousands of islands, thus it has a diversity in tribes, traditions, beliefs and taboos. All of these potencies are considered as a great assets for managing fisheries development. Some of the traditional fisheries management systems remain survive. It is argued that given their advantages, they should be promoted in policies which aim at ensuring better management of fisheries resources. This is not an easy task and the conclusion is reached that a change of attitude among policy makers or the political authorities are really expected.

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