



Shifting Fisheries Structure towards Sustainable Development: A Case Study in Vietnam

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This paper aims to review the real situation of the national fisheries structure of Vietnam in the transitional period over the previous years, and especially considering the present time. The characteristics and fundamental factors that made significant impacts on the restructuring process have been considered as these could provide practical basis for prescribing orientations and recommendations for a healthy restructuring in the years to come.

For many years, the fisheries sector in Vietnam has greatly contributed to the creation of new jobs for millions of people. However, many inhabitants of the communities in the rural and coastal areas continue to be within the low level socio-economic conditions, relying heavily on agriculture and fisheries for their livelihoods. The prospects of expanding fishing operations and maximizing the use of the natural resources such as the fish stocks, soil and water could be a way out for these communities, but much pressure could be put on the resources desired and could lead to some socio-economic effects which in turn could entail a vigorous sectoral pattern. Nonetheless, shifting towards enhancing livelihood activities, optimizing resource

utilization, advancing socio-economic effects, improving the quality of lives, and protecting and conserving the environment, all combined have been considered as possible strategies that could ensure sustainable development of the country's fisheries sector and alleviate poverty in the fisheries communities.

Restructuring of the country's fisheries done in the past and also during the most recent times with the goals of achieving sustainable fisheries development, should be reviewed in order to thoroughly understand the real situation of the fisheries in Vietnam specifically its structure which has been shifted through the years. The characteristics and fundamental factors that have made significant impacts on the process should also be defined to create the practical basis for prescribing orientations and recommendations. This would also be crucial and useful for further restructuring in the years to come. The facts and figures collected during the case study, seem to suggest that in many aspects, the fisheries pattern in Vietnam has been changing towards the right and proper direction. This has been demonstrated in terms of the enhanced fish stocks, the positive economic effects created and the society's demands having been fulfilled. However, the expected transition has been happening very slowly thus, sustainable development could not yet be ensured.

In order to attain the socio-economical goals adopted by the government, the whole system of fisheries production must be shifted from being natural resource intensive based to be technology intensive. Following the National Master Plan for Fisheries Development of Vietnam, the fisheries has been encouraged to address the pre-requisites and conditions for sustainable development in order that fisheries development could thrive on the knowledge pool by the year 2020 when intellectual human resources would then be primarily relied on.

Current Status of Fisheries Restructuring in Vietnam

The impact of the fisheries restructuring in Vietnam is better described in the three major sub-sectors, namely: marine capture fisheries, aquaculture and fish processing.

Marine Capture Fisheries

Along with the overall development of the nation at large and the fisheries sector in particular, the capture fisheries structure of Vietnam especially the marine capture sub-sector, has been observed to be progressing well. Although the process to some extent is characterized by spontaneity, the progress appears to be going upward and ready for further development. Due to technological progress, the country's fishing vessels have been transformed and improved while the fishing gears are gradually upgraded. Production and catch composition targets have been refocused to respond to the changes in market demands. Fishing grounds have been expanded beyond the traditional areas to include underexploited waters. The traditional characteristics of the fisheries have been reduced and gradually replaced by new and more effective approaches. However, since the movement has taken place in a slow pace, the sought-after sustainable development is definitely not around the corner

yet. The major features of the historical structure shifting in the marine capture fisheries sector could also present the true picture of the country's shifting fisheries structure.

Vessel structure

Prior to 1975, most of the fishing vessels in Vietnam were generally characterized as artisan (specific to North Vietnam only). After 1975 when Vietnam was united, the number of vessels increased and more than half of the country's fishing vessels were powered, mainly because most of the additional vessels formerly belonging to South Vietnam were motorized. From 1976 to 1980 when the central planning mechanism was strictly adopted across Vietnam, state-run fishing enterprises and cooperatives were on top of the priority for development.

As a consequence, the number of fishing vessels had decreased in terms of quantity and quality. However, between 1981 and 1990 when the new state management principles were introduced that allow for more deregulations whereby economic entities were free to operate on their own, the capture fisheries sub-sector enjoyed advantageous conditions and started to prosper. In late 1990s, the size of the national fleet has almost doubled compared with that of the 80s in terms of quantity and capacity, but the fleet composition remained unchanged, and by 2000, vessels of low capacity (below 45 HP) continued to account for more than 70% of the total number of vessels in Vietnam (Table 1).

Occupational structure

Fisheries in Vietnam are prominently operated using traditional approaches where the fishing households are the main provider of the labor force. Vietnam is located in the

Table 1. Vessel structure in marine capture fisheries of Vietnam (1976-2005)

| Indicators | 1976 | 1980 | 1990 | 2000 | 2005 |
|---------------------------------------|---------|---------|---------|-----------|-----------|
| Total number of vessels (units) | 51,520 | 44,388 | 72,723 | 87,724 | - |
| Powered vessels (units) | 34,833 | 27,128 | 43,417 | 76,768 | 90,880 |
| Total capacity (HP) | 543,431 | 453,915 | 947,929 | 3,478,524 | 5,317,447 |
| Structure of powered vessels (%) | | 100.0 | 100.0 | 100.0 | 100.0 |
| 20 HP and below | | 47.4 | 56.5 | 39.7 | - |
| 20-45 HP | | 40.1 | 41.4 | 33.3 | - |
| 45-140 HP | | 12.0 | 1.7 | 13.5 | - |
| 140 HP and above | | 0.5 | 0.4 | 13.5 | 7.2 |
| Average capacity (HP/vessel) | 15.6 | 17.7 | 21.8 | 46.7 | 58.5 |
| Fishing productivity (metric tons/HP) | 1.12 | 0.88 | 0.75 | 0.37 | 0.38 |

Sources: Institute for Economic and Planning, Ministry of Fisheries (1998); Draft of the Master Plan for Shifting Structure of the Capture Sector within 1996-2010, Ministry of Fisheries (2006); and Summary Report on the Effects of the State Plan of the Fisheries in 2005

Table 2. Occupational structure of the marine capture fisheries of Vietnam (1976-1995)

| Gear types | 1976: % of total number of the same gear type | 1995: % of total number of the same gear type) |
|----------------|---|--|
| Trawlers | 65.8 | 26.2 |
| Purse seiners | 8.2 | 4.3 |
| Gill netters | 9.4 | 34.4 |
| Lift netters | 13.5 | 5.6 |
| Long liners | 7.0 | 13.4 |
| Fixed trappers | 3.1 | 7.1 |
| Others | 3.0 | 9.0 |

Sources: Institute for Economic and Planning, Ministry of Fisheries (1998), and Draft of the Master Plan for Shifting Capture Pattern within 1996-2010

tropical zone and gifted with abundance and wide variety of fish species but the fishing pattern is varied, inevitably scattered and inefficient. The official statistical data from 1976 to 1995 (Ministry of Fishery, 1998) indicated that there were more than 20 kinds of fishing gears employed that could be classified into seven main groups (**Table 2**).

The different gear types were distributed across the whole country, and in central Vietnam and the Gulf of Tonkin where pelagic fisheries are popular, drift nets and trawls were common accounting for 60.8% and 13.7% of the gear used, respectively. In the eastern and southwestern parts of Vietnam, trawling is more commonly practiced, representing approximately 38.1% of the total, a pattern considered appropriate for the existing fisheries resources in these areas where demersal species are abundant with the potential production reported to reach about 620,850 mt, representing 74.8% of the total production capacity of the area.

However, the pattern of gear employed seems to be not suitable for fishing operations in the central part and the Gulf of Tonkin since the ratio of pelagic to demersal fishes in these areas was estimated to be about 57.3% to 42.7%, while the proportion of trawlers remained at 13.7%. Moreover, one third of the total trawlers in the Gulf of Tonkin target the economically high value fishes while the rest go for shrimps.

Production structure

The catch composition from marine capture fisheries in Vietnam was also different in the areas although on the whole, the catch comprises: 81.1% fish, 7.6% shrimps, 6.7% cuttlefish, and other species about 4.6% (Ministry of Fisheries, 1995). Recently, the fishermen have put

much greater emphasis on targeting the species of high commercial value such as shrimps, cuttlefish, groupers, red snappers, sharks, tunas, etc.

Fishing ground structure (inshore and offshore)

Most fishing activities in Vietnam are operated along the coastal areas, which resulted in the rapid increase in the total number of vessels and fishing gears, and eventually to an alarming depletion of the natural aquatic resources. The consequences of which could be in terms of reduced economic efficiency as well as a downgraded environment. After the introduction of a state policy on capital credit preference for building offshore fishing vessels in 1997, the country's vessel fleet had witnessed a marked shift towards increased number of offshore vessels, although the results have still been insignificant. At the end of 2003, the number of powered fishing vessels stands at 83,122 with a total capacity of 4,100,000 HP with an average of 49.32 HP/vessel. About 24.3% of the total powered vessels were sufficiently equipped for offshore fishing operations. Thus, production from offshore operations in 2003 was estimated at 533,000 mt representing about 38.8% of the total fisheries production (it was about 20.0% in 1995). **Table 3** shows the total marine capture fisheries production of Vietnam by fishing area from 1995 to 2005.

Sectoral structure

Prior to the introduction of far-reaching reforms in 1986 and when central planning was predominant, marine fisheries were categorized into three sub-sectors, namely: state-run, co-operative and private. From 1960 to 1970, the state-run and co-operative sub-sectors occupied almost the upper half of the structure, but in the following decade when these

Table 3. Marine capture fisheries production of Vietnam by fishing area (1995-2005)

| Fishing Areas | 1995 | | 2005 | |
|-----------------------|----------------|------------|------------------|------------|
| | Volume (mt) | % | Volume (mt) | % |
| Tonkin Gulf | 42,200 | 4.4 | 88,238 | 4.9 |
| North Central Vietnam | 86,750 | 9.1 | 166,957 | 9.2 |
| South Central Vietnam | 288,770 | 30.3 | 379,708 | 21.0 |
| Southeast Vietnam | 524,310 | 54.9 | 411,173 | 22.7 |
| Southwest Vietnam | - | - | 728,015 | 40.2 |
| Total | 942,030 | 100 | 1,809,689 | 100 |

Sources: Institute for Economic and Planning, Ministry of Fisheries (1998); Draft of the Master Plan for Shifting Structure of the Capture Sector within 1996-2010; Ministry of Fisheries (2006); and Summary Report on the Effects of the State Plan of the Fisheries in 2005

two sub-sectors revealed many inherent shortcomings and became less advantageous in terms of competition, these were gradually replaced by the fishing households.

On the other hand, the private sector has been the driving force in the marine capture fisheries sector, delivering increased production compared to only about 0.1% from state-owned entities. Among the reasons for this was the fact that most of the state-run fishing enterprises have been dissolved or have shifted its primary functions from fishing into logistic services, and only a few remained in the fishing business.

Aquaculture Development

With great potentials and advantages of growth of various aquatic species, aquaculture has so far registered a very remarkable development in Vietnam. Before the 80s, aquaculture production was negligible and could not be considered as an industry in itself. From 1985 to 1995 however, the average growth rate of the aquaculture production was recorded at 109% per year which produced about 459,950 mt in 1995. In the following ten-year period from 1996 to 2005, the growth rate averaged at 115% per year, with an increase of 17% per year in 2000-2005, yielding 1,437,400 mt in 2005 (42% of the total fisheries production of Vietnam). The total area used for aquaculture was 959,900 ha in 2005 (about 46.8% of the total potential area for aquaculture). The marvelous development of aquaculture in Vietnam in the past years was the result of concerted efforts from many major players in the economy. From the sectoral structure perspective, many features have contributed to the fast development of the aquaculture sub-sector of Vietnam.

Water surface areas

In the nine-year period from 1995 to 2003, there was a shift in the usage of the water surface areas mainly in ponds, small lakes, ditches, reservoirs, and tidal areas as shown in **Table 4**. Moreover, the recently promoted and encouraged sea ranching scheme by the government, has been considerably developed in many provinces such as in Quang Ninh, Hai Phong, Binh Dinh, Phu Yen, Khanh Hoa, Binh Thuan, Ninh Thuan, Ba Ria-Vung Tau, etc.

Cultured species

The main species cultured in Vietnam are various fishes and shrimps (in brackish and marine environments), mollusks (oysters, shells) as well as freshwater species such as frogs, eels, tortoises, etc. In recent years, the species that have been strongly developed are shrimps (with the white leg species in some areas), tra-basa catfish and some special species such as sweet snails, sea crabs, and oysters. **Table 5** shows the species groups being cultured in various environments in Vietnam.

Production systems

Almost all aquaculture farms in Vietnam are operated by households in scattered areas using small and artisanal production methods such as extensive and improved extensive (semi-intensive) farming. Some industrial farming

Table 4. Water surface areas available and used by for aquaculture in Vietnam (1995-2003)

| Categories | Potential areas | | Areas used (to 1995) | | Areas used (to 2003) | |
|---|------------------|--------------|----------------------|-------------|----------------------|-------------|
| | Area (ha) | % | Area (ha) | % | Area (ha) | % |
| Ponds, small lakes, ditches | 120,000 | 5.9 | - | - | 100,986 | 84.2 |
| Reservoirs | 340,000 | 16.6 | 100,000 | 29.4 | 56,272 | 16.6 |
| Paddy fields where aquaculture is appropriate | 580,000 | 28.3 | 85,000 | 14.7 | 68,449 | 11.8 |
| Tidal areas | 660,000 | 32.2 | 275,000 | 41.7 | 575,137 | 87.1 |
| Others | 350,000 | 17.0 | 121,000 | 34.3 | 25,407 | - |
| Total | 2,050,000 | 100.0 | 581,000 | 28.3 | 902,229 | 44.0 |

Sources: Institute for Economics and Planning, Ministry of Fishery (1998), Draft of The Master Plan for Fishery Development to 2010; Ministry of Fishery (2005), Fisheries Statistics of Vietnam 2001- 2003.

Table 5. Cultured species in Vietnam by water environments (2001-2003)

| Environments and species | 2001 | | 2002 | | 2003 | |
|--------------------------|----------------|--------------|----------------|--------------|------------------|--------------|
| | Volume (mt) | % | Volume (mt) | % | Volume (mt) | % |
| Marine and Brackishwater | 319,071 | 45.0 | 396,099 | 47.0 | 443,135 | 44.0 |
| Shrimps | 149,978 | 21.1 | 181,851 | 21.5 | 233,086 | 23.2 |
| Finfish | 37,833 | 5.3 | 44,594 | 5.5 | 56,270 | 5.6 |
| Other sp. | 131,259 | 18.6 | 169,654 | 20.1 | 153,779 | 15.3 |
| Freshwater | 390,820 | 55.0 | 448,710 | 53.0 | 559,960 | 56.0 |
| Shrimps | 4,933 | 0.6 | 4,364 | 0.5 | 4,794 | 0.5 |
| Finfish | 383,186 | 54.0 | 441,827 | 52.3 | 548,131 | 54.6 |
| Other sp. | 2,701 | 0.4 | 2,519 | 0.3 | 7,035 | 0.7 |
| Total | 709,891 | 100.0 | 844,809 | 100.0 | 1,003,095 | 100.0 |

Sources: www.fistenet.gov.vn (2005), Fisheries Statistics of Vietnam 2001-2003

activities are also in operation which account for about 25% of the farms that have been intensively invested. In recent years, farming methods and practices have been improved in order to respond to the rigid export market requirements. This requires a systematic shifting in the aquaculture pattern, guided by science-based planning and stricter management policies of the aquaculture activities.

Many developments can thus be seen from many angles, for example in constructing an irrigational infrastructure for aquaculture; monitoring the sources of broodstock, proper management of feeds and the aquatic habitat, preventing the occurrence of aquatic diseases without using excessive antibiotics as well as applying the management models of good aquaculture practices (i.e., BMP, GAP, CoC, etc.) .

In addition to diversifying the species cultured which should be of commercial value and the culture systems, some aquaculture operators have established breed-producing facilities to get a firm hold on the broodstock supply and also to restock the depleted natural resources. Until 2005, there were 4,281 shrimp breeding farms producing 28.8 billion post larvae and 392 broodstock units producing 17.45 billion of milkfish fry.

In short, aquaculture has achieved both rapid growth rate and high economic efficiency. This can then be translated into changing the economic pattern in rural and coastal areas by means of creating new jobs, increasing income, eliminating hunger, and reducing poverty. The aquaculture structure has gone from reducing production methods that are spontaneous, unplanned, self-sufficient and highly dependent on natural resources to intensifying large-scale production that can accommodate the huge demands of the local consumers and the export markets. However, there are many things that need to be done in the transitional process in order to achieve sustainable aquaculture development. Several factors cited include proper water surface area planning, infrastructure construction and improvement, technological progress application, and the selection of proper production methods and inputs.

Fish Processing

From the point of view of the whole economy, fisheries processing is an integral component of the food industry and fisheries production system is only one stage of the whole process. In this stage, raw materials from capture fisheries and aquaculture could be processed

into many kinds of food products that suit the consumers' tastes and habits in different locations at different times. It is where new values are added and at the same time, the consumers' needs and wants are incorporated to produce the appropriate fish products with new attributes. Therefore, fisheries production has a direct connection to changes in consumer demands over periods of time.

Additionally, the switch also reflects the requirement of increased economic efficiency not only for aquatic processing itself but also for capture and aquaculture. Such diversified pattern in turn allows the diversification of seafood products and the minimization of post-harvest losses, as it plays a major part in solving inherent conflicts in sector development, notably between the comparatively stable nature of fish species and consumers' diverse and fast-moving demands. Furthermore, the shift in the fisheries processing structure is also regarded as a leverage to encourage the structural change in capture fisheries and aquaculture in conformity with market needs.

The advancement of fisheries processing, especially the export-oriented sub-sector could be considered as a breakthrough in the development of the whole fisheries structure, creating the foundation for new economic management methods adopted in the past years. Before 1980s, fisheries processing was a simple and traditional economic activity that includes fish sauce processing, and fish drying and salting, with the products mainly sold in

Table 6. Structure of the processed fish products in Vietnam (by volume)

| Products | 2000 | | 2002 | | 2004 | |
|--------------|-------------------|------------|-------------------|------------|-------------------|------------|
| | Volume (mt) | % | Volume (mt) | % | Volume (mt) | % |
| Fish | 68,479.13 | 23.46 | 149,951.02 | 32.69 | 201,135.63 | 37.86 |
| Shrimp | 67,420.43 | 23.10 | 115,855.13 | 25.26 | 142,206.65 | 26.76 |
| Cuttlefish | 61,086.51 | 20.93 | 73,799.25 | 16.09 | 72,209.08 | 13.59 |
| Others | 94,936.61 | 32.52 | 119,052.58 | 25.96 | 115,774.49 | 21.79 |
| Total | 291,922.68 | 100 | 458,657.98 | 100 | 531,325.85 | 100 |

Sources: Compiled based on the statistical data of the Informatics Center, Ministry of Fisheries (2005)

Table 7. Structure of the processed fish products in Vietnam (by value)

| Products | 2000 | | 2002 | | 2004 | |
|--------------|----------------------|------------|----------------------|------------|----------------------|------------|
| | Value (USD) | % | Value (USD) | % | Value (USD) | % |
| Fish | 205,102,156 | 13.90 | 479,323,866 | 23.70 | 567,698,445 | 23.65 |
| Shrimp | 658,213,061 | 44.59 | 965,792,440 | 47.74 | 1,272,331,198 | 53.00 |
| Cuttlefish | 109,918,471 | 7.45 | 249,428,043 | 12.33 | 233,041,195 | 9.71 |
| Others | 502,830,507 | 34.07 | 328,276,567 | 16.23 | 327,710,277 | 13.65 |
| Total | 1,476,064,195 | 100 | 2,022,820,916 | 100 | 2,400,781,115 | 100 |

Sources: Compiled based on the statistical data of the Informatics Center, Ministry of Fisheries (2005)

domestic markets. After 1981, production of frozen fish products for export grew quickly, resulting in increased number of enterprises, freezing capacity and hence, export values. The annual average growth rate of this export-led sub-sector was recorded at 108% in terms of number of factories; 121% in capacity and 117% in export value from 1996 to 2005 (Table 6 and Table 7).

The fisheries processing structure of Vietnam (from the product patterns in the market shown in Table 8 and Table 9), has been heading towards diversification in order to meet market demands and focusing on commodities of high export values (high value-added products accounted for 40-50% in 2005) and in 2000-2005, the market structure has been more diversified. Prior to 1995, about 70% of the national export of seafood products was bound for Japan with the remaining 30% delivered to other Asian markets such as Hong Kong and Taiwan. Later, the market had been expanded to include high-end markets such as Europe and the USA. At the end of 2005, fish and seafood products from Vietnam were already very visible in the markets of 105 countries and territories.

The changing structure of commodities and extending markets made Vietnam overcome the barriers to trade such as regulations of quality standards as well as the

anti-dumping policy of large and demanding markets in Europe and the US. However, as in other economic areas, the shifting of the fisheries processing structure was mainly in terms of quality standards while the application of new technology and value addition to seafood products have been progressing rather slowly. While some 50% of exported frozen fish and seafood is still in the preliminary stages of processing, both product quality and management quality have exposed imminent threats against unsustainability.

Orientations for Shifting the Fisheries Structure

From the prevailing practices of structure transformation in the fisheries sector in the past decades, some significant features can be observed. For example, the shift in the fisheries structure was implemented with a rather slow start. Considering the backward socio-economic conditions of the sector, some form of structure shifting was carried out without proper planning, and remained unstructured and unchecked for a long period of time. The structure shifting in fisheries played a part in transforming the sector from a small component of the whole agricultural system to an independent production sector that made great contributions to the economy. Since the shift in the fisheries structure was closely connected to reforms of management institutions/

mechanisms that governed the economy, the process also generated impulses to speed up innovations and reforms. The structure shifting has generally led the sector forward to a rapid and sustainable development, helping Vietnam to integrate its economy into the regional and global economies. In order to achieve the goal of “rapid and sustainable growth” as provided for in the Master Plan for Fisheries Development to 2010, which was approved by the government in January 2006, the fisheries structure should be pushed forward following predefined orientations. In general, the whole system of fisheries production must be shifted from the natural resource intensive based to technology intensive.

Orientations for the Sectoral Structure

The relationship between aquaculture and industrial fisheries mirrors the same relationship as with agriculture and the industry. As such the thrust of aquaculture must be changed from being natural and self-sufficient production sector to commodity production to ensure the supply of diverse commodities for the consumers and to supply the raw materials for

Table 8. Market structure of Vietnam’s processed fish products (by volume)

| Markets | 2000 | | 2002 | | 2004 | |
|------------------------|-------------------|------------|-------------------|------------|-------------------|------------|
| | Volume (mt) | % | Volume (mt) | % | Volume (mt) | % |
| Asia (excluding Japan) | 106,779.27 | 36.58 | 134,744.06 | 29.38 | 123,891.10 | 23.32 |
| Europe | 20,290.78 | 6.95 | 28,612.78 | 6.24 | 73,459.21 | 13.83 |
| America | 37,979.87 | 13.01 | 98,664.54 | 21.51 | 91,380.69 | 17.20 |
| Japan | 68,717.19 | 23.54 | 96,251.41 | 20.99 | 121,160.49 | 22.80 |
| Other markets | 58,155.57 | 19.92 | 100,385.20 | 21.89 | 121,434.36 | 22.85 |
| Total | 291,922.68 | 100 | 458,657.99 | 100 | 531,325.85 | 100 |

Sources: Compiled based on the statistical data of the Informatics Center, Ministry of Fisheries (2005)

Table 9. Market structure of Vietnam’s processed fish products (by value)

| Markets | 2000 | | 2002 | | 2004 | |
|------------------------|----------------------|------------|----------------------|------------|----------------------|------------|
| | Value (USD) | (%) | Value (USD) | (%) | Value (USD) | (%) |
| Asia (excluding Japan) | 412,396,176 | 27.89 | 497,803,341 | 24.61 | 413,861,348 | 17.24 |
| Europe | 71,782,420 | 4.85 | 73,719,852 | 3.64 | 231,527,515 | 9.64 |
| America | 301,303,916 | 20.3 | 654,977,324 | 32.38 | 602,969,450 | 25.12 |
| Japan | 469,472,915 | 31.75 | 537,459,466 | 26.57 | 772,194,720 | 32.16 |
| Other markets | 223,654,122 | 15.13 | 258,860,933 | 12.80 | 380,228,081 | 15.84 |
| Total | 1,478,609,549 | 100 | 2,022,820,916 | 100 | 2,400,781,114 | 100 |

Sources: Compiled based on the statistical data of the Informatics Center, Ministry of Fisheries (2005)

processing. The structure of aquaculture and capture fisheries must be transformed in accordance with the predefined orientations as provided for in the National Master Plan for Agriculture-Forestry-Fisheries Pattern Shifting to 2010 approved by the Prime Minister in June 2004.

For aquaculture

Based on the National Master Plan, aquaculture is expected to increase fish production from brackishwater culture and searanching and at the same time, develop freshwater culture in ponds, small lakes, rivers and reservoirs. Identifying potential groups of main aquaculture species considering the bio-ecological environment of each area, region and at the same time also supplying market demands is also mandated for the aquaculture sector in the Plan. Moreover, investing into industrial and intensive zones of shrimp culture, applying the standards of safe and sanitary food to farming zones, intensifying the protection of the ecological environment and biodiversity, and readjusting the aquaculture structure according to the Master Plan, have been put forward for the aquaculture sector to undertake in order to gain high economic efficiency.

For capture fisheries

Transforming quickly occupational structure and stabilizing capture fisheries production in coastal areas while increasing offshore production have been included in the orientation for the marine fisheries sub-sector. In addition, the whole marine water resources should be divided into manageable areas so that monitoring, control and supervision activities can be efficiently put in effect. Furthermore, decentralization and authority delegation should be the guiding principles in the administration of fishing operations while fishing ports systems should be better equipped, and fishing logistics and services should be enhanced.

For fish processing industries

The expansion of the fish processing sub-sector should comply with general orientations for fisheries development, specifically referring to the fact that capture fisheries that is based on simple natural resource utilization, should be gradually reduced. Processing instead should take the center stage to enhance the initial values of the natural aquatic resources and bring additional values to the economy by producing high-end, instant consuming products. This could be an appropriate answer to the condition of the country's aquatic resources which are characterized by multi-species but small stocks.

Sectoral Development Orientations

For the State-run Sector

The government should ensure that logistics services are provided for the other economic sectors, such as production services by constructing fishing ports, building and repair of fishing vessels, providing materials and equipment, adopting modern technologies, providing broodstock and feeds for aquaculture, etc. In addition, the government is also encouraged to provide technical services through conduct of scientific training and technological transfer activities. Services to accommodate the physical and spiritual life for fishermen should also be promoted. Providing processing services and seeking outlets for seafood products from the other economic sectors are also the responsibility of the State. In addition, the State should represent all the other economic sectors to cooperate with foreign business partners.

For the Other Economic Sectors

The other economic sectors such as cooperatives, private sector, households, etc. should continue to play decisive roles as the driving force for fisheries product development, especially from capture fisheries and aquaculture. This strength could be enhanced with the concerted coordination efforts among all sectors, i.e. Agriculture, Forestry, Fisheries, Irrigation, and Marine Economy.

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