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PHILIPPINES.

SECTORAL PLAN
FISHERIES AND AQUACULTURE SECTOR

DECEMBER 27, 1988

SECTORAL PLAN
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I. SECTOR REVIEW

A. ROLE OF FISHERIES

1. Contribution to GNP

Fisheries as an economic sector accounted for 5% of the Philippine Gross National Product (GNP) in 1987 and makes an important contribution to the economy in terms of income, employment, contribution and export earnings.

2. Employment

The fishing industry directly employs an estimated 1 million fishermen and fishfarmers, out of which 250,000 are engaged in aquaculture operations, about 700,000 in municipal fisheries and 42,000 in commercial fishing. Indirectly, the industry likewise provides employment to those engaged in fish marketing and distribution, fish processing, operation of ice plants and cold storages and in allied industries such as net making, boatbuilding, etc.

3. Production

The annual growth rates achieved by the Philippine fisheries from 1978 to 1987 were registered at 3.8% and 16.4% in quantity and value, respectively.

The total fish production for 1987 reached 2.2 million metric tons, largely contributed by municipal capture fisheries (48%), followed by commercial fisheries (27%) and the rest by the aquaculture sector (25%) (Table 1).

4. Fisheries Export

The Philippines has had a positive balance of trade in fish and fishery products since 1975 and, currently, fish products constitute about 3.4% of the total value of national foreign exchange earnings. The value of fisheries exports increased steadily from P532 million (48,438 mt) in 1978 to P6.445 billion (112,382 mt) in 1987 (Table 2).

Increases in fisheries exports were largely due to the growth in tuna exports and the rapid expansion of high value cultured shrimp exports. Earnings from the third largest export product, seaweed, are also increasing. With the price of tuna on the rise and the expansion of shrimp and seaweed culture operations, the total contribution of fisheries to net foreign exchange earning is expected to increase.

Based on export revenues for 1987, the following are the 10 major Philippine fisheries exports: shrimp/prawn, 49% (P3,187 M); tuna, 22% (P1,427 M); seaweeds, 8% (P488 M); shellcraft articles, 5% (P302 M); cuttlefish/squid, 3% (P214); fish kept alive for transport, 1% (P107 M); clamshell meat, 1% (P97 M); milkfish, 1% (P80 M); capiz shells, 1% (P63 M) and sea cucumber, 1% (P52M) (Table 2A).

5. Fisheries Import

The value of fisheries imports increased from P230 million in 1978 to P444 million in 1982. Foreign exchange problems resulted in a decline to P111 million in 1983. In 1984, restrictions were imposed on the importation of canned sardines and mackerel. This resulted in a further decline in the value of imports to P50 million in 1984. In 1986, the Government implemented an import liberalization program by virtue of Executive Order 1047, resulting in a substantial increase in the importation of fish for canning (Table 3). This trend is expected to continue as the canners have an excess capacity in relation to current supply, particularly during the lean fishing months.

Fish meal, a vital component of animal feeds, comprises the bulk of the country's fishery imports. For 1987, the major fishery imports were composed of fishmeal, 49% (P315 M), followed by frozen sardines/mackerels, 40% (P257 M) and frozen tuna, 6% (P38 M) (Table 3A).

6. International Comparative Position of the Fishing Industry

The Philippines is the 12th largest fish producer in the world (FAO, 1985) and is ranked as the number one aquaculture and tuna producer in the ASEAN region.

B. RESOURCE BASE, EXTENT OF EXPLOITATION AND PRODUCTION

1. General

The Philippine fisheries jurisdictional area (including the Exclusive Economic Zone or EEZ) encompasses a total marine water area of 2,200,000 sq.km. Of this, the shelf area (depth 200 M) is 206,000 sq.km. and the coral reef area is 27,000 sq.km.

Inland water areas are also extensive. They comprise 223,717 ha of developed brackishwater and freshwater fishponds; 200,000 ha of lakes, 31,000 ha of rivers; 19,000 ha of reservoirs and 338,393 ha of swamplands for fishpond development.

The marine fishery resources comprise mostly fishes and invertebrates, contribute significantly to the total fish production. The major species are tuna, roundscad (galonggong), anchovies (dilis), sardines (tunsoy, tamban) and slipmouth (sapsap).

Cultivable fish species and other aquatic resources in freshwater and brackishwater areas in the country include milkfish, prawn/shrimp, tilapia, carp, oysters, mussels, and seaweeds.

2. Aquaculture

Aquaculture is seen as one of the potential growth areas in the fisheries sector because of its fast profit turnover, the stability of its output, the higher value and export potential of its products and its availability to provide the much needed alternative employment in fishing communities.

The major systems for aquaculture production in the Philippines include: brackishwater and freshwater pond systems; fishpens and fish cages; mariculture or seafarming and integrated fishfarming.

It is estimated that 260,000 ha of land area are being used for aquaculture. Brackishwater fishponds make up 81% (210,319 ha) of the total area; freshwater ponds, 5% (13,398 ha) and the rest for fishpens and fish cages.

a. Brackishwater

Brackishwater pond culture of milkfish (Chanoschanos) is the major aquaculture activity in the Philippines. However, the foreign demand for prawn (P. Monodon) causes abrupt shifting from milkfish to shrimp cultivation.

The culture of several other species such as sea bass, grouper, siganids and other shrimp species are being undertaken to a limited extent.

In 1987, production from brackishwater ponds totalled 234,584 mt, registering an increase of 13% over that of the previous year. The average annual yield/ha was 1.15 mt/ha. Highly productive fishponds are in Regions I, VI and III with 1.475 mt/ha, 1.332 mt/ha, and 1.330 mt/ha, respectively; the lowest, in Region VIII, with 0.438 mt/ha in 1987 (Table 4).

Currently, milkfish production in brackishwater ponds is in the order of 150,000 to 160,000 mt/yr. Total brackishwater shrimp production ranges from 30,000 to 40,000 mt annually. Approximately 73% of the milkfish produced in brackishwater ponds comes from three regions, Region I (Northwestern Luzon), III (Central Luzon) and Region VI (Western Visayas).

Regions III, VI and IV are also the major producers of cultured brackishwater shrimp. Together they account for approximately 88% of the brackishwater shrimp production.

b. Freshwater

The dominant species cultured in freshwater systems are tilapia (particularly Tilapia nilotica) milkfish and several species of carp particularly the common carp (Cyprinus carpio) and the silver carp (Hypophthalmichthys molitrix).

Freshwater aquaculture systems include fishponds, fishpens and fish cages for the culture of mainly tilapia, milkfish, and tilapia, respectively. Approximately 90% of all recorded fishponds in the country are located in Luzon. Recorded freshwater fishpens and fish cages are also concentrated on Luzon, particularly in Laguna de Bay.

The total production from freshwater fishponds increased by 94% from 1986 to 1987. Regions III, I and II accounted for 82%, 7% and 5%, respectively, of the total production in 1987 (Table 5).

A 14% decline in production from freshwater fishpen culture was also reported from 1986 (41,296 mt) to 1987 (35,588 mt). A significant increase in production from fish cages was attained in 1987 (Table 6).

c. Marine Aquaculture (Seafarming/Mariculture)

Marine aquaculture, also referred to as mariculture or seafarming, is practised in a number of coastal areas throughout the Philippines. The most important animal species cultured in marine waters are oysters (*Crassostrea* sp. and *Saccostrea* sp.) and the green mussel, *Perna viridis*. Various types of stack, rack and raft systems are used to culture oysters and mussels.

Total production of oysters and mussels reported for 1986 was 16,465 mt and 12,114 mt, respectively. Corresponding 1987 values were 18,569 mt and 12,792 mt. The majority of oyster production takes place in Regions I, IV and VI. Mussel culture is most predominant in the National Capital Region and in Regions IV, VI and VIII (Table 7).

The Philippines is one of the few countries in the world that have successfully grown marine algae (seaweeds) in commercial quantities. The seaweed industry, which is centered in the southern part of the Philippines, primarily in Mindanao, ranks third after shrimp and tuna among fisheries exports. Compared to the other two species, seaweeds provide greater direct economic benefits to a greater number of small fishermen.

In 1987, seaweed exports, mostly in dried form, amounted to 30,752 mt, valued at P488 M. In recent years, several seaweed processing operations have been established in the country for the production of agar and carrageenan. Carrageenan exports in 1986 were estimated to be in the order of 4,500 mt with an approximate value P288 M.

The *Eucheuma* seaweed species dominate the Philippine seaweed industry. While *Sargassum*, *Gracilaria*, *Gelidium* and a few other species are commercially important, limited information about them is available. Present culture technology utilizes the monoline system which can easily be adopted to either floating or substrate based methods.

Total production of seaweeds is increasing annually. As technology improves, more species are cultured and more areas come into production. Total recorded harvest of seaweed increased from 168,868 mt in 1986 to 188,118 mt in 1987. Important seaweed producing regions include Regions IV, VII, VIII and IX. Approximately 90% of the seaweed production reported for 1987 came from Region IX (Table 7).

d. Potential Areas for Development

The potential areas for the development of brackishwater fishponds, seafarming, oyster culture, mussel culture and fish cages are indicated in Annexes A1, A2, A3, A4 and A5, respectively.

3. Capture Fisheries

Marine waters can be considered as either pelagic or demersal. The pelagic zone includes the water column, with the demersal zone being close to the bottom.

Pelagic fisheries refers to those fish species that are exploited at or near the surface of the ocean. The large pelagics which are highly migratory fishes consist of tunas, skipjack and other related groups.

Various estimates of the potential yield of Philippine pelagic fisheries resources have been made. Silvestre (1987) stated that coastal pelagic and oceanic pelagic potential yields are 800 +/-100 thousand tons and 250 +/-50 thousand tons, respectively. Dalzell *et al.* (1987) estimated that annual maximum sustainable yield of small pelagics is 544,000 tons. This report also stated that the Philippine small pelagic fisheries are heavily over-exploited and since 1973 landings have shown a declining trend.

On the other hand, demersal fish resources are found in or near the sea bottom on either soft or hard grounds. Various fishes and invertebrates are caught by using bottom trawls with set nets. Demersal stocks have contributed a considerable portion (25% to 40%) to the Philippine marine landings since the late forties.

Results of the NRMC/FIDC workshop also provide an assessment of the state of exploitation of the demersal resources vis-a-vis the estimated potential. As shown in Table 8, almost all soft/trawlable areas were either fully exploited or overexploited, with the exception of Palawan waters. Hard grounds or reef areas were generally considered as underfished, with the exception of the Lingayen Gulf, Antique and Cuyo East Passage, South Negros to Bohol and the Northern Mindanao coast.

Most other areas, particularly those in the enclosed seas, are heavily exploited, and additional effort might cause decreases in the total catch and will eventually decrease the profitability of those vessels already in fishing.

Currently available information pertaining to the potential yield and state of exploitation of Philippine demersal resources reveal that:

- Demersal fish and invertebrate stocks in the Philippines are estimated to have a potential annual yield of 600+/-100 thousand tons.
- The lower limit of the yield projection has essentially been reached with harvest, particularly in the nearshore areas, at or exceeding sustainable levels.
- In addition to better stock management, future increases in demersal landings could come primarily from areas around Palawan, Tawi-Tawi and Lamon Bay.

A comparison of the potential production of the Philippine fishing area as estimated in NRMC/PFDC (1980) with actual BFAR production statistics from 1983-1984 is given in Table 9.

a. Commercial Fisheries

Commercial fisheries refer to fishing operation using fishing boats of more than three (3) gross tons and are allowed in waters more than seven (7) fathoms deep (PD 704). Another dimension in area of operation was added with the approval of LOI 1328 which prohibits commercial trawling and purse seining in waters within 0 to 7-km distance from the shore in order not to compete with the municipal fishermen.

Commercial fishing operations are undertaken in about 115 marine fishing grounds throughout the country. Some of the more frequented fishing grounds are: Lingayen Gulf, Balintang Channel, South China waters, Sulu Sea, Mindoro and Palawan waters, Lagonoy Gulf, Visayan Sea, Manila Bay, Sorsogon Bay, Samar Sea, Maqueda Bay, Panguil Bay, Celebes Sea, Davao Gulf and Moro Gulf.

For 1987, the bulk (83%) of the marine commercial fish was caught by three major fishing gears namely: purse seine, 41%; otter trawl, 25%, bagnet, 17% and others, 17%.

In the same year (1987) the commercial fisheries sector recorded a total catch of 591,000 mt (27% of the total fish production), indicating an 8.2% increase over that of the 1986 production of 546,000 mt. The total value amounted to P9.8 billion, equivalent to 26% of the total value of fish production for 1987 (Table 1).

Commercial fisheries production by region in 1987 is given in Table 10.

b. Municipal Fisheries

Municipal or small-scale fishermen refer to those fishermen using boats of 3 gross tons or less, or employing fishing gear not requiring the use of boats. Their place of operation is usually marine waters within the 7 km from the shoreline, as well as streams, lakes and tidal waters.

The contribution of municipal fisheries to the total fish production is quite substantial. Total municipal production in the Philippines, including both marine and inland catches, totalled 1,060,878 mt in 1987. Estimated value of the fishery was P16 billion. Municipal landings represented 49.4% of the total fish production in the Philippines for the same year (Table 11).

The landings by region from the municipal fisheries for 1987 is shown in Table 12. The highest marine fish landings were in Region IX, followed by Region VI, then Region IV. For inland municipal landings, that in Region IV is highest, in Region XII next, then in Region III.

C. FISH SUPPLY AND REQUIREMENT FOR HUMAN CONSUMPTION

For the period covering 1978 to 1987, total fish production (including both food and non-food components) attained a growth rate of 3.81%. Considering the food fish or food component only, the corresponding growth rate of production was 2.87%, imports, 3.56% and exports, 14.56% (Table 13).

The country produced an average of 1.76 million mt/yr of food fish from 1983 to 1987 or 32.25 kg/capita/yr. Exports averaged 72,920 mt/yr while imports amounted to only 24,196 mt/yr. The resulting net export of 48,724 mt/yr reduced the available supply to 1.713 million mt/yr or a lower 31.35 kg/yr per capita (Table 13).

The annual average fish requirement for human consumption during the same period was 2.406 million mt/yr while the available supply was 1.713 million mt/yr. The deficit, therefore, averaged 693,000 mt/yr.

D. PROBLEMS AND ISSUES

1. Conservation-related Concerns

a. Aquaculture

-Conversion of mangrove areas into brackishwater fishponds has reduced the 450,000 ha of mangrove thought to exist in 1918 to 240,000 ha in 1980 and only 150,000 ha today.

-Rapid conversion of mangrove areas into fishponds affects the breeding grounds of marine species.

-Proliferation of brackishwater fishponds causes the seepage of saline water into public drinking water system.

-Pollution of communal waters adversely affect aquaculture operations.

b. Municipal Fisheries

-Overfishing in nearshore areas;

-Resource use conflicts

*between municipal and commercial fishermen in the exploitation of the same resources.

*between aquaculture and open water fishing in bodies of water leading to reduced area for fishing grounds and waterways.

-Siltation due to forest denudation, upland agriculture and mine tailings;

-Water pollution (resulting from the build up of pesticides, industrial wastes and toxic substances) serves as an aggravating factor for red tide infestation;

-Degradation of the marine ecosystem due to unabated illegal fishing activities, i.e. dynamite fishing, use of poisons and fine-mesh nets, etc.;

-Poor enforcement of pertinent fishery laws, regulations and environmental protection measures.

c. Commercial Fisheries

-Unabated use of destructive fishing methods;

-Poor enforcement of fishery laws rules and regulations;

-Inadequate protection given to tuna spawning grounds;

-Overexploitation of traditional fishing grounds and

-Inadequate fisheries resource assessment programs for commercially important species (i.e., tuna and other pelagic species) and non-traditional fishing grounds.

2. Production-related Concerns

a. Aquaculture

-Genetic deterioration of tilapia stocks and lack of quality tilapia fingerlings and broodstock;

-Inaccessibility of improved technology for prawn and milkfish culture, especially to small-scale operators;

-Lack of available aquaculture production technology for other commercially viable species;

-Inadequacy of competently trained extension workers for technology dissemination;

-Insufficient research on fish disease outbreak and control;

-High prices of aquaculture inputs and prohibitive costs of equipment and machineries make it difficult to engage in semi-intensive and intensive fish farming methods;

-A number of milkfish pond operators are shifting to prawn culture, causing a decline in milkfish production; however, most existing brackishwater ponds are still underutilized;

-Increasing cost of feeds, organic fertilizers and price fluctuations limit expansion in aquaculture.

b. Municipal Fisheries

-High cost of inputs, fishing boats, gears, spare parts, etc.;

-Incidence of piracy and unstable peace and order situation in coastal fishing villages.

c. Commercial Fisheries

-Government policy on importing fish and fishery products, specifically frozen and canned fish, should be reviewed;

-High cost of imported fishing paraphernalia;

-National funding support for research on marine fisheries is too small as compared to the aquaculture sector.

3. Post-harvest, Marketing and Infrastructure - related Concerns

-Improper handling of fish and fishery products from landing time to distribution, processing and marketing cause great losses in quality and in value of fresh and processed fish;

-Inadequate standardized procedures for traditional products results in non-uniformity of product quality and limits their sale to the domestic market only;

-Inadequate training in proper fish handling and processing and the slow transfer of technology on newly-developed fishery products;

-Import liberalization of processed fishery products renders local fish products non-competitive;

-Limited export market for major exportable fish and other fishery products;

-Inadequate intensive research on product development;

-Insufficient market outlets for under-utilized fishery resources;

-Lack of fish quality standards for local consumption;

-Inadequate efficient marketing system/facilities;

-Inadequate fish marketing information and services, such as dissemination of information on both domestic and world fish prices, fish distribution patterns, promotion of new fishery products, etc.;

-Slow adoption of improved fish handling techniques to minimize post-harvest losses; and

-Inadequate infrastructure facilities for post-harvest handling (i.e., ice plants and cold storage, processing plants, ports and transport).

-Low domestic demand for prawn/shrimps due to low level per capita income and high price.

4. Credit-related Concerns

-Stringent bank policies

- * required collateral and equity discourages participation of small-scale fishermen/fishfarmers with no collateral to offer;

- * high interest rates/interest charges on outstanding and past due loans;

- * high transactional costs in loan application; i.e., filing fees, attorney's fees, transport costs, etc.

-Limited participation of rural financing institutions due to poor financial status i.e. no fresh capital, high default rates, overdependence on government subsidies/funds;

-Limited participation of private commercial banks in fisheries projects and

-Access to credit: large projects are favored over small/medium projects and aquaculture projects over commercial/municipal projects.

Fisheries production has steadily increased in volume over the past 35 years. As a consequence, the productivity of fishery resources has continuously deteriorated. Degradation of the marine environment as well as the unabated use of illegal fishing methods pose grave threats to the productivity of both our municipal and commercial waters. Consequently, aquaculture operations are

also affected due to their dependence on the wild for the supply of fish seeds and breeder stocks. Continual neglect of the state of our marine and inland fishery resources leads to periodic infestation of our waters (i.e., outbreak of red tides) that affects the livelihood of our fishermen and endangers the health of the consuming public.

Further compounding the problem of the fisheries industry is insufficiency in institutional support in terms of credit availability, research, post-harvest, marketing and infrastructure facilities.

II. POLICY FRAMEWORK FOR THE MEDIUM TERM FISHERIES PLAN

The general policy framework for the Medium-Term Fisheries Plan comprises of:

1. The 1986 Constitution declaration -
 - (a) "The State shall protect the nation's marine wealth in its archipelagic waters, territorial sea, and exclusive economic zone, and reserve its use and enjoyment exclusively to Filipino citizens."
 - (b) "The Congress may, by law, allow small-scale utilization of natural resources by Filipino citizens, as well as cooperative fish farming, with priority to subsistence fishermen and fishworkers in rivers, lakes, bays and lagoons..."
 - (c) "The State shall protect the right of subsistence fishermen, especially of local communities, to the preferential use of the communal marine and fishing resources, both inland and offshore. It shall provide support to such fishermen through appropriate technology and research, adequate financial, production and marketing assistance and other services. The State shall also protect, develop and conserve such resources. The protection shall extend to offshore fishing grounds of subsistence fishermen against foreign intervention. Fish workers shall receive a just share from their labour in the utilization of marine and fishing resources."

2. The national development goals -
 - (a) alleviation of poverty;
 - (b) generation of more productive employment;
 - (c) promotion of equity and social justice;
 - (d) attainment of sustainable economic growth.

3. The policy for agricultural (including fisheries) development stated in the National Medium Term Development Plan:
 - (a) "The role of the government is to create policy and institutional framework and to provide necessary incentives and investments in such areas as infrastructure, research and technology. The private sector shall be called upon to propel the economic recovery in the countryside. People's participation through farmers' institutions shall be recognized as a key factor in bringing about rural/agricultural development."

Other policies are indicated in the Policies/Strategies of the Plan for Fisheries .

III. THE PLAN, 1988-1992

A. GOALS AND OBJECTIVES

The goal of the Fisheries Sector Management and Development Program is to achieve the economic development potential from opportunities in fisheries based on sustainable growth.

The objectives of the Program are:

-To alleviate poverty in coastal communities through employment-oriented, rural-based activities;

-To increase the quantity and quality of fish available for domestic consumption and for international trade;

-To provide employment in fisheries or promote alternative employment opportunities;

-To protect and manage aquatic resources for long-term benefits of fishing communities and all Filipinos;

-To increase the foreign exchange generated from fisheries opportunities.

B. TARGETS

For the Plan period from 1988 to 1992, total fish production (including food- and non-food components) is targeted to increase from 2,242,000 mt in 1988 to 2,584,000 mt in 1992, or at an annual growth rate of 3.61 % . The corresponding target growth rates for each of the subsectors are as follow: aquaculture, 529,000 mt to 675,000 mt, or 6.28%; municipal fisheries, from 1,100,000 mt to 1,175,000, or 1.66%; and commercial fisheries, from 613,000 mt to 734,000 mt, or 4.61% (Table 14).

If the non-food components of total fish production (seaweeds, sponges, freshwater snail for ducks and shell weight of mussel and oyster) were excluded, the corresponding food fish production targets for human consumption are presented in Table 15.

By 1992, the population of the Philippines will have grown to 64,258,000 and will require 2,827,000 mt of fish, based on the 44 kg/capita recommended by the FNRI. By then, food fish production is projected at 2,165,000 mt while import and export with annual growth rates of 6% and 7% are estimated at 91,000 mt and 125,000 mt, respectively. Hence, the available food fish supply will be 2,131,000 mt, or 33.16 kg per capita. The expected deficit, therefore, will be 697,000 mt (Table 16).

The lower target growth rates for the plan period are in keeping with the resource situation and are based on the following assumptions: (a) the Comprehensive Agrarian Reform Program will not significantly affect aquaculture production and (b) moderate increases in capture fisheries shall come from the development of offshore fisheries and improved fisheries management.

C. THRUSTS/STRATEGIES

The Plan adheres to and reflects the provisions of the Constitution and the basic policy directions

laid by the President for the management, allocations, access to, and conservation of the country's fishery resources, which include the following thrusts:

- Emphasis on social justice and equitable distribution of the benefits of fishery resources, especially in favor of the poor communities like the subsistence municipal fishermen and their families, together with measures that consider the share of these resources for future generations of Filipinos (intergenerational equity);

- More effective role of the fisheries sector in the attainment of socio-economic and political stability in the country and

- Management and utilization of the fisheries resources using the sustained-yield, multi-purpose and conservation principles which also stress the protection of the environment where these resources are located.

Among the general strategies to attain the Plan objectives are:

- Implement an effective conservation and management program with greater participation of fishing communities in the allocation, utilization, control and protection of the resources with government support;

- Improve the productivity in aquaculture and promote seafarming;

- For overfished areas in capture fisheries:

- *Reduce pressure on the resources by regulated licensing, encouraging the shift from capture to culture fisheries including seafarming, and developing alternative income sources and rural activities in coordination with other sectors; and

- *Develop artificial reefs where appropriate, coupled with strict enforcement of other conservation measures to regenerate the resources;

- *Manage lagoons and bays as management units or special management areas(SMA);

-For underfished areas in capture fisheries:

*Improve resource information through a comprehensive resource assessment program;

*Promote fishing in less exploited offshore/oceanic areas;

*Increase income and yield through appropriate fishing gears/methods and the provision of extension, credit and other support services;

-Improve post-harvest practices and the marketing and distribution system;

-Establish fishing ports and ice plants and cold storage facilities in fishing areas not attractive to private investors; constant consultation with the private sector as to the acceptability and validity of selected sites; and encourage private sector participation in the operation of these facilities.

Specific policy thrusts/directions by areas of concern are:

1. Conservation-related Strategies

a. Aquaculture

-Stop the conversion of mangrove swamps into fishponds. Increased production from brackishwater aquaculture shall be through higher production per unit area and not through the expansion of fishpond areas.

-Strict enforcement of anti-pollution regulations and

-Continuous restocking of depleted inland waters and adoption of appropriate management measures, rules and regulations.

b. Municipal Fisheries

- Develop village level fishermen's/fishfarmers' organizations, cooperatives, associations, etc. that would themselves undertake such functions as resource management and conservation, conflict resolution, enforcement and regulation;
- Initiate a community-led integrated resource assessment and management program;
- Identify areas where fishing efforts must be reduced as an initial condition for long-term sustainable development and determine alternative investment areas in the community to generate employment for displaced municipal fishermen;
- Reduce fishing effort in municipal fisheries by limiting the number of fishing units in municipal fisheries; shift to stationary passive fishing gear and develop alternative source of income by encouraging seafarming;
- Intensify anti-pollution, anti-destructive fishing and educational campaigns to inform the public on the ill effects of pollution in fishing grounds;
- Conduct regular red tide monitoring on traditional fishing grounds and intensive research on the real causes and prevention of red tide blooms to ensure public health and safety;
- Promote massive education and information drive on illegal fishing and resource management to create awareness of the need to conserve and protect the resources for the present and future generations.

c. Commercial Fisheries

- Implement a Comprehensive Resource Assessment Program;
- Intensify stock assessment studies on unexploited fishery resources, including those in the EEZ;

- Exploit the underutilized resources within the sustainable development guidelines;

- Protect the principal tuna spawning areas in the Sulu Sea, South China Sea, off the west coast of Palawan and the southern coast of Mindanao through the regulation of the use of the payaw and regulation of net mesh size of tuna fishing gears and

- Promote community-based monitoring, control and surveillance system to manage the exploitation and conservation of resources.

2. Production-related Strategies

a. Aquaculture

- Aquaculture is a priority area for fisheries development to fill in the gap for domestic fish consumption and export as marine production tapers off;

- In support of production, research focus will be on (a) genetic quality improvement and broodstock development of tilapia species, including marine strains; (b) intensify research on commercially important species for which culture techniques are not known; (c) improve production techniques of species for domestic consumption (e.g. tilapia and carp); and (d) control of fish diseases;

- Improve the mechanism for faster technology transfer from the specialists or researchers to the producers;

- Promote commercial production of suitable natural feeds and formulation of commercial feeds by utilizing locally-available feed ingredients;

- Promote diversified methods of inland fish production, such as integrated fish-livestock/crop culture, etc;

- Promote hatchery production for penaeids and finfishes;

- Promote technology transfer on semi-intensive culture of milkfish, tilapia and carp for domestic consumption;

b. Municipal Fisheries

- Promote seafarming and integrated rural development;
- Assess abundance and increase production of underfished species, such as cephalopods (squid/cuttlefish), through exploratory fishing;
- Stocking of communal waters;
- Establish fish sanctuaries and improve fish habitats through provision of fish shelters and installation of artificial reef in suitable depleted areas;
- Coordinate with concerned government agencies on ensuring the safety of fishermen and their belongings at sea;

c. Commercial Fisheries

- Provide incentives for the commercial fisheries sector to engage in offshore fisheries and to participate in tuna fishing in the West Pacific (FAO statistical area 71);
- Support the modernization of the existing commercial fishing fleet and liberalize importation of fishing paraphernalia by restructuring the tariffs and taxes on imported capital equipment and supplies to effect the capability to engage in offshore fishing;
- Manage the existing demersal and small pelagic fisheries and
- Exclude fish and fishery products that can be sufficiently produced locally from the import liberalization program.

3. Post-harvest, Marketing and Infrastructure-related Strategies

- Promote cooperative marketing of high-valued species for institutional markets to enable small producers to have access to high-priced domestic markets;
- Improve the present fish handling procedures and processing techniques;

-Promote the development of new processed products including those from underutilized by-catch and low-valued species on the cottage industry level;

-Provide centralized and integrated landing and market facilities in major fishing areas;

-Provide laboratory support in the regional level and training of qualified fish inspection staff;

-Continue implementation of educational programs aimed at improving fish quality with emphasis on sanitation and hygiene;

-Formulate and implement quality control standards to ensure that the exportable commodities meet the requirements of the importing countries;

-Expand the export market for tuna and tuna-like species, shrimps/prawn, milkfish and seaweeds, since these products are currently suffering from a narrow market base;

-Continue promotion of export diversification (markets and fish products);

-Improve dissemination of fish market information and

-Advocate the improvement of secondary and tertiary road systems to facilitate distribution and transport of fishery products and continued support to the development of harbors and associated services.

4. Credit-related Strategies

-Facilitate credit access to support development of aquaculture, commercial fishing in non-traditional fishing grounds, post harvest technology and shift to alternative livelihood;

-Support program for the rehabilitation of the depressed rural banking institution and

-Encourage the participation of private commercial banks in lending to priority agro-fisheries projects as well as financing small and medium-sized projects.

E. PROGRAMS/PROJECTS

The following are the implementing programs and projects:

1. Conservation and Management Program

More than ever the need to manage and conserve our finite fishery resources cannot be overemphasized. The dwindling catch, pollution and red tide infestations are among the reasons for the prioritization of this program. Management should focus on the development of the fisherman and his community.

The program components are:

(a) Law Enforcement

- * Strict implementation of all fishery laws;
- * Deputization of selected barangay residents as fishery officers with powers to apprehend violators;
- * Immediate prosecution of cases involving illegal and destructive fishing through proper courts;
- * Offer incentives to informers of illegal fishing incidents;
- * Establish a surveillance network among coastal villages and lakeshore areas through provision of small motorized patrol boats and communication equipment and
- * Training, information and awareness campaign on the objectives of law enforcement to the fishermen and the law enforcing agency.

(b) Fish Sanctuaries

- * Set aside fish sanctuaries in the municipal waters to be administered by local residents;
- * Establish more marine sanctuaries to protect breeding grounds and

* Provide effective management schemes for fish sanctuaries.

(c) Management of Coastal Resources

*The concept revolves around the organization of coastal folks into fishery associations that would be given rights to manage the fishing grounds in their locality and control fishing effort, gears, etc.

(d) Comprehensive Resource Assessment

* A comprehensive resource assessment program (CRAP) will generate fishery data needed for the formulation of rational policies for the development and management of coastal and offshore fisheries. Initially, CRAP should be conducted in critical areas like Manila Bay, Ragay Gulf and San Miguel Bay where fishermen populations are dense.

(e) Mangrove Rehabilitation Program

* Evaluation of abandoned, foreclosed, or unproductive fishponds for possible reconversion to mangrove farms and

* Replanting of marginal areas and prohibition of any further destruction of mangrove areas.

2. Development Program

2.1 Aquaculture

(a) Broodstock Production and Distribution

* This includes breeding studies intended to develop techniques for mass seed production of economically-important species and make them easier and cheaper to produce by fishfarmers. The key objective of the program is the production of high quality seeds or fingerlings.

Distribution priority are the overfished inland waters that need stocking.

(b) National Bangus Breeding Program (NBBP)

* The milkfish breeding technology is currently being verified in various sites of the Philippines through the NBBP. This makes use of floating net cages which is more economical and easier to maintain than concrete tanks and pond facilities. The present thrust of the milkfish breeding research is on the nutritional requirement of larvae and broodstock. Spawning data from broodstock show that the present technology can significantly satisfy the fry demand of the milkfish industry in the Philippines;

(c) Genetic Improvement of Tilapia

* Genetic and broodstock development of tilapia is a priority considering the importance of quality fry to the sustained development of the freshwater fishponds.

(d) Fish Diseases

* Fish health studies support and complement production objectives. Studies will concentrate on major fish diseases that hinder aquaculture production.

(e) Culture of Finfishes and Seaweeds

* Development of culture techniques suitable for traditional and non-traditional finfish species and for commercially important seaweeds.

* Research on species of seaweeds abundantly found in the country but are not presently utilized and

* Conduct research on the development of feeds for finfish, using local ingredients with efficient conversion ratio.

(f) Extension and Training

* Government support to disseminate the product of research, particularly aquaculture research, in such areas as genetic selection and culture technologies for non-traditional species shall be intensified.

* The private and public sector shall be encouraged to work together to improve the technology transfer once the basic research has been completed.

2.2 Municipal Fisheries

(a) Artificial Reef Development (ARD)

Artificial reefs (ARs) are man-made structures set in selected marine areas to either attract fish and other marine life or to provide shelter, spawning ground, and forage habitats for a variety of marine organisms. The project involves:

* Identification of coastal areas suitable for ARs and

* Participation of the coastal community in the acquisition of scrap materials, in the construction, monitoring and management of ARs.

(b) Seafarming

* Identification of suitable seafarming sites;

* Promotion of seafarming/marine aquaculture which includes culture of oysters, mussels, seaweeds and various species of finfishes.

(c) Development of Cephalopod Fishing

Conduct of exploratory fishing experiments on cuttlefish to initially examine the relative abundance of cephalopod species;

(d) Stocking of Inland Waters

* Restocking of exploited inland waters preferably with fish species with no established population (i.e., bighead carp);

* Regulation of fishing gears to prevent catching of juvenile fish stocks; and

* Assessment of limnological capacity for proper stocking density.

(e) Coastal Resource Assessment

* The project envisions to generate adequate and reliable resource data on the extent, distribution, abundance and availability of fishery resources in the territorial seas and the EEZ for the formulation of rational development, management and conservation programs on fisheries.

(f) Monitoring of Red Tide

* The project aims to undertake scientific research that would provide baseline information for the formulation of long-term management schemes on red tide phenomenon.

(g) Extension and Training

* Provision of technical assistance and advisory services:

-- on appropriate fishing methods and improved operation and navigation;

-- on boat design, construction, rigging, installation of fishing gears and equipment, fishing net design and construction and adoption of appropriate fishing techniques.

2.3 Commercial Fisheries

(a) Exploratory Fishing

* Conduct of exploratory fishing in non-traditional fishing grounds to compare seasonal variations in catch per unit effort and catch composition;

* Conduct of exploratory fishing experiments on cuttlefish to initially examine the relative abundance of cephalopod species.

(b) Tuna Stock Assessment

* There is an urgent need to establish a nationwide tuna stock assessment program to acquire adequate and reliable data for the rational development and management of

the Philippine tuna fisheries. It will be done by determining the spatial and seasonal distribution, abundance, stock structure of oceanic tunas in the EEZ and in the territorial seas and contiguous waters.

(c) Development of Offshore Fishing

- * Conduct of programs for the development of offshore fishing in the Philippines;
- * Improvement of knowledge on the resource through stock assessment, research and exploratory fishing.

(d) Extension and Training

- * Provision of technical assistance and advisory services:

--on appropriate fishing methods and improved operation and navigation;

--on boat design, construction, rigging, installation of fishing gears and equipment, fishing net design and construction and adoption of appropriate fishing techniques;

- * Provision of training courses on seamanship, oceanography and tuna fishing.

2.4 Post-harvest and Marketing

This program shall be directed towards providing services that will ensure efficient delivery of fish and fishery products in both the local and foreign markets.

(a) Product Development

- * Non-traditional fishery products shall be developed and tapped for export and the domestic market.

(b) Quality Control

- * This shall involve the establishment of quality control standards and setting up of laboratories in major fishing ports to improve the value of fishery products.

(c) Fish Handling

* Technology transfer on appropriate handling techniques shall be encouraged to minimize losses in terms of both quality and quantity. A fish transport system shall also be implemented to further improve fish handling and distribution.

(d) Market Assistance

* Various services shall be extended such as provision of market/trade information for easy access of the private sector in their trading activities. For specific projects, this may involve assistance in tapping markets for fishermen's produce.

2.5 Infrastructure Development

This program is aimed at providing the necessary post-harvest infrastructure for the efficient marketing and distribution of fish.

(a) Fishery Port Development

* Under this project, a nationwide network of fishing ports and fish markets shall be developed. Among the basic structures of the port are landing facilities and market halls.

(b) Ice Plants and Cold Storage (IPCS)

* To complement the fishery ports, IPCS shall be constructed/operated in several fish landing areas of the country in order to preserve the freshness of fish catch.

(c) Processing Plant Development

* This project is intended to ensure the handling of fishery products, particularly the exportable ones, through the establishment of processing facilities equipped with ice-making equipment, contact freezers, cold storages and preparation/processing areas.

TABLE 1. FISH PRODUCTION BY FISHERY SECTOR, 1978-1987

Unit: Quantity - 000 Metric tons
Value - Million Pesos

YEAR	TOTAL		COMMERCIAL		MUNICIPAL		AQUACULTURE	
	Quantity	Value	Quantity	Value	Quantity	Value	Quantity	Value
1978	1,580	9,477	506	3,465	858	4,810	216	1,202
1979	1,581	10,537	501	3,512	839	5,365	241	1,660
1980	1,672	11,644	488	3,785	895	6,017	289	1,842
1981	1,773	13,954	495	4,125	939	6,964	339	2,865
1982	1,897	15,064	526	4,355	979	7,316	392	3,393
1983	2,110	18,981	519	4,643	1,146	9,539	445	4,799
1984	2,080	25,650	513	6,521	1,089	11,863	478	7,266
1985	2,052	31,297	512	7,857	1,045	14,716	495	8,724
1986	2,089	37,331	546	9,248	1,072	17,251	471	10,832
1987	2,213	37,242	591	9,821	1,061	16,107	561	11,314
Growth Rate 1978-1987(%)	3.81	16.42	1.75	12.27	2.39	14.37	11.15	28.29

Source: Fisheries Statistics Section

Table 2. Export of Fish and Fishery Products, 1978-1987

Year	Quantity (mt)	Value (P10)
1978	48438	532
1979	64890	782
1980	76179	939
1981	83236	1251
1982	68265	1120
1983	75588	1592
1984	63044	2129
1985	95077	3496
1986	101449	4863
1987	112382	6445
Growth Rate		
1978 -1987, %	9.8	51.9

Source: BFAR Fisheries Statistics of the Philippines/HCSO, 1987

TABLE 2A. MAJOR FISHERIES EXPORT IN TERMS OF VALUE, 1987

	QUANTITY (M.T.)	VALUE (000 P)
1. SHRIMP/PRAWN - - - - -	15,550	3,187,354
Frozen/chilled	14,935	3,158,144
Salted dried/cooked	455	21,946
Prepared whether or not in airtight containers	160	7,264
2. TUNA - - - - -	37,311	1,427,225
Frozen/chilled	11,250	371,687
Prepared or preserved in airtight containers	26,061	1,055,538
3. SEAWEEEDS - - - - -	30,752	487,969
Dried/Treated	25,511	458,622
Fresh	599	14,905
Salted	454	4,635
Kelp Meal Powder	4,188	9,807
4. SHELLCRAFT ARTICLES - - - - -	3,747	302,449
5. CUTTLEFISH/SQUID - - - - -	2,886	214,398
Fresh/Frozen/Chilled	2,646	197,497
Salted/Dried/Smoked	230	15,889
Prepared whether or not in airtight containers	10	1,012
6. FISH KEPT ALIVE FOR TRANSPORT - - -	4,148	107,206
7. CLAMSHELL (MEAT) - - - - -	1,457	97,260
Prepared or Preserved in airtight containers	1,457	97,260
8. BANGUS (Milkfish) - - - - -	1,795	80,223
Frozen/chilled	1,690	73,995
Smoked	31	1,743
Prepared or Preserved in in airtight containers	74	4,485
9. CAPIZ SHELLS - - - - -	4,066	63,556
10. SEA CUCUMBER (Trepang) - - - - -	2,195	51,648
11. OTHERS - - - - -	7,923	422,517
T O T A L	111,830	6,441,805

Table 3. Import of Fish and Fishery Products, 1978-1987

Year	Quantity (mt)	Value (P11)
1978	47995	230
1979	45873	207
1980	53402	274
1981	46850	298
1982	83445	444
1983	23038	111
1984	6097	50
1985	28755	118
1986	69084	386
1987	104936	637
Growth Rate		
1978 -1987, %	9.08	11.98

Source: BFAR Fisheries Statistics of the Philippines/BCSO, 1987

fn:nafcexp

fn:import87

TABLE 3A. MAJOR IMPORTS FOR 1987

	QUANTITY (m.t.)	VALUE (000 P)
A. Frozen Sardines/Mackerels and Others - - - - -	63,208	257,122
Hongkong	0	18
Japan	62,738	250,234
Trust Territory of the Pacific Islands	470	6,870
B. Tuna (Frozen) - - - - -	3,297	38,489
U.S.A.	1,250	16,964
Indonesia	420	1,457
New Guinea	1,502	17,093
New Zealand	125	2,975
C. Fish Meal - - - - -	37,473	315,120
Japan	5,967	104,251
Peru	29,545	193,965
Taiwan	1,503	13,840
Thailand	101	565
U.S.A.	200	696
Canada	50	458
Norway	90	1,030
Belgium	0	18
West Germany	17	289
Hongkong	0	4
D. Others - - - - -	7,852	5,831,074
T O T A L	111,830	6,441,805

TABLE 4. BRACKISHWATER FISHPOND PRODUCTION, BY REGION, 1986-1987

Region	1986			1987		
	Pond Area (ha)	Production (mt)	Productivity (mt/ha)	Pond Area (ha)	Production (mt)	Productivity (mt/ha)
NCR	703	633	0.900	703	633	0.900
I	16631	22943	1.380	16659	24576	1.475
II	1469	850	0.579	1469	911	0.620
III	53492	66525	1.244	53465	71122	1.330
IV	23281	17514	0.752	23281	17514	0.752
V	11028	7413	0.672	11077	7392	0.667
VI	58974	61919	1.050	59074	78663	1.332
VII	7110	6721	0.945	7110	6721	0.945
VIII	5740	2517	0.439	5766	2525	0.438
IX-A	1562	818	0.524	1540	1063	0.690
IX-B	14813	8070	0.545	14799	10491	0.709
X	4289	2210	0.515	4326	2782	0.643
XI	7241	5524	0.763	7248	6617	0.913
XII	3986	3617	0.907	3940	3574	0.907
TOTAL	210319	207274	0.986	210457	234584	1.115

fn: nafcpro

fn:pondprod

TABLE 5. FRESHWATER FISHPOND PRODUCTION, BY REGION 1986-1987

REGION	1986			1987		
	POND AREA (ha)	PRODUCTION (m.t.)	PRODUCTIVITY (m.t./ha)	POND AREA (ha)	PRODUCTION (m.t.)	PRODUCTIVITY (m.t./ha)
NCR*	0	0	0.000	0	0	0.000
I	1,453	1,761	1.212	1,471	2,103	1.430
II	1,238	1,290	1.042	949	1,348	1.420
III	9,105	10,949	1.203	9,114	24,743	2.715
IV	372	223	0.599	378	491	1.299
V	131	93	0.710	207	102	0.493
VI	118	381	3.229	554	493	0.890
VII	0	0	0.000	0	0	0.000
VIII	93	54	0.581	257	91	0.354
IX-A	0	0	0.000	0	0	0.000
IX-B	148	96	0.649	137	159	1.161
X	385	396	1.029	385	396	1.029
XI	241	147	0.610	240	126	0.525
XII	114	113	0.991	114	113	0.991
TOTAL	13,398	15,503	1.157	13,806	30,165	2.185

* NCR = National Capital Region

TABLE 6. PRODUCTION FROM FISHPENS AND CAGES, BY REGION 1986-1987

REGION	FISHPEN (M.T.)		FISHCAGE (M.T.)	
	1986	1987	1986	1987
NCR	7001	7001	339	339
I	8	8	2	2
II	0	0	206	193
III	0	30	306	306
IV	34005	28235	4368	11069
V	0	0	3871	5521
VI	0	0	0	0
VII	0	0	0	0
VIII	40	32	53	58
IX-A	0	3	0	0
IX-B	200	250	0	16
X	0	0	0	0
XI	42	29	223	280
XII	0	0	5	5
TOTAL	41296	35588	9373	17789

*NCR = National Capital Region

TABLE 7. PRODUCTION OF CULTURED OYSTER, MUSSEL AND SEAWEED, BY REGION 1986-1987

REGION	OYSTER PRODUCTION (M.T.)		MUSSEL PRODUCTION (M.T.)		SEAWEED PRODUCTION (M.T.)	
	1986	1987	1986	1987	1986	1987
NCR*	0	0	3,622	3,622	0	0
I	8,084	6,580	0	0	0	0
II	9	4	0	0	0	8
III	487	487	95	95	0	0
IV	5,312	1,139	5,675	3,501	1,920	1,920
V	128	83	2	27	6	6
VI	2,438	2,058	1,000	447	0	0
VII	0	0	0	0	11,508	11,508
VIII	0	0	1,720	3,942	3,963	2,643
IX-A	0	0	0	0	128,244	166,717
IX-B	0	0	0	10	22,935	37,755
X	0	0	0	0	0	0
XI	7	10	0	0	292	282
XII-	0	0	0	0	0	0
TOTAL	16,465	10,361	12,114	11,644	168,868	220,838
% INCREASE		(37)		(4)		31

*NCR = National Capital Region

Table 8.

DEMERSAL RESOURCES POTENTIAL
OF DIFFERENT FISHING GROUNDS

Fishing Grounds =====	Estimated Potential =====	State of Exploitation =====
A. Soft Grounds		
1. Visayan Sea	At least 100,000 MT	Over-exploited
2. Samar Sea	Around 8,000 MT	Over-exploited
3. Tayabas Bay	6,000 MT	Fully-exploited
4. Ragay Gulf	2,400 MT	Fully-exploited
5. Bohol Strait		Fully-exploited
6. Palawan Waters		Under-exploited
7. Hinobaan & Sinapalay Area	Very limited Trawabale Area	Fully-exploited Fully-exploited
8. Sibuguey Bay		Fully-exploited
9. Illana Bay		Fully-exploited
10. Turtle Island to Lumbucan Island	More than 2,000 MT	?
11. San Miguel Bay		Over-exploited
12. Leyte Gulf	Limited Trawabale Area	?
13. North Coast		Fully-exploited
14. Lingayen Gulf		Fully-exploited
15. Manila Bay		Over-exploited
B. Hard Grounds =====		
1. Lingayen Gulf		Over-exploited
2. Babuyan and Batan Group		Under-Exploited
3. Western Coast of Ilocos Region		Under-exploited
4. Catanduanes coastal water		Under-exploited
5. Surigao del Norte Coast		Under-exploited
6. Eastern Coast of Samar		Under-exploited
7. Coron and Taytay Area	Very extensive area	Under-exploited
8. Antique and East Passage	less than 1,500 MT a year	Nearing full exploitation
9. South Negros	Narrow and limited	Fully-exploited
10. North Coast of Mindanao	Narrow and limited in area	Nearing full exploitation
11. Illana Bay	More than 10,000 MT	Under-exploited
12. Sulu Archipelago	MSY may be reached at 8,000 MT/yr	Under-exploited
13. Turtle Island to Lumbucan Channel	More than 300 MT	Under-exploited

Sources: BFAR/SCSP Workshops in Philippine Fishery Resources
 NRM/C/FIDC Workshop on Assessment of Fisheries Wealth
 Marine Sector - Del Phi Approach
 IFDR/ICLARM Multidisciplinary Research Project on
 the Small-Scale Fisheries of San Miguel Bay

Table 9. Comparison of Potential Production (MT) of Philippine Fishing Areas as Estimated in NRMC/FIDC (1980) with Actual BFAR Production Statistics for 1983 - 84.

Fishing Area	Estimated Potential Production			BFAR Statistical Area	83/84 Production			Possible Increase		
	Pelagic	Demersal	Total		Pelagic	Demersal	Total	Pelagic	Demersal	Total
I	120,000	90,000	210,000	4. Tayabas Bay	15,150	7,005	22,155	0	0	0
				14. Camotes Sea	13,886	7,178	21,064			
				15. Visayan Sea	119,014	79,002	198,016			
				17. Sibuyan Sea	30,070	12,406	5,476			
				18. Ragay Gulf	26,091	11,921	38,012			
				19. Samar Sea	24,853	17,240	42,093			
				Sub-total	229,064	134,752	363,816	0	0	0
II	112,000	84,000	196,000	8. South Sulu Sea	68,738	22,736	91,474	0	0	0
				9. East Sulu Sea	96,186	18,663	114,849			
				12. Bohol Sea	37,580	16,433	54,013			
				16. Guimaras Strait	49,118	44,430	93,548			
				Sub-total	251,622	102,262	353,884			
III	80,000	60,000	140,000	10. Moro Gulf	89,906	31,380	121,286	0	20,429	6
				11. Davao Gulf	10,517	8,191	18,908			
				Sub-total	100,423	39,571	139,994			
IV	264,000	198,000	462,000	5. West Palawan waters	17,505	8,358	25,863	100,178	152,700	252,878
				6. Cuyo Pass	41,435	11,295	52,730			
				7. West Sulu Sea	91,775	21,360	113,135			
				3. Batangas Coast	13,107	4,287	17,394			
				Sub-total	163,822	45,300	209,122			
V	64,000	48,000	112,000	1. Lingayen Gulf	5,570	4,981	10,551	39,980	14,748	54,728
				2. Manila Bay	13,660	23,690	37,350			
				24. Babuyan Channel	4,790	4,581	9,371			
				23. Palanan Bay	-	-	-			
				Sub-total	24,020	33,252	57,272			
VI	160,000	120,000	280,000	13. Leyte Gulf	24,939	24,531	49,470	91,351	49,032	140,383
				20. Lagonoy Gulf	8,252	12,480	20,732			
				22. Casiguran Sound	1,872	1,153	3,025			
				Sub-total	68,649	70,968	139,617			
Oceanic	250,000	-	250,000	Oceanic areas	138,783	0	138,783	111,217	-	111,217

Table 10. Commercial Fisheries Production
by Region 1987

Region	Production (mt)
NCR	187,183
I	3,407
II	7,266
III	9,077
IV	52,787
V	40,162
VI	119,249
VII	32,113
VIII	14,629
IX	79,752
X	6,397
XI	38,819
XII	315
TOTAL	591,192

Table 11. Municipal Production in
Quantity and Value
1978 - 1987

Year	Marine Quantity	Value (FM)	Inland Quantity	Value (FM)	Total Quantity	Value (FM)
1978	686,890	4,474	171,019	336	857,909	4,810
1979	635,538	4,872	203,920	492	839,358	5,364
1980	647,284	5,410	247,325	607	894,610	6,017
1981	709,989	6,263	228,639	700	938,628	6,963
1982	708,016	6,488	270,346	828	978,362	7,316
1983	770,988	7,463	374,853	2,077	1,145,841	9,540
1984	789,975	10,291	299,242	1,572	1,089,217	11,863
1985	785,132	12,795	260,240	1,920	1,045,382	14,715
1986	807,275	14,611	265,086	2,640	1,072,361	17,251
1987	816,247	14,216	244,531	1,891	1,060,878	16,107

TABLE 12. MUNICIPAL FISHERIES PRODUCTION, BY REGION, 1987

R E G I O N	P R O D U C T I O N (MT)		
	MARINE	INLAND	TOTAL
PHILIPPINES	816,247	244,631	1,060,878
NCR	9,569	6	9,575
REGION I	19,118	627	19,745
II	5,854	2,825	8,679
III	19,832	5,714	25,546
IV	135,931	208,486	344,417
V	78,478	3,161	81,639
VI	147,824	2,270	150,094
VII	23,721	21	23,742
VIII	36,396	558	36,954
IX	189,168	1,167	190,335
X	75,271	2,550	77,821
XI	53,596	722	54,318
XII	21,489	16,524	38,013

Source: Fisheries Statistics Section

TABLE 13. PROVISIONAL FOOD BALANCE SHEET 14

YEAR	TOTAL FISH	FOOD FISH 3/			AVAILABLE SUPPLY (M.T.)	POPULATION (000)	AVAILABILITY PER CAPITA (KG/CAPITA)	PRODUCTION PER CAPITA (KG/CAPITA)
	PRODUCTION 2/ (M.T.)	PRODUCTION (M.T.)	IMPORT 4/ (M.T.)	EXPORT 4/ (M.T.)				
Actual								
1977	1,508,855	1,467,503	44,049	21,664	1,489,888	45,051	33.07	32.57
1978	1,580,404	1,403,683	49,685	26,256	1,427,112	46,373	30.77	30.27
1979	1,581,303	1,362,424	37,497	41,555	1,358,366	47,735	28.46	28.54
1980	1,672,254	1,386,996	47,956	55,962	1,378,990	48,316	28.54	29.71
1981	1,772,897	1,521,183	50,573	74,497	1,497,259	49,536	30.23	30.71
1982	1,896,983	1,593,409	66,535	59,957	1,599,987	50,788	31.50	31.37
1983	2,110,230	1,788,873	12,555	69,052	1,732,376	52,055	33.28	34.37
1984	2,080,439	1,731,758	1,295	65,242	1,667,811	53,351	31.26	32.46
1985	2,052,111	1,701,021	5,649	69,536	1,637,134	54,668	29.95	31.12
1986	2,089,484	1,777,431	33,400	71,542	1,739,289	56,004	31.06	31.74
1987	2,213,040	1,810,200	68,080	89,228	1,789,052	57,356	31.19	31.56
Projected								
1988	2,242,000	1886560	72165	95474	1,863,251	58,721	31.73	32.13
1989	2,323,000	1952470	76495	102157	1,926,808	60,097	32.06	32.49
1990	2,407,000	2021020	81084	109308	1,992,796	61,480	32.41	32.87
1991	2,494,000	2091490	85949	116960	2,060,480	62,868	32.77	33.27
1992	2,584,000	2164750	91106	125147	2,130,710	64,258	33.16	33.69
Growth rate								
1977-87	3.90%	2.12%	4.45%	15.21%				
1988-92	3.61%	3.50%	6.00%	7.00%				
Mean								
1977-82	1,668,783	1,455,866	49,383	46,649	1,458,600	47,967	30.43	30.36
1983-87	2,109,061	1,761,857	24,196	72,920	1,713,132	54,687	31.35	32.25
1988-92	2,410,000	2,023,258	81,360	109,809	1,994,809	61,485	32.43	32.89

Source: BFAR

1/ Based on FAO format.

2/ Food and non-food components.

3/ Food component only. Exclude seaweeds, sponges, freshwater snail(suso) for ducks, and shell weight of oyster and mussel.

4/ In live weight (LW). Conversion of frozen/chilled, 100% LW; canned, 60% LW; processed (dried, salted & smoked), 60% LW.

TABLE 14. PROJECTED REQUIREMENT AND SUPPLY OF FISH, 1988-1992
(000 MT)

	1988	1989	1990	1991	1992
Population, 000	58,721	60,097	61,480	62,868	64,258
REQUIREMENT					
344 kg/cap, MT 1/	2,583,724	2,644,268	2,705,120	2,766,192	2,827,352
SUPPLY 2/					
Food fish prod., MT	1,886,560	1,952,470	2,021,020	2,091,490	2,164,750
Import, MT	72,165	76,495	81,084	85,949	91,106
Export, MT	95,474	102,157	109,308	116,960	125,147
Available Supply, MT	1,863,251	1,926,808	1,992,796	2,060,479	2,130,709
GAP, MT	720,473	717,460	712,324	705,713	696,643
SUPPLY from Domestic					
Production, kg/capita	32.13	32.49	32.87	33.27	33.69
AVAILABLE Supply, kg/ca	31.73	32.06	32.41	32.77	33.16

1/ FNRI

2/ Food component only.

fn: mtdp_prod

TABLE 15. FISH PRODUCTION, 1986-1992
(000 T)

Commodity	Actual 1986	Estimates 1987	Targets 1/					Annual Growth Rate 1988-1992
			1988	1989	1990	1991	1992	
TOTAL FISH PRODUCTION	2,089.48	2,139.97	2,242	2,323	2,407	2,494	2,584	3.61%
Aquaculture 2/	470.89	499.75	529	563	598	636	675	6.28%
Municipal 3/	1,072.36	1,081.04	1,100	1,119	1,138	1,157	1,175	1.66%
Commercial	546.23	559.18	613	641	671	701	734	4.61%

1/ Includes food and non-food component

2/ Includes fishponds

3/ Includes marine and inland production

TABLE 16. FOOD FISH PRODUCTION, 1986-1992
(000 MT)

Commodity	Actual 1986	Estimates 1987	Targets 1/				1992	Annual Growth Rate 1988-1992
			1988	1989	1990	1991		
TOTAL FISH PRODUCTION	1759.1056	1797.904	1886.56	1952.47	2021.02	2091.49	2164.75	3.50%
Aquaculture 2/	301.3696	319.84	338.56	360.32	382.72	407.04	432	3.05%
Municipal 3/	911.506	918.884	935	951.15	967.3	983.45	998.75	1.66%
Commercial	546.23	559.18	613	641	671	701	734	4.61%

1/ Food component only. Excludes seaweeds, sponges, freshwater snails(suso) for ducks and shell weight of oyster and mussel.

2/ Includes fishponds

3/ Includes marine and inland production

TABLE 17. REGIONAL PRIORITY COMMODITIES

COMMODITIES	TARGET MARKET	REGIONS COVERED	MPO	PROVINCES COVERED			TOTAL	REMARKS
				MA	PD	PT		
A. AQUACULTURE								
Lilapia (N)	D	Except IX (11)	20	14	22	4	60	
Milkfish (N)	D	Except IX (11)	29	15	9	1	54	
Prawn (N)	E	I, III, IV, V, VI, VII, VIII, X, XI (9)	23	12	17	-	52	
Seaweeds (N)	E	I, III, V, VI, VII, VIII, X, XI (8)	12	4	12	7	35	
Oyster (N)	D	I, II, IV, V, VI (5)	4	6	9	4	23	
Mussel (N)	D	I, V, VI, X, XII (5)	7	-	5	10	22	
Carp (N)	D	I, III, VIII, X, XII (5)	12	-	6	4	22	
B. Capture Fisheries (Commercial & Municipal)								
1. Marine								
Tuna (N)	E	Except VII & IX (10)	20	15	13	2	50	
Mudcrab (N)	D	I, II, III, V, VI, VIII, XI, XII (8)	13	2	18	1	34	
Squid/cuttlefish (N)	E/D	III, VI, VII, VIII, X, XI (6)	16	2	13	1	32	
Grouper (N)	D/E	I, II, III, IV, VI, X, XI (8)	7	10	14	10	31	
Mackerel (N)	D	II, III, IV, V, VIII, XI (6)	11	11	8	1	31	
Roundscad (N)	D	II, IV, V, VIII, XI (5)	10	10	7	2	29	
Shrimp (R)	D/E	V, VI, VIII, X, XII (5)	17	2	8	-	27	
Sardines (N)	D	II, V, VIII, X, XI (5)	18	1	4	2	25	
Lobster (N)	E	V, VIII, X, XI (4)	4	5	6	7	22	
Anchovies/moonfish (R)	D/E	II, VIII, X (3)	11	1	1	1	14	

SECTOR: FISHERIES AND AQUACULTURE

OUTPUT 13
Table 18. CRITERIA FOR COMMODITY PRIORITIZATION

NATIONAL	REGIONS											
	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII
1. Based on profitability	X	I	Y	X	X		X	X	X	X	X	X
2. Based on domestic Market	X	X	X	X	X	X	X	X	X	X	X	X
3. Based on appropriate size	X	X	X	X	X		X		X		X	X
4. Based on capital requirement	X	X	X	X	X	X	X	X	X	X	X	X
5. Based on the current state of technology	X	X	X	X	X	X	X	X	X		X	X
6. Based on potential foreign market	X	X		X	X	X	X	X	X	X	X	X
7. Relevance to medium-term priority program	X	X	X	X				X	X	X	X	X
8. Based on forward and backward linkages	X	X	X	X		X		X	X	X	X	X

Peace and order

Relevance to the provincial and municipal development program

Infrastructure facilities

Based on employment and income

Food security

Relevance to long-range Agriculture Development Plan

Based on Socio-Economic Contribution to Regional Development

Based on the conservation of Ecological balance of the region

Based on potential for development

Based on the availability of inputs

Based on employment generation

Based on potential production area

Based on availability of infrastructure

Based on availability of Post-Harvest Facilities