



MANAGEMENT OF RIVER AND RESERVOIR FISHERIES IN THE MEKONG BASIN

Data Collection and Sharing Mechanisms for Co-management

Report on Systems Requirements for National Management Institutions (“Level 2”) in Viet Nam



Vientiane, February 2004

Management of River and Reservoir Fisheries in the Mekong Basin (MRRF)

The aim of this Component of the MRC Fisheries Programme is to contribute to sustainable management and use of aquatic resources by strengthening reservoir fisheries co-management in the Mekong Basin. This will be achieved by developing improved river and reservoir management strategies, joint preparation of river and reservoir fisheries management plans by users and government agencies concerned and their implementation, and the strengthening of management capacity of all participating stakeholders. Major activities comprise the review of national fisheries management strategies, assessment of present and future river and reservoir fisheries potential, special studies on technical and institutional improvements in river and reservoir fisheries, participatory aquatic resource planning and management implementation, the training of resource users and Government staff in river and reservoir co-management and user community organization.

The Component maintains offices in all four riparian countries. Presently, its head office is at the Living Aquatic Resources Research Center (LARReC), Vientiane, Lao PDR. E-mail: fip@laopdr.com.

Title Illustration:

Upper photo: MRRF staff is recording catch data at fish landing in Ea Soup reservoir. In old data monitoring system, MRRF staff and local fisher collectors co-operated to collect data. The daily fishing data was recorded from all fishers of the selected reservoir. Catch assessment was based on gear types, species, then total production, production by species and gear type was calculated.

Lower photo: Mr. Cung, a fisher (member of Ea Soup fisher union) is collecting data from his neighbour. In the new monitoring system, a group of five fishers (board members) were selected for collecting data. Each of them was assigned to record daily data from their own and from four other fishers living nearby their house. At the end of each month, the collected data was calculated by MRRF staff. This method was decided by the fishers and data collection focused on stocked species. (Photos: MRRF Viet Nam Sub-component, Ban Me Thuot, Daklak, Central Highlands).

**Level 2 System Requirement Report:
Information needs of national management
institutions in Thailand for the co-management of
fisheries**

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ACRONYMS

CBD	Convention on Biological Diversity
CBFM	Community-based Fisheries Management
CBCRM	Community-based Coastal resources Management
CBNRM	Community Based Natural Resources Management
CITES	Convention on International Trade in Endangered Species
DANIDA	Danish International Development Assistance
DARD	Department of Agriculture and Rural Development
DFID	Department for International Development
DOF/DOFI	Department of Fisheries
FAO	Food and Agriculture Organization
FICen	Fisheries Information Center (MOFI)
GoV	Government of Viet Nam
GSO	General Statistics Office
ICLARM	World Fish Center
IFEP	Institute for Fisheries Economics and Planning (MOFI)
LMB	Lower Mekong Basin
NAFIQACEN	National Fisheries Inspection and Quality Assurance Agency
MOF/MOFI	Ministry of Fisheries
MRAG	Marine Resources Assessment Group
MRC	Mekong River Commission
MRRF	Management of River and Reservoir Fisheries in the Mekong Basin
MT	Metric tons
RIA/RI	Research Institute for Aquaculture
SRR	Systems Requirements Report
STOFA	Support to Fisheries Administration Project
SUMA	Support for Marine and Brackish Water Aquaculture Project
VAC	Livestock, pond, vegetable aquaculture system
VASEP	Vietnam Association of Seafood Producers and Exporters
VINAFIS	Viet Nam Fisheries Society
VND	Vietnamese Dong

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Section A – Introduction

Preface

This report presents the findings from a number of regional meetings with staff from national fisheries line agencies in the Lower Mekong Basin (LMB), as well as consultations conducted with and materials collected from staff of the national agency in charge of fisheries in Viet Nam, i.e. the Ministry of Fisheries (MOFI) by counterparts of MRRF who are also staff members of DOF, in the period June 2003 – March 2004, as well as a survey and study of pertinent literature and documents.

The information collected was compiled into a country-specific report. The main contributors are listed on the front page of the report.

Annex 4 of the report of Project Planning Workshop (Rome, April 2003), prescribes in detail the format of this Systems Requirement Report (SRR). Many of the line agency personnel, who provided the country-specific information, encountered problems with the requested contents of the reports, because it either overlapped considerably or indicated the need for information which was not readily available.

MRRF refrained from filling in information from literature or other secondary resources in order to make up for any gaps. Instead, the material contained in this report means to reflect the breadth and depth of information easily available with an important “co-management partner, that is, staff of the government agency concerned at national level.

1. Background

1.1 Purpose

Major pertinent documents prescribe the purpose of the project “Data collection and sharing mechanisms for (co-) management”, and, more specifically, the activity of writing up this report, as follows:

- To provide managers and advisors at all levels, but particularly local fisher communities and institutions, with appropriate cost-effective systems and mechanisms for the collection and sharing of data and information necessary to improve the sustainable co-management of their resources. [From the *RD1*];
- To develop guidelines for such data collection and sharing systems, based on a description, for local, national and regional levels, of (i) management institutions (ii) fisheries, (iii) data and information requirements for managers to meet their respective roles, responsibilities and mandates, (i) details of existing and planned data and information sharing and facilitation programmes, in the MRC’s area of operations (that is, the countries of the Lower Mekong Basin) [*Annex 2 of the Letter of Agreement between MRAG and MRC*];
- To write up this information in SRRs, which, subsequently, participants at the Guidelines Development Workshop will review, discuss and synthesize as the basis for developing a manual, in the form of an FAO Technical Paper, for designing and implementing data collection and sharing systems to support the co-management of aquatic resources.

1.2 Report Focus

It was agreed that the content of the SRRs should provide a broad picture of the (i) range of data and information requirements that exists, (ii) typically available manpower, resources and institutional capacity, (iii) structure and operations of co-managed fisheries, (iv) existing and potentially appropriate data collection tools, sources and methods, (v) existing data storage and processing methods (if any), (vi) requirements and opportunities for data and information sharing and (vii) lessons and experiences of previous or existing attempts to develop data collection and sharing mechanisms; this information should be provided for a range of geographic areas in the countries of the LMB, environmental regimes, and fisheries at different management levels. [From *Guidance Notes for Compiling System Requirements Reports*].

Section B – Methodologies

This document reports the information needs for co-management as felt and expressed by staff of the national management institutions DOF.

The compilers of this report collected pertinent information

- in workshops and other events with line agency staff presently involved in fisheries management, including the collection of management information;
- in consultations with line agency staff;
- in a literature survey carried out at MOFI.

The schedule (including date and venue) is shown below.

Table 1: Main events for collection of information for SRRs

Date	Event
Regional	
June 2003	MRC/FIP Annual Meeting, Udon Thani
August 2003	Joint Management Committee (JMC) Meeting, Udon Thani
September 2003	3 rd Regional Training Course on Co-management in Inland Fisheries
November 2003	MRC/FIP Technical Symposium, Pakse
January 2003	JMC Meeting, Vientiane
In Viet Nam	
October – November 2003	Circulation of questionnaires at MOFI (Hanoi) and RIA 02 (Ho Chi Minh City)
November 2003	Interviews with staff at RIA 02
February – March 2004	Interviews and literature survey at MOFI)Hanoi.

Section C - Results

1. Description of Department of Fisheries and its stakeholders

1.1 National and sectoral policy environment

The Government's (GoV) national objectives for the development in the fishery sector are stated in the Fisheries Master Plan Year 2010, which gives at its National Overall Objective "To effectively contribute to the improvement of the national economy and the social and socio-economic conditions of the people". Implied in this broad-based objective are a number of specific objectives, which are specified as:

- Improving the nutritional standards of the population by increasing the supply of aquatic products to domestic markets and improving people's access to aquatic products.
- Ensuring that all fisheries and fishery related activities are sustainable for this and future generations to continue benefiting from fisheries.
- Increasing export of aquatic products and net foreign exchange earnings that will derive from such exports.
- Accelerating modernisation and industrialisation of the fisheries sector and its associated industries to improve the economic and financial efficiency of the sector and to establish and maintain comparative advantages.

To achieve the overall national objective, six major development programmes are identified in the plan:

1. Usage of the environment and fisheries resources.
2. Industry structure, trade and enterprise support.
3. Rationalization and growth in marine fisheries.
4. Accelerating growth in marine fisheries.
5. Providing basic infrastructures to support fisheries.
6. Institutional strengthening and capacity-building.

The Ministry of Fisheries (MOFI) is part of the national public administration. The Minister for Fisheries is a member of the Governmental Cabinet.

The Ministry of Fisheries is the national authority responsible for fisheries management, including the development and formulation of policies for the fisheries sector. However, at the operational level, provincial, district and commune level People's Committees make policy decisions. In Viet Nam, as in all four MRC member countries, provincial government offices have a high degree of autonomy. This affects how national legislation is interpreted at the operational level and the level of enforcement. On policy matters, provincial fisheries authorities normally report to the Provincial Government (in Viet Nam the Provincial People's Committee), whereas on technical matters reporting is to national line agencies.

Viet Nam's current policies give communities an active role in fisheries management, an equitable share in resource property rights and shared responsibilities for conservation and management. However, these policies are vague, as they do not state how this sharing of management is to take place.

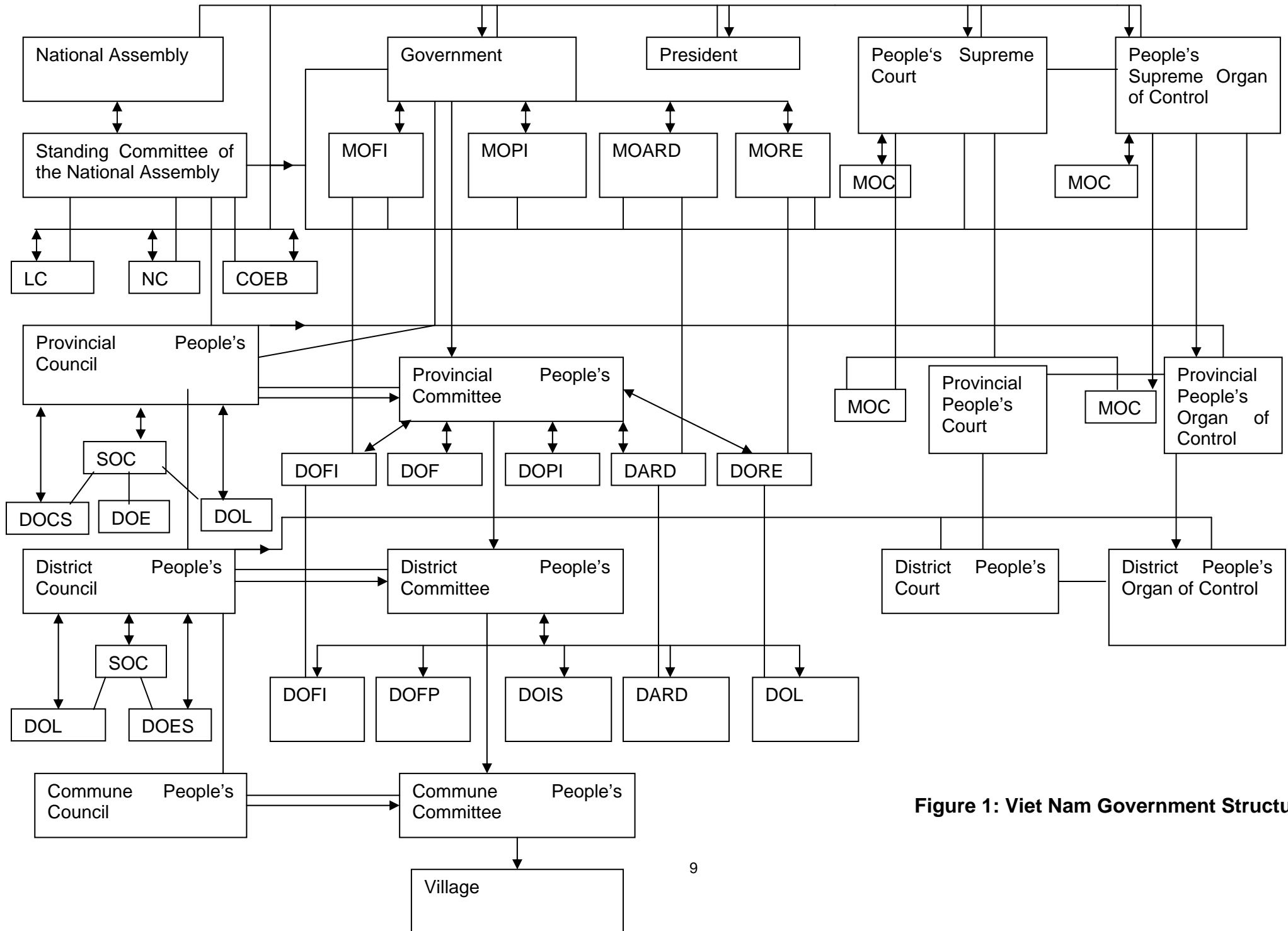


Figure 1: Viet Nam Government Structure

1.2 Roles and responsibilities of MOFI

According to the newly proclaimed Fisheries Law (December 2003/July 2004), fisheries are under “state management”. The state’s responsibilities are clearly lined out:

Article 51: Content of State management of fisheries activities. The content of State management of fisheries activities shall include:

1. Establishment and carrying out of strategies, masterplan, plans and policies regarding the development of fisheries sector.
2. Formulation, advocacy, dissemination and implementation of fishery-related legal documents.
3. Survey, assessment, management and protection of sustainable development of fisheries resources; conduct of scientific research, application of advanced technology in fisheries activities; planning and management of inland protected areas and marine parks; conduct of statistics and information on fisheries activities.
4. Identification and delegation of powers of coastal areas management in fisheries activities; management and delegation of powers to manage fishing grounds; zoning the routes for fishing; proclamation of fishing grounds; management of the allocation, lease and revocation of aquaculture land and marine areas for aquaculture purposes.
5. Management of the granting and withdrawal of all kinds of licenses and certificates in fisheries activities in accordance with legislation; provision of training, examination, granting the master and operator’s degrees; granting and revocation of fishing license of foreign fishing vessels.
6. Management of appraisal work and recognition of new fish fry, fish veterinary drugs and aquaculture feed; examination, prevention and control fish diseases; management of environmental protection in fisheries activities.
7. Management and delegation of powers of fishing vessels, fishing ports and fish wholesale markets.
8. Performance of international cooperation on fisheries activities.
9. Management of apparatus organization, provision of human resources training for fisheries sector; making guidance on the professional skills and expertise for fishery-related occupation associations.
10. Examination and inspection of fisheries legislation enforcement, taking action to violations committed to fisheries legislation; settlement of conflict, petitions and prosecution in fisheries activities as regulated by legislation.

The overall responsibility of MOFI, but also related ministries, as well as People’s Committees at all levels is spelled out in the following article:

Article 52: State management duties on fisheries activities.

1. The Government shall manage fisheries activities in a unified manner throughout the country.
2. Ministry of Fisheries shall be responsible to the Government for the implementation of State management functions on fisheries activities throughout the country.
3. Ministries of Agriculture and Rural Development, Natural Resources and Environment, Health, Public Security, National Defense and other ministerial-level agencies within their functions, duties and authorities shall coordinate with Ministry of Fisheries in exercising State management on fisheries activities as set out by this Law and other relevant legislation.

4. People's Committees at all its levels shall be responsible for the State management regarding fisheries activities in their locality in accordance with this Law and other relevant legislation.

The organization chart of fisheries management in Viet Nam is rather complicated (Figure 1). The Ministry of Fisheries (MOFI) is a government agency responsible for implementing state administration of the fisheries sector. The MOM system includes the ministerial agency and some professional units of which three have branches in different localities, namely the Department for Fisheries Resources Conservation, the National Fisheries Inspection and Quality Assurance Agency (NAFIQACEN) and the National Fisheries Extension Centre.

The Department for Fisheries Resources Conservation has branches located in the coastal provinces and some inland provinces with large fisheries (mainly in the Mekong River Delta). NAFIQACEN has six branches set up at fisheries centres. The National Fisheries Extension Centre has a network of fisheries and agriculture extension centres in all provinces across the country.

In coastal provinces, the agency implementing the state management of fisheries is the Department of Fisheries (DOFI) which is under the management of the Provincial People's Committee. It is also subject to the professional management of MOM (actually, there are 25 Departments of Fisheries and one Department of Fisheries-Agriculture-Forestry). Two coastal provinces have no Department of Fisheries. In other provinces, the mission of managing fisheries is carried out by the Department of Agriculture and Rural Development.

At district level, an Economics Bureau or an Agriculture/Forestry/Fisheries Bureau implements fisheries management. At commune level there is an Agriculture Board or an Agriculture and Fisheries Board.

Assisting the Minister with public administration functions are Vice Ministers and heads of advisory departments. Advisory departments are (see also Annex 1):

- Fisheries Department;
- Fisheries Resources Conservation Department; this department, with 37 branches in localities are responsible for policy promulgation, direct management and inspection on the fisheries resources protection and development tasks;
- Department of Planning and Investment;
- Department of Personnel and Labour;
- Department of Science and Technology;
- Legal Department;
- Department of Finance and Accounting;
- International Cooperation Department;
- Ministry's Administrative Office;
- Ministry's Inspection.

In addition, there are the following institutions: The National Fisheries Inspection and Quality Assurance Centre (NAFIQACEN) consists of a Head Office and 6 branches located in key fisheries places. It is the national competent authority for fisheries food safety assurance and quality control.

The Central Fisheries Extension Centre with its Representative Office in Ho Chi Minh city and a system of fisheries and agricultural extension units in nationwide is responsible for transferring experiences, techniques, technologies and information to fishermen and farmers(in both public and private sectors) to help them with their

fisheries production. Fisheries University (in Nha Trang), fisheries faculties (University of Can Tho, Agriculture and Forestry University in Ho Chi Minh City), and the fisheries vocational colleges No 1, 2 and 4 are responsible for training human resources for the sector.

The Research Institutes for Aquaculture Nos.1, 2, and 3 are responsible on behalf of MOFI for fisheries and aquaculture research and development in the North, South, and central parts of Viet Nam respectively.

In coastal provinces, local fisheries administration authorities are Provincial Fisheries Departments. They are units of Provincial People's Committees and under the professional management from the Ministry of Fisheries. In inland provinces, the fisheries are the concern of the Provincial Departments for Agriculture and Development.

MOF has overall responsibility. A Department of Capture Fisheries has recently been established, incorporating part of the mandate of the former MOF Department of Fisheries and Department of Resource Protection. At the provincial level, different agencies of DOF or DARD are responsible.

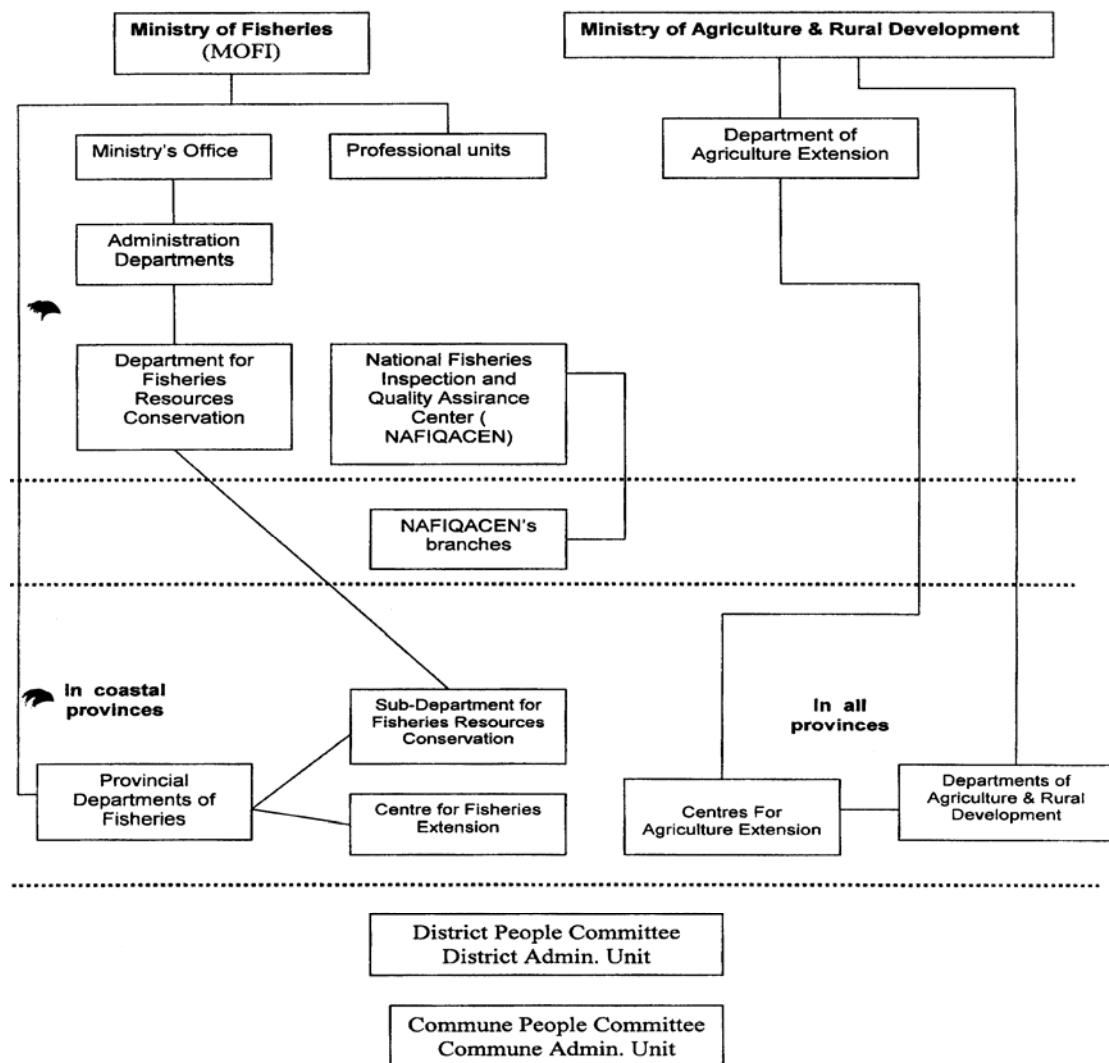


Figure 2: Organizational Chart of the Ministry of Fisheries

1.3 Institutional capacity and resources

The total number of employees in all offices under MOFI (including management departments, research institutes, colleges, other centres) is 18,970, of which about 51% are women, out of which about 15% are in senior positions (pers. comm., Viet Nam Committee on Advancement of Women in Fisheries).

1.4 Links and relationship with organizations and institutions

Socio-political organization and professional societies play an important role in organizing and encouraging fishers and fisheries enterprises to develop their business and production, as well as participating in the sector administration. They are:

- Vietnam's Fisheries Trade Union, with 67,900 members;
- Vietnam Fisheries Society (VINAFIS);
- Vietnam Association of Seafood Exporters and Producers (VASEP); VASEP was founded in 1998. Currently, it has 120 members as fisheries processors and exporters nation-wide. Its aims are to coordinate and join activities of its members from different economic sectors, regardless of their production and business scale, assisting members to improve value, quality and compatibility of Viet Nam's sea products. VASEP represents and protects legitimate rights of its members and of the seafood industry of Viet Nam. So far, it has taken part in the promotion of fishing and aquaculture to develop raw material sources and protect the prestige of the industry's products in the media and with consumers. In addition, it provides members with free-of-charge weekly and monthly Seafood Trade Newsletters with up-to-date information and special reports. Also it arranges a variety of training courses.

1.5 Description of co-management initiatives

Cooperation of people and government in administration and management of natural resources, as well as in all other matters, is said to go a long way back in Viet Nam. The old Vietnamese proverb "King's rules are stopped in the village" emphasizes the important role of village communities already in feudal times. Later, under socialism, the following concepts were followed: "Government and population do together"; "Co-operative is a house, co-operative members are owners"; "People know, people have opinions and people supervise", etc.

Already in the late 1980's, the concept of co-management was thought to be capable of addressing the sustainability problem faced by fisheries in Viet Nam. One of the two priority goals by MOFI to maintain fisheries sustainability (the other being to stop uncontrolled expansion of fishing fleet, fishing pressure, and uncontrolled destructive use of coastal ecosystems and habitats) was to "Immediately start the process of moving from an open-access, type of fisheries to a carefully manage and supervised people's fisheries in line with the intent and purpose of the overriding policy guideline of the Government". To achieve these goals, the Ministry of Fisheries has embraced co-management as a strategy to achieve sustainable and healthy use of the country's living marine and coastal resources.

Around 1997, the project "Case study of community-based coastal resources management in Vietnam" was undertaken by the Institute of Fisheries Economics and Planning (IFEP/MOFI) with assistance from the International Center for Living Aquatic Resources Management (ICLARM), to 1) document and evaluate recent projects/programs with CBCRM in Vietnam; and 2) develop policy recommendations

to improve national, provincial, district, commune and resources users roles in coastal resources co-management in Vietnam.

It was found in the survey that most co-management projects were carried out in

- Mangrove preservation and rehabilitation;
- Coastal aquaculture development;
- Fisheries in lagoons and bays, and, more recently, coral reefs; and
- Reservoir fisheries.

Examples of such projects, which have been implemented since the late 1980's, are:

- Mangroves rehabilitation in Thai Thuy district, Thai Binh province;
- Rehabilitation and Maintenance of Mangrove Forest for Long Term in Thanh Hoa, Nghe An and Ha Tinh provinces;
- Mangrove Reforestation in Ky Anh district;
- Mangrove protection program in Can Gio district, Ho Chi Minh city;
- RAMSAR Xuan Thuy Conservation area, Nam Ha province;
- Integrated Coastal Management in Tien Hai district, Thai Binh province;
- Community based management of coastal aquaculture development, Quynh Loc commune, Quynh Luu district, Nghe An, Viet Nam.
- Co-management in the planning of a waterway system for aquaculture, Phu Tan, Tam Giang Lagoon, Hue.
- Trao Reef Marine Reserve, Khanh Hoa Province, the 1st locally managed marine reserve in Vietnam;
- Reservoir Fisheries Co-management at Thac Ba reservoir, Yen Bai province;
- Co-management of Reservoir Fisheries in Daklak Province, Central Highlands.

Co-management is recognized as having promise for assuring sustainable, equitable fisheries management, and is supported through various projects, including the Management of River and Reservoir Fisheries Component of the Mekong River Commission Fisheries Programme and the Danida-funded Support for Marine and Brackish Water Aquaculture Project (SUMA). Besides this, it is becoming recognized that many traditional fisheries management systems in Viet Nam have a community base, and development of management systems for these fisheries needs to build on these. The results of these projects need further evaluation, but are expected to influence how the Ministry will support future co-management initiatives.

However, despite the government's line that highlights people's democracy based on the principles the local government does not have an appropriate mechanism of management based on the people. The fishers have lost their self-reliant nature and active role in management. The people have become completely dependent on the government's decisions. Such attitude and behaviour themselves have resulted in a deep gulf between the government and the people.

Organized fishers in Dak Lak indicate that the absence of external financial support (for use in, for instance, stocking and enforcement activities) as the greatest single barrier to assuring the sustainability of co-management.

2. The Fisheries

2.1 Resources and Environment

Viet Nam has extensive aquatic resources. They belong to three major areas:

- a coastline with a length of 3,260 km, with 12 lagoons, straits and bays, 112 estuaries, canals and thousands of small and big islands scattering along the coast; these resources cover an area of approx. 1,000,000 ha (300,000 - 400,000 ha of straits, bays and lagoons; and about 700,000 ha of tidal areas);
- an inland area with a total water surface of about 1,100,000 ha (120,000 ha of small ponds, lakes, canals, gardens; 340,000 ha of large water surface reservoirs; 580,000 ha of paddy fields); and
- the water surface and floodplains of two major rivers, that is, the Mekong and the Red River.

2.1.1 Stocks/fisheries and area of operation

Marine Fisheries

There are more than 2,000 fish species in Vietnam sea waters, in which about 130 species having economic value. According to the latest evaluation, the marine fish stock in the whole sea area is 4.2 million tons, in which the annual allowable catch is 1.7 million tons, including 850,000 tons of demersal fish, 700,000 tons of small pelagic fish and 120,000 tons of oceanographic pelagic fish.

Beside marine fish, there are also many natural resources namely more than 1,600 species of crustaceans with an annual allowable catch of 50,000-60,000 tons, in which marine shrimps, lobsters, slipper lobsters, crabs and mud crabs are high valued species; about 2,500 species of molluscs, of these squids and octopus have significantly economic value (the annual allowable catch is 60,000-70,000 tons). Each year a volume of 45,000-50,000 tons of high valued seaweed such as *Gracilaria verrucosa*, *Sargassum* can be exploited. In addition, there are also many precious species such as abalones, sea turtles, sea birds. Fish fin, fish bladder, mother pearl can also be exploited.

Dominated by the feature of a tropical sea area, the resources of marine products of Viet Nam have a diversified composition of species with small sized individuals and the high speed of resources reproduction. The monsoon regime creates the basic change in oceanographic condition leading to the change of fish distribution. Fish live scattered in small schools. The ratio of schools of small fish with size under 5x20m accounts for up to 82% of the total number of fish schools, the schools of medium sized fish (10x20m) occupy 15%, while the schools of big sized fish (from 20x50m upward) occupy only 0.7% and the schools of very big fish (20x500m) occupy 0.1% of the total number of fish schools. The number of fish schools bearing ecological characteristics of the coastal area occupies 68%, and the fish schools bearing oceanographic characteristics occupy 32%.

The distribution of fish stock and the capacity of exploiting demersal fish concentrate mainly in the sea area of depth below 50m (56.2%), followed by the areas of 51-100m in depth (23.4%). According to statistics, the allowable capacity of exploiting marine pelagic and demersal fish in the regions near the coast can be maintained at 600,000 tons. If other marine species are included, the stable annual allowable exploiting capacity is 700,000 tons a year, lower than the output harvested annually in this region in the past years. Meanwhile, resources in off-shore waters are great and under-exploited.

Fish resources are also different depending on the region and the depth. The south-east sea area gives the greatest capacity of exploiting marine products in distant waters, accounting for 49.7% of the exploiting capacity nation-wide, followed by the Tonkin Gulf (16.0%), the Central sea area (14.3%), the South western area (11.9%), emerging hills (0.15%), and oceanographic pelagic fish (7.1%) (see Table 2).

According to Government regulations, *offshore fishing* is defined as fishing in waters deeper than 30 m in the Gulf of Tonkin, off Vietnam's South Eastern and South Western coast and in the Gulf of Thailand. Off the central part of Vietnam with its narrow continental shelf, off-shore fishing is defined as fishing in waters deeper than 50 m. Fishing vessels with more than 90 hp are defined as off-shore vessels.

Table 2: Result of the Evaluation of Vietnam Marine Fish Stock and Fishing Capacity

Sea area	Fish	Depth	Fish stock		Fishing capacity (ton)		%
			MT	%	MT	%	
The Tonkin Gulf	Small pelagic fish		390.000	57,3	156.000	57,3	16,3
	Demersal fish	< 50m	39.200	5,7	15.700	5,7	
		> 50m	252.000	37	100.800	37	
	Total		681.200		272.500		
The Central region	Small pelagic fish		500.000	82,5	200.000	82,5	14,5
	Demersal fish	< 50m	18.500	3,0	7.400	3,0	
		> 50m	87.900	14,5	35.200	14,5	
	Total		606.400		242.600		
The South Eastern region	Small pelagic fish		524.000	25,2	209.600	25,2	49,7
	Demersal fish	< 50m	349.200	16,8	139.800	16,8	
		> 50m	1.202.700	58,0	481.100	58,0	
	Total		2.075.900		830.400		
The South Western region	Small pelagic fish		316.000	62,0	126.000	62,0	12,1
	Demersal fish	< 50m	190.700	38,0	76.300	38,0	
	Total		506.700		202.300		
Floating knoll	Small pelagic fish		10.000	100	2.500	100	0,2
The whole sea area	Deep sea pelagic fish (*)		(300.000)		(120.000)		7,2
Total	Small pelagic fish		1.740.000		694.100		
	Demersal fish		2.140.000		855.900		
	Deep sea pelagic fish		(300.000)		(120.000)		

Sea area	Fish	Depth	Fish stock		Fishing capacity (ton)		%
			MT	%	MT	%	
	(*)						
	Total		4.180.000		1.700.000		100

The total potential of fisheries *resources* is estimated at 4.2 million tons, the annual sustainable production is assessed at about 1.7 million tons. Surveys of deep-water pelagic resources carried out by Japanese semi-commercial vessels investigated mainly tuna stocks in distant waters off Central Vietnam. These resources are highly migratory the fish staying in Vietnamese waters only for a short period.

Inland Fisheries

As a country possessing large natural water surface areas, the fisheries in Viet Nam appeared very early. According to legend, the fishery was one of the first means of subsistence of the people. The modern fishery includes three operations: marine fisheries, inland fisheries and aquaculture.

In recent years, Viet Nam's fisheries have experienced rapid development, becoming one of the major economic sectors and a key export sector making up about 7% of country's GDP. However, while the fisheries sector has developed rapidly, in particular marine fisheries and aquaculture, inland fisheries have not been given due attention even though it plays a significant role in peoples' lives.

Inland fisheries in Viet Nam include fishing for food and other purposes such as making ornamental objects, medicines and capture of seeds for aquaculture. Recently, leisure fishing has become popular around urban and tourist areas. At present, inland fisheries are declining rapidly. The capture of fish seed for aquaculture has lost its role as the only source for seed supply for aquaculture. Nevertheless, the catch from inland fisheries still plays an important role in the regular supply of animal protein for rural residents who face difficult economic conditions and have to rely on food sources they can seek themselves. In farmer households, one can find at any time certain kinds of fishing gear such as rods, crab baskets, fish traps or cages. Species usually caught include fish (carp, snakehead, catfish, and eel), crustaceans (shrimp and prawns, fresh water and brackish water crabs) and molluscs (snails, clams, oysters).

However, in the eyes of managers and policy makers, inland fisheries have never been seen as an economic activity. Previously, fishers in inland waters were considered to be the poorest people with low education and no position in society. Actually, the number of inland fishers is very low and this practice is only one activity to provide food for their meals or for selling to other local people. This has some consequences. First, a source of employment to create additional income and provide food for the population has not been managed and brought into play, especially in terms of poverty alleviation. Second, non-managed fishing activities such as the use of toxic chemicals and electric shock to catch fish have resulted in the destruction and extermination of fisheries resources. Finally, without an appreciation of the role of the inland fisheries, there is little or no concern about the influence of other economic sectors on fisheries resources.

Viet Nam is among the more densely populated countries in Southeast Asia. The highest densities occur in the south especially within the delta of the Mekong River which represents the country's most important agricultural area. Economic

development has accelerated in recent years. Almost all freshwater areas are still heavily exploited for fisheries. The major river fisheries are centred on the Red River and its delta in the north, now highly degraded, and more importantly the Mekong delta in the south. Remote sensing flooding imagery shows that up to 40 percent of the area of the delta in Viet Nam is still flooded seasonally, mainly in the upper section. This is essentially an extension of the highly productive Tonle Sap floodplain system of the lower Mekong in Cambodia. Coastal regions are now largely under flood “protection”. A considerable amount of fish migrates into Viet Nam from Cambodia (and quite possibly the reverse occurs also). The Mekong delta also has a large brackishwater/estuarine fishery in its lower reaches. Viet Nam also has very extensive rice cultivation and has recently challenged Thailand as the world’s top exporter. However, production is intensive with very high pesticide use and rice-fish production has no doubt suffered as a result.

Aquaculture

The aquaculture sector is expanding dramatically and supplies various kinds of species and products for domestic and overseas consumption. For the domestic market, in addition to carp, major carps, snakehead, tilapia and various species of high economic value have been introduced, such as pomfret, hybrid catfish and single-blood tilapia. The growth of aquaculture production is responding to the increasing demand for domestic fish consumption. The development of the aquaculture sector is marked by a rapid expansion of brackish and marine aquaculture in coastal regions. High economic value products, such as shrimps, lobster, grouper and crab come from marine culture. The export value of these products contributes strongly to the total foreign exchange earning of Vietnam.

Aquaculture is very well developed with 407 000 MT reported national production in 1999.

2.1.2 The environment

Viet Nam’s coastline runs for 3,260 km, which extends from Mong (Quang Ninh) in the North to Ha Tien the Southwest. Most of it borders on the South China Sea, but a significant percentage from the southern tip of Viet Nam westward borders on the Gulf of Thailand. The coast runs from 8° 23’N to 21° 39’ N. The Exclusive Economic Zone of Viet Nam is over 1 million Km, over three times the land area of the country. There are numerous islands, lagoons, bays, and swamps, with varying potentials for other activities, including shipping and tourism.

Four hydrologically defined coastal regions can be distinguished, which are also considered as fisheries management areas i.e. the Bac Bo (Tonkin) Gulf in the North, Central Vietnam, South East Vietnam and South West Vietnam.

The 3 major areas for *marine demersal fisheries* are located in the Bac Bo Gulf off the Red River Delta in North Vietnam, in the coastal waters off the Mekong Delta in South East Vietnam and in the Gulf of Thailand off the South West coast of Vietnam. *Pelagic fisheries* are operated predominantly along the steep continental shelf in Central Vietnam as well as in Southeast Vietnam.

In the south, the seas tend to be shallow, whereas off Central Viet Nam, the continental shelf slopes sharply. This leads to a difference in zoning between inshore and offshore fishing activities: In the central zone of Viet Nam, the 50 m depth line is used to distinguish between inshore and offshore, while the 30 m line is used in the North and the South.

In the marine fishery, two main seasons are recognized: March to September (the South season), and October to February (the North season).

The sea area of Vietnam is divided into 4 main regions namely northern sea region, central sea region, south-east sea region, and south-west sea region. Fishing activities are classified into in-shore and off-shore fishing based on the depth of the sea in each region. The limit of 50 m and 30 m deep is used for the central sea region and the other regions, respectively. Owing to diversified climate and weather conditions from the north to south, the fishing season is divided into two seasons namely south season (from March to September) and north season (from October to February) (FICEN, 2001).

The climate is monsoonal, in general, with a rainy season from June to October. November to February tends to have lower temperatures than March to May, when the highest annual temperatures tend to occur. In general, and especially in the Mekong Delta, the daily variation in temperature tends to be greater than the variation in mean daily temperature among seasons.

Flood control projects in the Mekong delta and upstream dams on tributaries are expected to have adverse effects on Mekong delta fish stocks, but these are difficult to measure. In the Mekong delta, pollution has few effects, aside from flushing of acid sulphate water in some areas, at the beginning of the rainy season. Bottom fauna tend to be more vulnerable, because they are less mobile.

2.2 The Fishery

2.2.1 Status and trends

Total fish production was said to be 2.250,5 million MT in 2000.

Marine Fisheries:

Marine catches are reported to be between 1.3 – 1.7 million MT per year. 82% of the marine catch consisted of fish while the remainder consisted of shrimps, crabs, lobsters, squid, cuttlefish and other species. Over 60% were used for domestic consumption, 18% for export and around 20% for other purposes. Marine fisheries account for 65% of the total fish production of Vietnam. The remaining 35% come from aquaculture and fresh water fisheries. Fisheries resources in coastal waters below 50-m depth are considered to be fully exploited. In 2000, *offshore catches* accounted for up to 35% of total marine fish landings.

Inland Fisheries

Inland capture fisheries production reported to FAO, together with freshwater aquaculture for comparison, is shown in Fig. 2-25. Based upon this information, the relative degree of attention to, and investment in, aquaculture would appear justified. It is certainly the case that the aquaculture sector has performed well and the figures suggest it outstrips capture by a significant margin. But the reality regarding inland capture fisheries is quite different. For example, official reports of production from freshwater capture fisheries by a single province in the Mekong Delta (An Giang – see later) have averaged around 65 000 MT per year. It is hard to believe the province accounts for 86 percent of total national capture production from freshwaters; especially considering it is only one of at least 12 other provinces in the delta (subject to definitions on boundaries). An Giang province, being located near Cambodia, still with extensive seasonal flooding, is noted for its inland capture fisheries but a number of other provinces have similar freshwater resources, not least Dong Thap province which is adjacent in the north-east section of the delta (also bordering Cambodia), plus large sections of several others. Even those areas where the annual flooding is now largely eliminated are not expected to have totally insignificant capture fisheries, not least because all still have extensive networks of

canals and many still have fisheries on the Mekong distributaries. Also, those closer to the sea begin to have brackishwater/estuarine fisheries (inland).

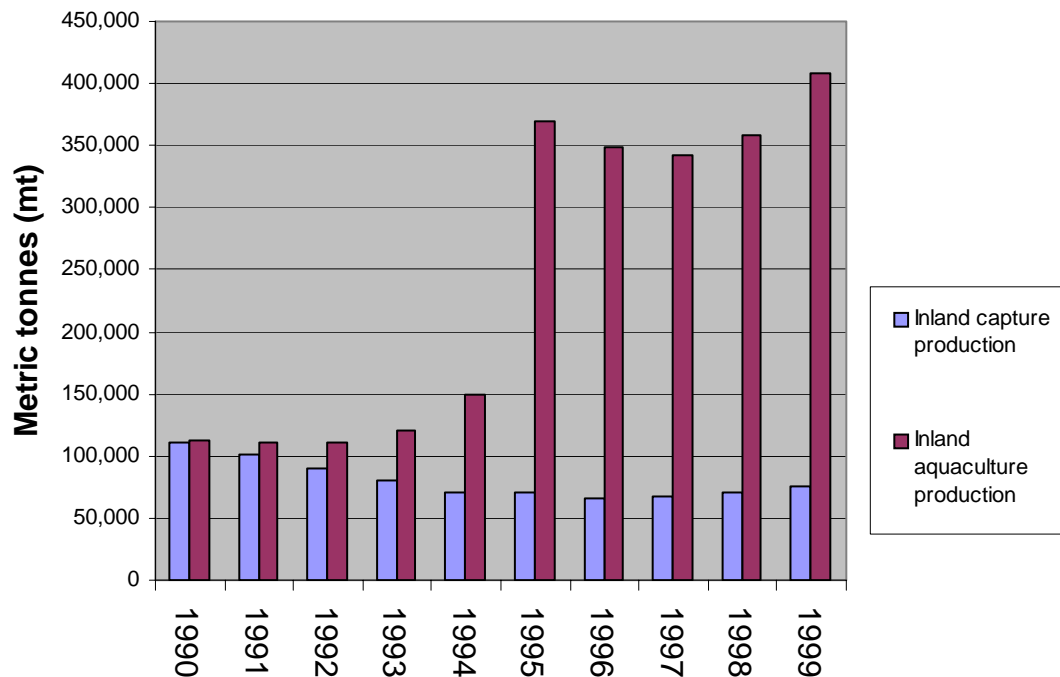


Figure 3: Viet Nam - Inland capture fisheries and aquaculture production

The fresh water fishery produces an estimated 300,000 tons per year, but this is probably greatly underestimated. Almost all major fresh water resources in Viet Nam: floodplains, river systems, reservoirs, canals, and natural lakes, have capture fisheries dependent on them. Inland fisheries are said to be heavily exploited to overexploited. In many reservoirs, the fishery is supported by regular stocking.

Recent statistically based sampling surveys of inland capture fisheries have shown that, as usual, the existing reporting/statistical system still grossly under-estimates the fishery. In 1998-9 the MRC commissioned a survey in An Giang province which was undertaken by a local university and provincial and district fisheries officers with technical assistance through the Research Institute for Aquaculture (RIA) Number 2 (Ho Chi Minh City). A team report was produced (Sjørøsløv, 2001) and the information produced on freshwater capture fisheries in the area was as follows:

- 66 percent of households rely significantly on capture fisheries either for income or food. This equates to about 1.35 million people who rely to various extents on capture fisheries (out of a total of 2 016 949) in just one province.
- 45 percent of people interviewed reported that they went fishing. This equates to about 900 000 people.
- 9 percent of fishers are children below the age of 15. About 30 percent of fishers are women.
- 5.7 percent of households are involved in either fish processing or trading.
- About one person per 62 households is involved in fish trading (about 60 percent of which are self-employed). This equates to about 32 500 traders in the province.

- By comparison, only 14 percent of households are involved in aquaculture, either solely, or more often in combination with capture fishing.
- Only 25 percent of “professional fishing” households actually operate larger-scale gears such as bag-nets and larger traps/barrages.
- “Professional fishers” spend about 10 months per year fishing, but “part-time” fishers still spend an average of 7.3 months per year fishing.
- The total catch estimate for “part-time” fishing households was approximately twice that from “professional” fishing households (and the latter also includes some small scale catches from non-licensed gears).
- The fishery cannot be adequately described or monitored by using “professional” (= licensed) fishers as the prominent group.
- 80 percent of the total catch is sold (including from part-time fishing households).
- The mean catch per household was 792 kg/year with a median of 300 kg/year (excluding households using highly productive gears such as bagnets). This estimate includes non-fishing households.
- Consumption of aquatic animals (fish plus other taxa) was 58.4 kg/person/year of which fresh fish (plus other taxa) accounted for 54.3 kg with 4.1 kg/person/year of processed fish. The fresh fish equivalent was 61 kg/person/per year.
- Fish accounts for 75 percent of the total animal food intake.
- 76 species of fish were reported to be caught (and that section of the survey only related to recent catches, the number of species over a full year would be much higher).
- Total production from the capture fishery was estimated at 273 118 MT for 1999. About 28 percent of this is used as fodder/feed for commercial aquaculture (the region has very significant cage culture particularly for carnivorous snake-heads, *Channa spp.*, and catfish). About 23 percent is likely exported (probably domestically) from the province.

Aquaculture

Considering the growing population of Viet Nam and the likelihood that most wild stocks are already fully exploited or overexploited, increasing attention is being given to aquaculture development in marine, brackish, and fresh water.

The Mekong Delta has the largest aquaculture area in the Mekong Basin, covering 330,000 hectares. Freshwater aquaculture production in 1999 was 171,570 tonnes. Production is high, with the mean annual pond production of 4.8 tonnes per ha. Over 100 hatcheries in the Delta produced an estimated 1,615 million fry and 595 million fingerlings in 1999. The most commonly cultured fish species are river catfish, silver barb, common carp, tilapia, giant gourami, sand goby, hybrid catfish, silver carp, Indian carps and snakehead. Polyculture is the norm and pond production is generally integrated under the 'VAC' system, an acronym from the Vietnamese words for 'livestock', 'pond' and 'vegetables'. Eighty thousand hectares is presently under rice-fish culture. Silver barb, common carp, silver carp, tilapia, Indian carps, climbing perch, and snakeskin gourami are most frequently stocked in rice-fish systems. The mean annual production is 0.37 tonnes per ha. Fish are often held in the rice fields for two or three successive rice crops. There are nearly 5,000 fish cages in the Delta ranging from 50 to 400 m² in size. Each cage consists of accommodation on top and the submerged cage portion below. River catfish, snakehead, red-tail tin foil barb, silver barb and common carp are the common species reared in these cages. Cages are most often stocked with wild captured fry or juveniles. Fish are fed wet sticky

balls of mixed rice bran, broken rice, trash fish and vegetables. Fish are cultured for 10 to 14 months and yields range from 80 to 120 kg/m³. Cage culture of high value species requires investment levels beyond the reach of poor and marginal farmers. The government of Viet Nam has recently begun promoting giant freshwater prawn culture in the Mekong Delta and it is expanding rapidly. There are more than 30 fish and prawn species cultured in the Lower Basin including exotics and indigenous species.

However, by 2001, according to GSO (2002), the total area of water surface used for aquaculture in the country was only 641,874.1 ha, representing 37.7% of the potential area for aquaculture. Notably, aquaculture practices especially shrimp culture is very much developed in the south of Vietnam, particularly in the Mekong River Delta where the area of aquaculture in 2001 was 445,154.2 ha, equal to 69.3% of the area suitable for aquaculture.

Along with the increase in the area for aquaculture, total output of aquaculture increased rapidly from 414,600 MT in 1997 to 589,600 MT in 2000, which accounted for 26.2% of the total output of fisheries sector. Fish and shrimp were the main products of aquaculture with total output of 391,100 and 93,500 MT in the year 2000 respectively. Comparing the development of fish and shrimp culture, it is found that the shrimp output increased more, reaching in 2000 a level of 189% (basis 1997), while that of fish output increased to 140%.

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2.2.2 Numbers of fishers

The Viet Nam Committee for the Advancement of Women in Fisheries give the total number of people "employed" in fisheries of Viet Nam as about 4 millions, in which women are 50-60%, which, however, are involved mainly in processing, trade and aquaculture.

Quantitative information on numbers of fishers is available mainly from marine fisheries. Here, a number of 425,000 fishers were involved, of which about 75% were inshore fishers and the rest fished offshore. They crewed 72,000 motorized vessels with 2.5 million HP capacity, and 29,000 artisanal vessels. About 6,000 of the motorized boats have capacities of 90 HP or higher.

In Vietnam, there is not an absolute figure of labour force engaged in fisheries sector since aquaculture activity is normally confined with activities in other sector. However, statistics show that there are more than 4 million people living in tidal areas and about 1 million living in swamp and lagoon areas in 714 villages in 28 coastal provinces and cities. In addition, more than 12 million households in the rural area of Vietnam have substantial contribution to the fisheries labour force in various kinds of fisheries activities including fish farming, fish trading etc.

2.2.3 Fleets and Gears

Again, information on fleets and gears exist mainly for the *marine sector*. It has been pointed out that, recently, the fishing fleet in the sector has developed rapidly. In 2000, Vietnam had about 76 000 motorised *fishing vessels* with a total engine capacity of around 3.2 million hp as well as a large number of non-motorised artisanal boats. Among the motorised vessels, there were more than 6 000 units with an engine capacity of over 90 hp which are capable of offshore fishing. Only about 100 vessels are equipped with engines of 400-500 hp with the capacity for deep-sea fishing operations. This fleet comprises trawlers and purse seiners. Trawlers are used in waters of 35 to 80 m depths mainly in south-eastern waters, whereas purse seiners fish pelagic species in deep waters, mainly off the central region.

In terms of *fishing gear*, trawl gear accounts for the biggest portion (31-34%) followed by drift gillnets (20-21%), longlines (17-19%), purse seines (8-21%) and other fishing gears such as lift nets (5%), handlines etc., which are mainly used in coastal waters. Drift gillnets are widely used in the Northern provinces.

Inland Fisheries: There is no information on the inland fisheries fleet. Regarding gears, over 100 identified. Apparently, they are too numerous to mention!

The capture fisheries of the Lower Mekong Basin have a centuries long history of catch technology, local resource knowledge, fish processing, marketing and social organisation. The fishery is highly diversified and adapted to its variable and complex environment. Floodplains, swamps, rice fields, canals, streams, tributaries, main river, lakes, estuaries, and large and small reservoirs are exploited. A wide range of fishing methods are used to catch all types of fish and other aquatic animals. The methods include traps, hooks and lines, gill nets, drift nets, drift seines, drag seines, encircling seines, frame trawls, lift nets, cast nets, river barrages with associated trap systems and extended floodplain/lakeshore fences with trap systems. The methods have considerable design variations and size ranges. Much of the technology is indigenous to the Basin or has been extensively adapted to local conditions.

Most of the fishing gear and boats used are of traditional design and are manufactured with extensive use of local materials. The major items of recent origin are twine, netting material and engines. An important aspect of catch technology is the ecological knowledge applied by local people in their fishing activities. Most fisheries activities are based on an intimate knowledge of fish response to seasonal environmental changes.

2.2.4 Seasonality

In the marine fishery, two main seasons are recognized: March to September (the South season), and October to February (the North season). In inland fisheries,

fishing is conducted year-round. In floodplains, it is mainly restricted to the rainy season. In the Mekong Delta, “white fish” are caught mainly in the mid-to-late rainy season and early dry season. “Black fish” are caught throughout the year, but especially in the dry season.

2.2.5 Fishing locations

In the Central zone of Viet Nam, the 50 m. depth line is used to distinguish between inshore and offshore, while the 30 m. line is used in the North and the South. The overall majority of marine catches (i.e. 75%) are from inshore areas.

2.2.6 Landing locations

Marine fish are landed throughout the country, but major ports are located at Cat Ba, Cua Hoi, Xuan Pho, Song Gianh, Thuan Phuoc , Phan Thiet, Con Dao, Tac Cau, Ca Mau, and Tran De.

2.2.7 Socio-economic categories of fisherman

Marine Fisheries

The fishing sector in Vietnam has a history of centuries of operations with fish flowing inland from landing places along the coast of Vietnam. According to a recent FAO studies on fish marketing in marine fisheries and aquaculture, fishers have spent about 20 years on average in fisheries capture (>10 years, 71%). Their long experience in fishing ensures good awareness of the business regarding various aspects including fishing techniques and marketing.

In general, the fishers specialize in capture fisheries in the sea. It is found that about 86% of the fishers mainly lived on capture fisheries, which constituted more than 75% of the income of fishing households. The study also shows that 42.3% of the fishers surveyed did not engage in any activity beyond catching fish. The remaining proportion of the fishers may engage in various economic activities such as small trading, aquaculture, agriculture, boat repairing service. Small trading was the most preferable additional activity carried out. This is common in most of the households of fishers since during fishing trips women are often left at home and choose small trading as additional occupation.

The degree of specialization in capture fisheries is somehow higher in the north than in the other regions. The survey shows that 67.6% of the fishers did not have any other activity. The strong specialization is confirmed by the fact that 98.4% of the fishers have more than 75% of the total income from fisheries capture.

Among the fishers surveyed most were organized at household level, which accounted for 87% of the total. The remaining types of fishers were organized either in enterprises (private and state-owned) or joint capital groups or cooperatives. Fishing cooperatives are formed and operate according to the Law of Cooperatives. Organized in cooperatives, fishers may have higher investment, higher capability of off-shore fishing and marketing. Fishing cooperatives may consist of 12 to 100 members. Unlike the cooperative, the joint capital group is normally the aggregation of several fishing households ranging from 2 to 12 households. The group has less favourable status as compared to the fishing co-operative especially in credit accessibility.

Since 2001, under the National Target Program on Off-shore Fishing Development, the fleet of off-shore fishing boats is increasing. The definition of near shore and off-shore fishing is determined by the water depth of the sea where fishing beyond 30 m deep (for the central region 50 m deep) is defined as off-shore fishing. From the

study, 66.7% of the fishers go fishing off-shore. Therefore, it takes more than 17 hours on average for a boat to reach fishing grounds. Normally, a fishing trip lasts for 14.5 days. This reveals that it takes around 10 days for the fish caught to be landed. Therefore, the quality of fish may deteriorate unless effective preservation methods are taken.

In general, after landing the catch is sold directly to fish traders. However, 25% of the fishers reported that they took a small proportion of the catch (from 5 to 10%) for other purposes such as home consumption, gifts, or paying salary to their hired labourers as in-kind payment. Notably, 44.2% of the fishers reported that they processed fish before selling. It is also reported that 79.9% of the fishers could keep several species alive to sell at much higher price compared to the same species sold in the form of fresh fish. The main species which are often kept alive are grouper, mackerel, swimming crab and lobster. However, the proportion of live products was often below 20% of the total catch per trip.

Demographic characteristics of fishers:

- Gender of fishers: Male 84%, female 16%; it is interesting to note that about 1/6 of the fishers i.e. owners, operators and/or managers of fishing boats and enterprises included in the sample are women; this shows that women are actually participating in Vietnam's capture fisheries on a significant scale;
- Age of fishers by gender: The most common age bracket of fishers, both women and men, is the age category 41 to 50 years. Other important age groups, both in the case of men and of women, are the age brackets 31- 40 and 51- 60 years. Gender specific differences regarding age do not seem to be significant.
- Education of fishers by gender: Primary education is the most common educational level of both female and male fishers. The second most common educational level is lower secondary education followed by upper secondary education. Illiteracy is rare among male fishers and less rare though among female fishers. When comparing the educational level of both female and male fishers, it can be observed that the educational level of female fishers is lower than that of their male counterparts.
- With regard to the relevance of these demographic findings on gender, age and educational levels of fishers to their capacity to make use of institutional credit facilities and comply with application and documentation procedures, it can be concluded that fishers are probably sufficiently educated to read and understand loan contracts and conditions as well as loan disbursement and repayment schedules. They should also be able to manage their fishing enterprises as far as the necessary reading, writing and basic arithmetic skills are concerned.
- As far as gender is concerned, financial institutions should be aware when appraising loan applications that fishing in Vietnam is not an exclusively male dominated activity and that there is a substantial number of women, who manage, own and/or operate fishing boats and enterprises. Thus, public and private financial institutions should make sure that women also benefit from credit programmes for capture fisheries in Vietnam.

Occupational characteristics of fishers:

- Fishing seems to be the by far most important source of income for the fisher households interviewed during the survey. 61% of all households derived their entire income from fishing. Only 4.5% earned less than 40% of their entire household income from fishing. These findings also suggest that the

households covered by the study, with few exceptions, are full-time or major-time fishing households.

- Another important occupational characteristic is the type of ownership in a particular enterprise. Five main types of ownership are distinguished i.e. ownership by a private household, by a private enterprise, by a group, by a state owned enterprise and ownership by a cooperative. Table 5 shows that the vast majority of fishing enterprises covered by the study are owned by private households.
- Only 6 % and 5 % of the fishing enterprises, respectively, are owned by private enterprises and groups. Less than two percent of the sample consists of fishing vessels owned by state owned enterprises and cooperatives. The data suggest that about half of the fishers included in the sample own and operate inshore fishing vessels of less than 80 horsepower. 30 % of the respondents own fishing boats of less than 45 HP, which are most common in Vietnam and account for 85% of all motorised fishing vessels in Vietnam, which again account for 2/3 of all fishing vessels, the remaining ones being non-motorised vessels. The vessels of less than 45 HP also include some inland fishing vessels with 50 – 80 HP. These constitute the most catch efficient segment of Vietnam's inshore marine capture fisheries sector.
- Fishing boats with a capacity from 90 – 135 HP and 140 – 390 HP fall under the category of off-shore fishing boats and 9 % and 34 % respectively of the respondents are owners and operators of these types of vessels. Fishing vessels with more than 400 HP engine capacity are capable of deep sea fishing operations. 8% of the fishing vessels owned by the respondents fall under this category.

Inland Fisheries

The great majority of inland fishers are small-scale. Fishing for subsistence plays a role in almost all cases. The importance of fishing for income is highly variable, and family-specific.

Traditionally, the freshwater bodies provided livelihood for a large portion of villagers who lived on freshwater fishing. It is being said that, at present, the number of dependents on the freshwater bodies is decreasing since the fishing effort is also decreasing due to over-fishing and excessive pollution of the water environment. However, freshwater bodies still play a significant role in supplying fish to specific regions of Vietnam such as the Central Highlands, some northern mountainous areas along the Red River system and several reservoirs. Most of the species caught from the freshwater bodies are the most preferred by consumers, including catfish, snakehead, common carp, major carp and major carps.

During recent years management practices of freshwater fishing have changed. In most freshwater bodies, free fishing is no longer permitted. The user right of the water surface is gradually assigned to different individuals or organizations. Freshwater fishing is also transformed into freshwater aquaculture or cage culture. In the province of Daklak in the Central Highlands, most of the reservoirs have been assigned to state-owned enterprises as long-term leases. These enterprises are responsible for making use of the water surface. In the province of An Giang in the south, in most rivers and canals free fishing is prohibited so as to encourage and protect cage culture along the water bodies.

In general, freshwater fishers operate at household level. They do often use family labour and hired labour as necessary for their business. The fishing trip often lasts no longer than a day. They go fishing around 22 days per month. The catch per day ranges from several kilograms to hundred kg.

Aquaculture

Aquaculture plays an important role in the rural economy where a large proportion of rural villagers live on the primary sector. Traditionally, aquaculture was not seen as an economic sector, as it mostly provided fish for household consumption and subsistence. Recently aquaculture has become a profitable occupation that strongly contributes to rural family's income. From the recent FAO survey on marketing and credit needs, it is found that around half (49%) of the fish farmers had as their main income source aquaculture, which accounted for more than 75% of their total income.

It is convenient to divide the aquaculture sector in Vietnam into two types of culture: The traditional aquaculture is in the freshwater environment, while the modern, intensive aquaculture mostly operates in brackish or marine waters. Among the fish farmers surveyed, 43.4% of them were brackish or marine fish farmers. The distribution of the marine farmers was mostly in central region and the south of Vietnam. This is consistent with the current situation of aquaculture in the regions, where the north has a less important role with 61.3% of the farmers undertaking improved extensive aquaculture (this figure was much lower in the other regions).

Findings show that aquaculture is rather new to fish farmers in the country. Compared to those working in marine capture, the proportion of farmers which had more than 10 years of experience is much lower at only 15%. Basically, fish farmers are the newcomers, in which 35% had less than 3 years of experience. The large number of the newcomers to the industry has caused various problems as experienced shrimp farmers criticized and complained; especially problems related to farming techniques, disease control and prevention, and market competition.

Similar to the case of the fishers, most fish farmers (94%) were running at household level. A few cases in the survey were operating in private or state-owned enterprises. Notably, it is found that 5% of the fish farmers were operating in the form of joint-capital groups from 2 to 10 share holders. In this way fish farmers could accumulate resources and invest in the business for quick expansion.

The survey shows that the contribution of aquaculture products to the industry is still limited. More than half of the processors (55.2%) did not use aquaculture products as raw materials for their production. They relied very much on products from marine capture. However, aquaculture products still played an important role in inland areas where access to marine species and products is limited. Large consumers were the agents that consumed more aquaculture products than the others; only 15.8% of the establishments did not use aquaculture products.

Demographic characteristics of fish farmers

- Gender of fish farmers: Fish farming is predominantly carried out by men. Women account for less than 10 % of fish farmers. Different from what might generally be assumed, this is lower than women's participation in capture fisheries in Vietnam.
- Age of fish farmers by gender: As in the case of fishers, the most common age bracket of fish farmers included in the sample, both women and men, is the age category of 41 to 50 years. Other important age groups, both in the case of men and of women, are the age brackets 31- 40 and 51- 60 years.
- In the sample selected for the study, male fish farmers show a significant higher educational level than fishers. Lower and upper secondary education is the most common educational level of male fish farmers. When comparing the educational level of both female and male fishers, it can be observed that the educational level of female fishers is lower than that of their male counterparts.

Illiteracy is rare among male fish farmers though less rare among female fish farmers.

Occupational characteristics of fish farmers

- In most households included in the fish farmer sub-sample, fish farming accounts for the major share of the total income of the household. For almost 2/3 of the households, it account from 61 % to 100 % of all household income. As we have seen in the previous chapter, the income derived from capture fisheries was an even more important source of household income.
- Fish farmers operate almost exclusively on the level of private households, 5 % of the fish farmers interviewed carry out this economic activity together with others as a group.
- As far as the scale and type of operation is concerned, information is provided on the total pond area and number of ponds owned by the farmers, the area used for fish culture as well as on the expenditure incurred.
- The size of pond area owned by the fish farmers in the sample shows a wide variation, ranging from ponds as small as 150 m² to pond areas as large as 3 500 000. The most common size of ponds (owned by about one fifth of the fish farmers is the range from 10,000 to 24,000 m². One fifth of all fish farmers own ponds smaller than 2,500 m². Almost one tenth of farmers own large ponds from 100,000 to 700,000 m² while very few (3 %) respondents own very large ponds in the range from 1,000,000 m² to 3,500,000 m².
- When comparing the total pond area with the pond area used for fish farming, it becomes clear that almost all the pond area owned by the fish farmers in the sample is used for fish farming and very little is kept idle or is exclusively used for other purposes.
- In terms of the number of ponds owned per fish farming household, about half of the sub-sample owns just one pond. About one fourth own two ponds and 13 % of the fish farming households own three ponds. A few households i.e. four percent own a large number of ponds ranging from seven to as many as seventy-three ponds.

Labour and employment

In aquaculture around half of the labour force is self supplied from fish farmers, while the majority of the labour force under the fishers is hired. From a gender perspective, it is found that fishers are not using female labourers; only 1.39% of the total hired labour force is women. Women are not allowed to be onboard during fishing trips. They are employed in inland fisheries for preparation of materials (water, salt, ice, food, fishing gears) for a fishing trip, or sorting fish species, or selling fish. Women are especially involved in fish wholesaling, retailing, and processing, in which the majority of the labour force is female. Women play much more important roles in fish marketing and processing rather than fish production. In the Mekong River Delta, fish trading is women's work, representing 89.4% of intermediaries in the market. The fishing industry not only creates employment for the rural labourers but also generates income for large proportions of the rural population through seasonal employment.

2.2.8 Socio-economic value of fisheries

Compared to aquaculture, fishing contributes substantially to total fisheries production. In 2000, its output was 1.66 million MT, accounted for 74% in terms of quantity and 64% in terms of value. In 2000, total output value of fisheries sector was 21,777.4 billion VND at 1994 constant prices. Mostly fish amounting to 1.08 million MT, accounting for 65% of the total quantity captured.

Fresh water fish is the main source of animal protein for the population of the Mekong delta and many other parts of the country. In the Central Highlands, it is the cheapest source of animal protein. In the Mekong Delta, between 5% and 10% of the household heads are full-time fishers and over 50% are part-time fishers.

Inland capture fisheries and rice are the basis of food security for the rural population in the Lower Mekong Basin. Fish is the single most important source of animal protein and rice, in the form of carbohydrates, the most important source of energy. With a total inland fisheries production from wild capture fisheries, reservoir and aquaculture of approximately two million tonnes (and given approximately 60 million inhabitants), the average per capita fish consumption surpasses 30 kg per year. Exports and import of marine fish into the Basin add to the ambiguity of this figure but hardly change its magnitude.

The role of fish as the most important source of animal protein in Southeast Asia goes undisputed. Many species have a high content of vitamin A. This is needed to prevent and treat a widespread deficiency causing eye infections and blindness among a high number of people in the region. Particularly, the eyes and entrails of certain species are high in vitamin A. Identification of species most suited as sources of vitamin A are still ongoing. Fish are also an important source of iron and zinc. Other wetland species including frogs, crabs and edible insects are less well known as a source of nutrition.

2.3 The Fisheries and other stakeholders

Besides capture, varying proportions of the population are involved with processing, sales, and related labour to support the fishery.

2.4 Management control measures

In Viet Nam, the fresh water fisheries in the Mekong Delta and elsewhere are regulated through a Fisheries Law that focuses primarily on marine fisheries. The Ministry of Fisheries is the national authority responsible for fisheries management, including the development and formulation of policies for the fisheries sector. However, at the operational level, provincial, district and commune level People's Committees make policy decisions. Management intervention with inland capture fisheries has traditionally been minimal.

Access to wild fisheries tends to be open. Bag net fishers need permission from commune authorities and have to pay an annual tax. Poisoning, blasting, and electrofishing are banned, but in general, enforcement is not very effective.

However, already since the early 1990's, there seems to be a tendency in the utilization of some coastal and inland ecosystems and habitats to initiate a process of moving from an open-access, type of fisheries to a carefully manage and supervised people's fisheries in line with the intent and purpose of the overriding policy guideline of the Government.

In reservoirs, stocking by government proved not very cost-effective, but in smaller reservoirs, individuals or groups have been more effective in managing stocking programs. Normally, an annual fee is paid to the concerned local authorities. In larger reservoirs, the fishery tends to depend more on wild fish.

In December 2003 a new Fisheries Law was proclaimed, which will enter in force on 1 July 2004. Important articles regarding questions of interest to this report are:

Article 8: Conservation, protection, rehabilitation and development of fisheries resources. This article relates to policies on resource conservation and protection; and to fishing regulations to be proclaimed by MOFI. Under para 4 it states: "In case

of necessity and with the acceptance of Ministry of Fisheries, the People's Committees of provinces and cities under central level (hereinafter referred to as "provincial People's Committee") shall proclaim the supplement to the regulations made in paragraph 3 of this Article to make it suitable with practical fishing operations in their provinces."

Article 15: Management of fishing grounds. Para 3: "The provincial People's Committees shall have responsibility to issue rules of fishing grounds in rivers, lakes, lagoons and other natural waters under its jurisdiction in accordance with guidance of Ministry of Fisheries; shall organize and promote the local residents to take part in monitoring, detection and prosecution of any violations committed to fisheries activities in fishing grounds."

Article 16: Fishing license. Para 1: "Organizations and individuals engaged in fishing operations shall hold fishing licenses except the individuals fishing by fishing vessels with tonnage smaller than 0,5 tons or not using fishing vessels."

Article 19: Fishing report and logbook. Stipulates the following responsibilities with regard to reporting and information sharing:

1. Organizations and individuals who hold fishing licenses shall make fishing report to fisheries management agencies located in place where the fishing vessels are registered.
2. Regarding the type of fishing vessels which requires the master degree, the master of that type of fishing vessel shall be responsible for recording a logbook while fishing.
3. The Ministry of Fisheries shall issue the form and content of logbook and its management regime as well as the report regime and its content.

2.5 Fish disposal

The bulk of fish catches taken by small-scale farmers and fishers are consumed locally or traded fresh at village, district or provincial markets. Storage time from catch to consumption is short and usually little or no ice is used or needed. Some of the more robust species are marketed live. Ice is in widespread use in southern Viet Nam for storage and for transport to large cities. With the growth of towns and the development of transport infrastructure, the use of ice is expected to expand.

Domestic markets are the most important. Fish species in the Mekong, as in other parts of the world, are often particular to a river basin and little known elsewhere. This limits their export potential. Other species, the sand goby for example, are widely known and highly priced in Asia and have a huge export market in Singapore and Hong Kong. Tilapia may, as an internationally known species, have market potential outside the region, but as it is not a highly priced species, the transport costs may be a limiting factor. River catfishes (*Pangasius* spp) from Viet Nam are one of the few local species groups to find an export market, mainly in countries where Vietnamese immigrants have settled. Recently, a considerable export market has developed in the USA where the marketing of catfish from the Mekong seems to have benefited from the already established market for the American catfish.

There is considerable trade in fish within the Mekong Basin and its neighbouring catchments. Fresh fish from the Great Lake Tonle Sap in Cambodia is exported to Thailand in large quantities. River fish, including river catfish juveniles for cultured grow-out, are finding their way from Cambodia southwards into Viet Nam. A lively trade is taking place between Thailand and Lao PDR, with Lao traders sending high valued species over the river to Thailand, receiving in exchange tilapia and other species. *Pra hok*, the fermented fish product from Cambodia, is highly valued in large

parts of Thailand and is exported together with some high quality dried fish products. The quantities traded across regional borders are not included in national statistics.

In a recent marketing study it was found that fish marketing is very simple. 57% of the fishers sold their products to local wholesalers, a few sold to local retailers. However, approximately half (47.6%) of the fishers often acted as retailers to sell fish directly to final consumers in local markets.

Marketing Channels for Products from Capture Fisheries

Figure 3 shows that the channel of fishers => wholesalers => processors => export is the main one, since 90% of the captured products sold to fish wholesaler, the 62.1% running from wholesalers to fish processors, from which 93.6% of the products are for the export market. In the context of the fish capture sector, it indicates that the export market plays an important role in absorbing the fish products, while the domestic market has less importance for the development of capture fisheries.

For the domestic market, the fish channel through the wholesaler is the major one. Very few fish products reach the final consumers or retailers directly. In supplying fish to consumers, the fish retailer is the main market operator. Therefore, the channel from fishers => wholesaler => retailer => consumers is the main one for the domestic market.

Marketing Channels for Aquaculture Products

Similar to the case of products from capture fisheries for the export market, the channels from fish farmers => wholesaler => processor => export, and for the domestic market with the channel from fishers => wholesaler => retailer => consumers are the main ones. However, the market channel to the export market was shortened by the access of processors to fish farmers. The fish farmers sold 32.6% of their products to the processors, along with another 52.2% of the products to the wholesalers. This is the linkage between the processors and the fish farmers in mobilizing raw materials for processing. In reality, the linkage here can be explained as one kind of contract farming practices that ensure the fish farmers of the products being sold, and the processors of the raw materials being available.

Similarly, the marketing channel for domestic market is also shortened somehow by the access of retailers to fish farmers, who operate almost everywhere in the country. The channel through retailers could be one of the shortest possible channels to ensure fresh fish products to consumers.

Compared to the fish farmers, fishers are in a weaker position to fish selling since once the fish products are caught, preservation and storage costs incur, the longer the time before sales after the catch, the higher the costs incurred and the higher the risk of loss. Therefore, once fishing boat is landed, fishers may have to sell off all of the catch as soon as possible. Sometimes, there are so many boats landed at the same time that the total supply is very large and fish prices may go down due to pressure caused by fish traders. In Ca Mau and Kien Giang provinces cases were reported when fishers had to accept sale on commission with an unspecified price to be determined later following onward selling.

It is necessary to establish a firm coordination between fishers and inland markets in order to ensure a smooth flow of fish products to the inland consumers. Better fish marketing facilities including storage and transportation would help to improve the situation.

Fish wholesalers are diverse in forms and operations. With regard to inland aquaculture, fish wholesalers are usually multifunctional, who come directly to fish farms and sell directly to fish retailers or other traders right at fish ponds of the fish

farmers. In general, the multifunctional wholesalers have a very close relationship with both fish farmers and fish retailers. They may set up their own soft loan packages or provision of inputs like feeds and fingerlings to assist farmers. In return, they have a stable source of fish products for their business. The operation of the multifunctional wholesalers is effective as perceived by the fish farmers in Hanoi city. However, the fish retailers or other traders may be linked to several single wholesalers, whose products may be seasonal or limited to some specific products, which constraints the choices of the fish retailers. Therefore, it is possible that a specific fish product may be available in one market, but not in another market nearby.

For marine capture fisheries first fish wholesalers primarily operate at fish landing places. Similar to the multifunctional wholesalers, the first wholesalers has close relationship with fishers. The catch by fishers may be relatively stable over time; however, the purchasing capability of the first fish wholesalers is very much dependent on the absorption capacity of the inland market, (final consumption and processing). Therefore, access of the first fish wholesalers to inland markets is critical to improve marketing of the catch of the fishers.

The responses to the question “what are the three main difficulties you have encountered in selling your catch?”, show first that about half of the replies of the interviewed fishers in the north indicate no such problems. However, low prices and fluctuation of prices are frequently mentioned as problems, more so in central and southern Vietnam where lack of market information is seen as another major problem. The lack of product collection services are referred to in central and southern Vietnam whereas poor infrastructure is indicated in the centre and the north of the country. Only a fifth of the replies of the fish farmers indicate “no problems” (all in the north) whereas unstable and low prices are mentioned most frequently as the main problem in selling products along with lack of market information. To a lesser extent (one fifth to a third of the replies identify the limited number of buyers and no or low local demand as main obstacles. These are indicated somewhat more frequently in central Vietnam than in the rest of the country. Wholesalers in the north mention capital shortage, poor infrastructure and low selling prices as the main difficulties in current business: low selling prices, high prices of raw material and high competition are the main factors mentioned by the wholesalers in central Vietnam and capital shortage, high competition, poor infrastructure and low selling prices by those in the south.

Summing up the main difficulties it may be concluded that the producers identify prices and lack of market information as the main obstacles preventing them from doing better business. Selling and purchasing prices combined with strong competition, capital shortage and poor infrastructure are the concerns most frequently mentioned by wholesalers; this is similar to the situation described by processors which however, also point to unstable raw material supply and lack of output markets. Prices and competition are negatively perceived factors by retailers, together with shortage of capital, too many taxes and poor infrastructure.

The complementary questions “What are the three main expectations to improve your product marketing” (or “current business” in the case of the traders and processors)? show that fishers count very much on price and market information (three quarters of the replies, very high numbers in the centre and still above 50% in the north). Other improvements are expected from the establishment of fish collection services and fish wholesale markets as well as selling under contracts. The preferences expressed by fish farmers follow a similar pattern; however, there is no mention of fish collection but the availability of suitable policy is expected by two thirds of replies. On the whole, stability of supplies and technical and market

information are the main aspects considered necessary for improving business of the operators.

Figure 4: Marketing Channels for Capture Fisheries

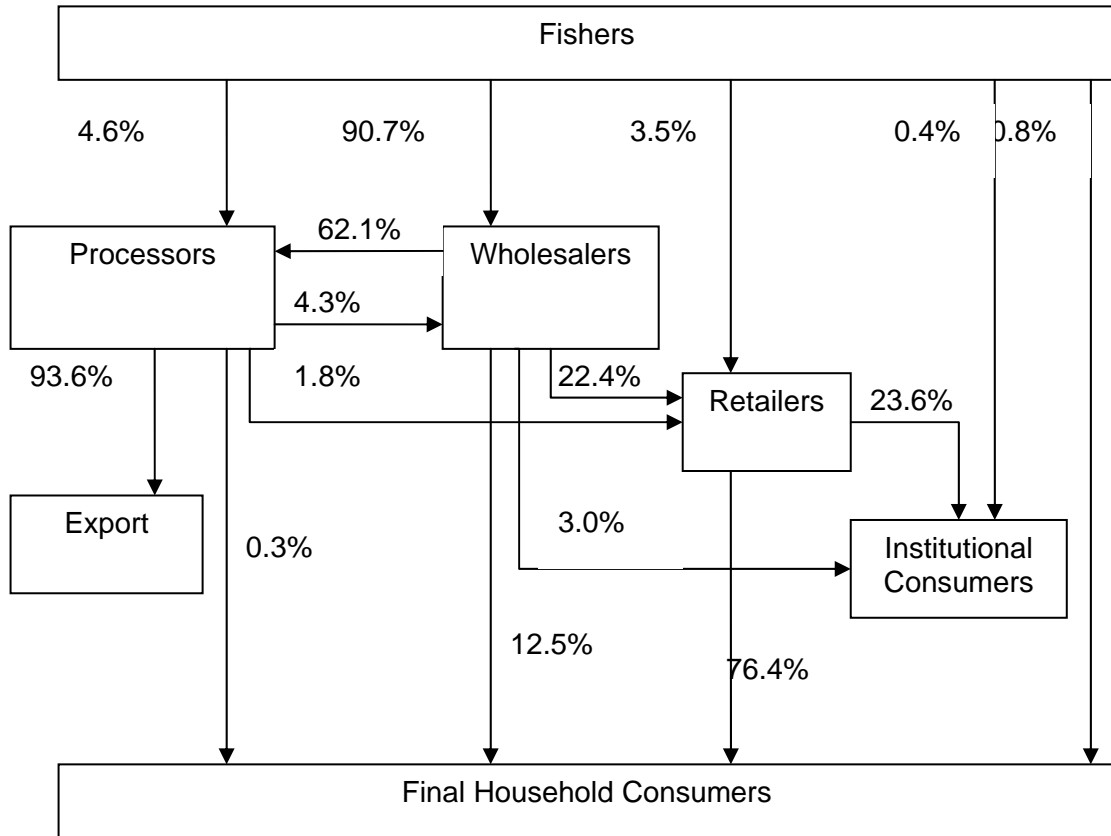
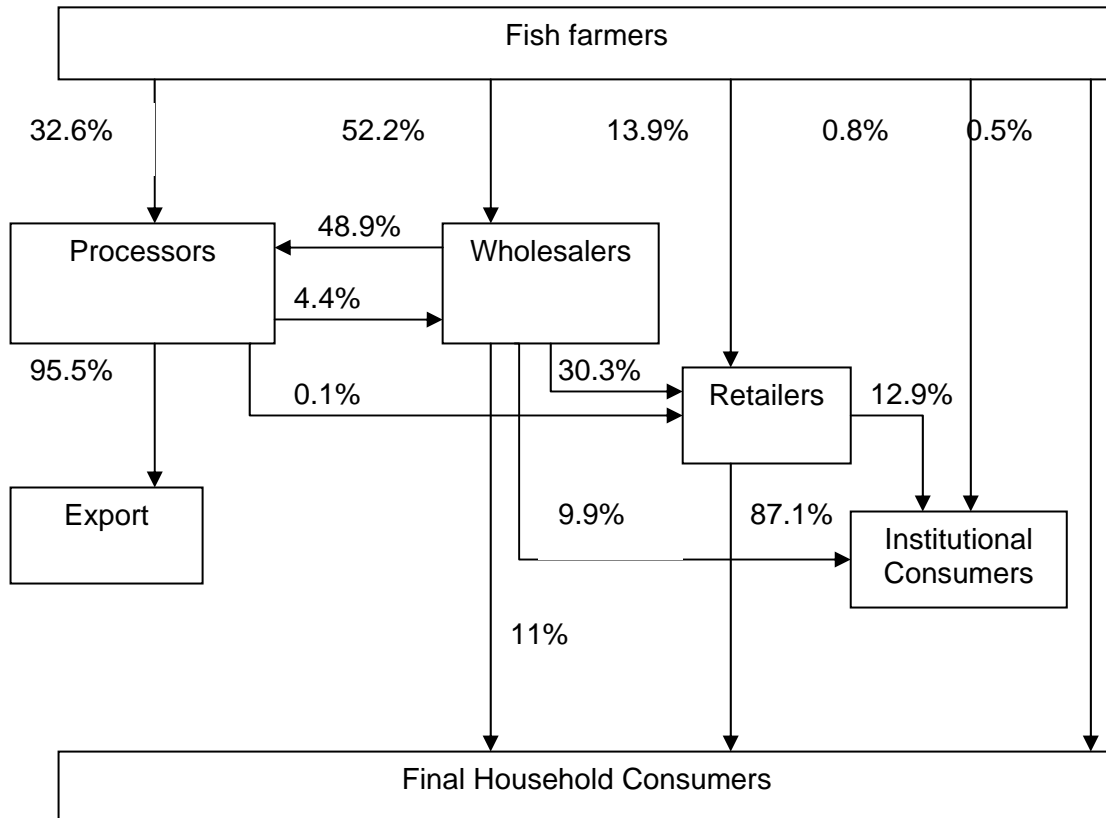


Figure 5: Marketing Channels for Farmed Fish



3. Identification of data and information requirements

3.1 Details of management plans

In addition, a Fisheries Development Program has been specified in the Fisheries Development Strategy Period 2000-2010 (Fisheries master Plan?) of the MOFI, which has three economic target programs namely Programs on Off-shore Fishing, Aquaculture Development and Fisheries Export Development.

Major Targets for Fisheries Development in the future:

It is planned that by 2005 the country's export turn-over would reach US\$2.7 to 3 billion per year. At that time, the total fisheries production would be 2.55 million MT, of which 1.4 million MT would be contributed from capture fisheries and the rest of 1.15 million MT from aquaculture.

In order to achieve the targets, total area under aquaculture would increase to 1.4 million ha, of which 300,000 ha would have been transformed from rice culture to aquaculture. For capture fisheries, it is planned that 30 new fishing ports would be built and preservation technology used by fishers could be upgraded (VNS, 2001). Aquaculture development would also benefit from a Policy Promoting Contract Farming proclaimed in 2002. This policy encourages enterprises in all economic sectors to have farming contracts with farmers in order to have a stable link of farm commodity with processing and marketing activities for the sake of sustainable farm development.

According to Report No. 3 on Domestic Market under Sub-Project 3 of the Master Plan Project for Viet Nam Fisheries, in the period of 1985-1995 no specific laws and regulations dealing with the domestic fisheries market have been issued. Domestic fisheries market is under the control of general economic policies, laws and regulations of the nation. However, recently, national policies and regulations have been issued in order to promote domestic marketing along with the development of fisheries sector as a key economic sector.

In order to promote export of fisheries products and assist fisheries exporters to integrate with regional and global markets, the Viet Nam Association of Seafood Exporters and Processors (VASEP) was established in 1998. For the domestic market, attention has been directed towards the improvement of the market network. MOFI has policies encouraging development of fish wholesale markets or transaction centres. Up to now, a fisheries transaction centre has been established in Ho Chi Minh City, and the other two are planned for Khanh Hoa and Ben Tre provinces. Moreover, under the assistance of the ADB, 17 key fishing ports nation-wide have been improved with provision of basic logistics for fishing and fish trading on-shore. Recently, the Government of Viet Nam has established a policy of promoting contract farming in order to link production with marketing and processing activities. The following paragraphs present some key points of the development policies for the fisheries sector.

The evidence suggests that the inland capture fisheries in Viet Nam, particularly in the lower Mekong River, are worth sustaining. But Viet Nam, in common with many countries, is certainly making an error of judgement by assuming that its inland capture fisheries cannot be improved. Evidence from Myanmar in this report, and experiences elsewhere, conclusively show the substantial benefits that can accrue by applying cost-effective enhancement techniques to such fisheries (through better management of the environment and/or stocking). There is much scope for such techniques to be applied to river fisheries in Viet Nam, particularly since most of the

environments are already under substantial management. In common with most countries in the lower Mekong basin, Viet Nam has yet to adopt closer co-ordination of water and fisheries management activities to optimise resource utilisation for which will require improved statistics and information.

Program on Development of Fisheries Export to the year 2005. The objectives of the program are as follows: hasten the progress of industrialization and modernization in Viet Nam's Fisheries sector; increase fisheries export value in order to reach US\$1.1 billion by the year 2000 and US\$2 billion by the year 2005; make fisheries sector a key economic sector of Viet Nam's economy; create more jobs, contribute to improve people's life, put a new face to rural areas and coastal regions, and solve questions on environment and ecology; connect closely fisheries export with aquaculture, fishing, preservation and consumption of products; create firm bases for fisheries production and effective exploitation of fisheries potential; improve quality of fisheries products, reduce production costs, increase efficiency and capital accumulation for reproduction, and improve competitive capability and expand markets for Viet Nam's fisheries products.

3.2 Management objectives

National overall objective: To effectively contribute to the improvement of the national economy and the social and socioeconomic conditions of the people.

Major development programme are:

- Usage of the environment and fisheries resources.
- Industry structure, trade and enterprise support.
- Rationalization and growth in marine fisheries.
- Accelerating growth in aquaculture industries.
- Providing basic infrastructures to support fisheries.
- Institutional strengthening and capacity-building.

Fisheries Development Strategy Period 2000-2010 of the MOFI, which has three economic target programs namely Programs on Off-shore Fishing, Aquaculture Development and Fisheries Export Development.

3.3 Decision-making methods for each management objective

Domestic fisheries market is under the control of general economic policies, laws and regulations of the nation. However, recently, national policies and regulations have been issued in order to promote domestic marketing along with the development of fisheries sector as a key economic sector. The state's role in decision-making and the delegation of certain decision-making responsibilities to People's Committees on all levels is part of the new Fisheries Law (see above).

3.4 Requirements for policy and development planning

Regarding fisheries in the LMB, in general, researchers now have a reasonable understanding of the Mekong Basin ecology. However, there are certain gaps in our knowledge that remain to be filled.

Understanding the sub-populations and to what degree they overlap is crucial for the delineation of management units (stocks). For many of the species studied it has been possible to hypothesise the existence of sub-populations at least on a basin-

scale. One method that could be used to clarify this issue is population genetics research. This should be considered a priority.

For certain species (e.g. the river catfishes) little is known about spawning sites or spawning behaviour. Some are believed to spawn in deep sections of river channels.

Inter-connectivity of essential habitats is not well known especially for the long-distance migrants where spawning areas can be very distant from nursery areas. Knowledge of adult migrations is increasing, but larval and fry migration studies have begun only recently. Quantitative data on fisheries yield by species and by habitat is required. Although more and better information now exists on the total fisheries yield of the Mekong system, there are very few quantitative data by species and by habitat.

Economic valuation is still limited. There is little reliable information on the size and value of exports, in particular the relationship between fish yields (by species) and habitat types. Better understanding of such relationships will be crucial in implementing measures for habitat protection.

Macro-habitat requirements are known for a few species in broad categories such as floodplain habitats and deep pools. However, micro-habitat requirements are unknown for most species. For example, even if it is known that a certain species lives in deep pool habitats during the dry season, the habitat features that the species require within the deep pool (type of substrate, vegetation, depth, slopes, current etc.) are unknown. Such micro-habitat requirements determine types of pools certain fishes prefer and indirectly determine other ecological characteristics including migration patterns.

Feeding biology for most species is related to the micro-habitat issue since availability of food (for example on the floodplain) determines the preferred floodplain micro-habitat.

There is a need for detailed socio-economic studies on the functioning and resilience of traditional fisheries management systems, as well as the functioning of co-management fishery systems recently established by local initiatives.

More information is needed on the trade of fish and fish products within the Basin and exports and imports to and from the Basin. More information on species interactions and inter-relationships is needed.

There may be an opportunity for improved integrated planning between capture fisheries and other sectors, especially aquaculture. As natural resources come under stricter management control, the borders between culture and capture fisheries become blurred or non-existent. This is especially so as capture fisheries become enhanced through culture-based activities (stocking). It would be unproductive to sustain a continued and artificial division between these two sectors when joint planning could improve the circumstances under which various forms of aquaculture might be promoted in a region where capture based activities will remain dominant for the foreseeable future. One of the major threats to sustaining capture fisheries is environmental degradation arising from the activities of other sectors. Better governance is the only solution and has to include better approaches to integrated planning for natural resources management. Achieving this goal will not be easy. Worldwide, those sectors (or indeed countries) have tended to separate resources in river basins, particularly water, through unilateral planning. This has generally left downstream users to deal with problems caused upstream, with fisheries being at the bottom of the hierarchy of influence. Until recently this has been the trend in the Mekong region but there are encouraging signs that things are changing and real opportunities are emerging.

An example is the Mekong Agreement of 1995 including subsequent strategic plans whereby four countries of the Lower Basin pledge to develop the Basin with sustainable livelihoods, poverty reduction and maintaining ecosystem integrity as cornerstones of development. Recent recommendations by the World Commission on Dams promote similar principles for dam planning. Notably, this was prompted largely by documented impacts of dams on fisheries (see box "Some impacts of a dam on the Mekong fisheries"). However, there remains much to be done at the technical level in terms of implementing these and related principles. The developed world has few examples of how to sustain river ecosystems. However, much attention has recently been given to river ecosystem restoration, which, in essence, is natural resources planning in reverse. Working technologies are now emerging including integrated aquatic resources management planning, which may have significant potential use in the Mekong.

Two developments could significantly reduce or even eliminate the constraints. First, the true value of water should be reflected in costing development activities. This would force development planners to factor into project design consideration of the impacts of their activities on other water users. Second, existing water resources users (including users of wetlands) should be given legal rights over their use. These changes would significantly improve the rational economic base for decision making in natural resource allocation. For political reasons, neither is likely to occur in the near future. However, legal rights for users is well established for river fisheries in developed countries (mainly for recreational uses which have very high economic value) and has been responsible for halting, in some cases reversing, the harmful impacts of other resource users.

3.5 International reporting responsibilities

The following information is provided to FAO:

- Fisheries characteristics such as the number of fishers, boats, etc.;
- Annual fish production throughout the country including exports and imports and their value, etc.;
- Fleet statistics (total catch, fish processing, fishing grounds, etc.);
- Employment statistics for full- and part-time fishers as well as occasional workers in the fisheries sector;
- Current fisheries management.

However, as Coates (2002) described, at least with regards to national inland capture fisheries statistics, they do not include all available provincial information; or, more likely, the information is not reported to national authorities.

Viet Nam has joined the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) in 1994, and has made a declaration to be bound to the provisions of CITES. Its status is that of a country in "accession". As such, like any other member country, it is required to annual report data on the trade of species listed by CITES, such as the number and types of permits and certificates granted, the size and sex of specimens in questions, etc. However, the extent in which it is actually providing such data is not known.

Viet Nam ratified the Convention on Biological Diversity (CBD) in 1994. Concerning the data and information requirement in order to meet the objective of CBD, the following should be collected: Physical environment; Species lifecycles, abundance and distribution in time and space; Biological diversity abundance; Ecosystem aspects; How to manage in order to maintain biological diversity? How is the current

biological diversity, including successes and failures? However, to what extent it actually provides this data is not known.

3.6 Support community-based fisheries

Information on markets and seed fish sources (especially good quality seed fish sources) was widely identified as desirable by organized fishers in Dak Lak. More technical support is also desirable, as is information on the returns from stocking efforts. Some of this information, but not all, can or should come from self-monitoring.

3.7 Coordination and evaluation of co-management activities

The following data are required:

- Yield and value of fish from the co-managed fishery.
- Frequency of fisheries violations.
- Indicators of living standards of fishing families
- Level of satisfaction with co-management by all stakeholders

4. Data collection tools, sources and methods

4.1 Existing

Sverdrup-Jensen, Coates and Visser (unpublished report of a trip in 1996) found the fishery statistics collection system in Viet Nam to be very unclear. It has continued to prove difficult to establish exactly how statistics are collected. One reason for this is that there is a large degree of delegation of the statistical system to provinces and it can be challenging to establish exactly what is happening at that level. In provinces where a Department of Fisheries exists it is responsible for collection and processing of information on fisheries production at the district and village/community levels. This information is heavily biased towards aquaculture statistics. Out of a total of 53 provinces, 23 have a Department of Fisheries including all provinces in the Mekong delta. In general, most provinces now have fisheries extension offices but for inland areas these mainly service aquaculture. In other provinces, staff of the Department of Agriculture and Rural Development will collect the information on fisheries via their staff employed at district level and report directly to the Ministry of Fisheries (MoF), Department of Planning and Investment, in Hanoi. Provinces are requested to report every 3 months and produce a yearly report on the total area and total production. Only a limited number of species are distinguished, in particular, shrimps/prawns, marine crabs, *Gracilaria* spp. and a number of commercial fin-fish (in particular snakeheads and Pangasiid catfishes), which have export potential. All other production (culture or capture) is lumped together and reported simply as “freshwater fish”. Since production figures are used as a basis for government revenue and tax it might be expected that this system results in a certain bias in reporting.

The Ministry of Fisheries has no budget to collect their own data and rely entirely on the data supplied by provincial offices. An independent (parallel) system is in place through the General Statistics Office (GSO). This office has, since 1994, mobilised people at community level to ascertain, amongst other things, the total production area and the average production per production method by means of a sample. Again the bias is towards aquaculture. There seems to be some communication at different levels between the two systems, although it is admitted that this co-operation is far from optimal.

There is a licensing system in place for fishing in the larger reservoirs. Licensing systems also occur in open water (river/floodplain) fisheries and these target the larger professional gears. Compliance is not high and relationships between fishers and district officials in general leave room for improvement. The government is promoting improved co-management approaches to try to improve governance and management of the fisheries.

A complicating factor is that four different departments (excluding the Ministry of Fisheries) are responsible for the management of the different inland water bodies. Whilst all might lay claim to revenue from the fishing, few of them systematically collect data on the number of fishers involved or the capture fisheries production on a national basis. The government Ministries or Departments went through a major re-organisation and reform in the mid-1990's and this, together with the still ongoing shift to market oriented economy, does not clarify matters in terms of responsibilities and competence of different offices for collecting data. A detailed investigation of the actual data gathering systems on a provincial, district and village level is necessary to obtain a clear picture of the usefulness and potential of any specific statistics. This can be time consuming and requires significant local knowledge.

A major overhaul of the fishery sector was proposed by the Fisheries Sector Master Plan project (Danida in 1996). The marine fishery remained the main target for changes in the way data are collected. Again the emphasis has been on the export sub-sectors and aquaculture. There is currently an on-going Danida funded project to improve fisheries information systems. This has not fully addressed the needs for inland capture fisheries but is attempting to incorporate some aspects through liaison with the Danida funded MRC Fisheries Programme.

Collecting data on the small scale fishing activities, in general, is not currently considered feasible. Inland capture fisheries are considered only to constitute a minor fraction of the total fishery and aquaculture sector. The government takes the view that the main thrust for growth from inland areas will be from aquaculture. There is a perception, not universally held, that there is probably little point improving the statistics for inland capture fisheries. Needless to say, in the absence of hard data on the inland capture fishery, this attitude is somewhat irrational. In the few areas where improved statistics have been collected it has also been shown to be incorrect (see below). Nevertheless, emphasis by the government on generating export revenue has placed inland capture fishery statistics as a low priority.

Where statistics do exist for inland capture fisheries, based upon information collection, they appear to be founded mainly upon estimates from records of licensed gears. These may or may not include an element of catch reporting by fishers. Some districts may undertake surveys of reports from fishers. Better statistics might be available on a local basis for individual reservoirs, but the mission has been unable to find any that are relevant to obtaining estimates of reservoir fisheries on a national basis.

Due to the lack of concern for inland fisheries, the record of statistical data is weak. In reality, no agency is responsible for doing the statistical work. Any statistics on inland fisheries are only estimates.

The fisheries statistics system in Viet Nam is complicated, not mentioning short-term investigations implemented by programmes and projects. At present, regular statistical data on fisheries are being collected in parallel by two systems, namely the statistical system of the Ministry of Fisheries and that of the General Statistics Office. Nevertheless, neither system has been designed to include all information fields necessary for the management of fisheries. This situation is due, on the one hand, to the complexity of the state administration apparatus as described above and on the other hand to the process of shifting the national economy from a centrally planned

mechanism to a market one. These two mechanisms have different methods and requirements for economic information and statistics and have different ways of organizing the system. The qualifications and working style of officials is also different. At present, efforts are being made to strengthen the capacity of the fisheries statistics system to keep pace with countries in the region and in the world.

The main agency responsible for collecting fisheries statistics in coastal provinces is the Department of Fisheries (supervised by an Economics Bureau or an Economics and Planning Bureau). In the remaining provinces this work is done by the Department of Agriculture and Rural Development. Collection of fisheries statistics by the Department of Fisheries is done according to the following methods:

- Registration book and license;
- Reports made by district officials;
- Reports based on the original data of the Sub-Department for Fisheries Resources Conservation, the Center for Fisheries Extension and the Market Management Board;
- Interviews and survey forms;
- Estimates of monthly, six-months and annual fisheries statistics, which the Department of Fisheries uses to make a report for MOFI's agency in charge of fisheries statistics.

Before 2000, MOFI's agency responsible for statistics was the Planning and Investment Department staffed with two or three specialized officials. Since late 2000, this mission has been transferred to the Fisheries Information Centre (FICen). Besides provincial Departments of Fisheries, the Departments of Agriculture & Rural Development in the provinces also submit statistical data to MOFI prepared on a quarterly, six-month and one-year basis or at the request of FICen (mainly data on aquaculture production). FICen also receives reports from the General Customs Department on production and the business of corporations and statistical data on fishery products exported through border gates.

FICen is responsible for processing and analyzing reports to make a monthly, quarterly, six-month and annual report serving management and policy-making bodies of MOFI and local authorities. Every quarter FICen (on behalf of MOFI) meets with the General Statistics Office to make comparisons and analyze data. Thus, statistics published by MOFI include output of the marine catch and aquaculture and output from inland fisheries in coastal provinces (Fig. 2).

In addition to the statistical system of MOFI, the General Statistics Office has a network of Departments of Statistics in provinces and Bureaus of Statistics in districts and officials in charge of the statistics work in communes. They gather statistics at the national level, including fisheries data (Fig. 3). In provinces where there is a Department of Fisheries, every month an official in charge of statistics holds a meeting with the Department of Statistics to make comparisons and analyze data, then prepares a report to submit to the provincial People's Committee, the General Statistics Office and MOFI.

In provinces where there is no Department of Fisheries, the monthly statistics are usually not introduced into the collection content but only quarterly or six-month statistical data. Statistics on inland fisheries include mainly aquaculture output and the catch from inland waters.

Data on inland fisheries are collected in one of two ways: first, output is estimated through registered and supervised fishing gear (set net, bag net) or through on the spot markets. Generally, data on inland fisheries output are not adequately reflected.

Second, fisheries data supplied by the General Statistics Office are the State's official data, including: output and value of marine catch and output and value of aquaculture output. In general, there is a difference between statistics put forth by the General Statistics Office and MOFI. This difference is partly due to the output of inland capture in non-coastal provinces.

The lack of Viet Nam fisheries statistics both on marine catch, aquaculture and inland fisheries has been recognized by management agencies which are actively seeking ways to improve the situation.

Under the direction of the Government and with support from FAO in October 2001, the General Statistics Office co-coordinated with the Ministries of Agriculture and Rural Development and Fisheries to conduct the second census on agriculture and rural areas and the first census on fisheries. Collected data are being processed and the results will be announced by the end of 2002. Though this investigation does not focus on fisheries, it is hoped that the result will indicate a general picture of the role of fisheries in rural livelihoods in Viet Nam.

MOFI has assigned FICen to implement a theme to raise the statistical capacity of the fisheries sector and make preparations for conducting some investigations focusing on socio-economic matters of the sector.

However, in the process of raising its capacity, MOFI is faced with the following difficulties:

- Lack of trained human resources;
- Lack of funds to conduct investigations;
- The system of statistical criteria is not adequate;
- Reported fisheries data still mainly rely on administrative reports;

Officials in charge of fisheries statistics are required to be trained professionally and possess knowledge of the fisheries. This demand is not easy to meet. Due to the lack of a unified statistical system and a limited state budget, actual statistics activities of the fisheries sector face many difficulties.

Viet Nam will require assistance and collaboration from international organizations and other countries, especially countries in the Mekong River Basin, to build and put into operation a fisheries statistics system meeting the requirements of management, policy-making and data exchange.

Data collecting systems are not well-developed. The General Statistics Office and the Ministry of Fisheries run parallel data-collecting systems, for different purposes, and gaps exist in both. In particular, data-collecting for inland fisheries is inadequate. Because of the small scale and widespread nature of the fishery, systematic, adequate monitoring is very difficult. The systems are being modified.

Data for MOF are collected either by Provincial Department of Fisheries (DOF) or Provincial department of Agriculture and Rural Development (DARD) offices. Data are based on (a) registration books and licenses (for marine fisheries), (b) reports from district fisheries authorities, (c) DOF Divisions for Fisheries resources, Conservation, and Extension, and (d) estimates by local fisheries authorities. Surveys and interviews are rarely used.

Reports are sent to the MOF Fisheries Information Centre every three months. This Centre also received reports on exports from the General Customs Department. The Centre processes and analyses all data and produces quarterly, semi-annual, and annual reports on fisheries statistics for management and policy-making bodies of MOF and local authorities.

The General Statistics Office is under the Prime Minister's Office and received data from Provincial Departments of Statistics and more local statistical offices.

Inland fisheries and aquaculture are estimated province-wise at provincial level, but the level seems far below the estimates made by the Ministry of Fisheries staff together with the MRC Fisheries Programme. Data are not compiled or estimated separately for the Mekong Basin. There is some commercial fishing in the Mekong Delta, but no data on these fisheries seem to be collected. In provinces where a Department of Fisheries exists this is responsible for collection and processing of data on fisheries production on a district and village/community level. These data seem heavily biased towards aquaculture statistics. Out of a total of 53 provinces, 23 have a Department of Fisheries including all provinces in the Mekong Delta.

In general, most provinces now have extension offices mainly for aquaculture. These are familiar with producers, species and production methods, but, as yet, do not record any data. In other provinces, staff of the Department of Agriculture and Rural Development will collect the data on fisheries via their staff employed at district level and report directly to the Ministry of Fisheries (MOF), Department of Planning and Investment in Hanoi. Provinces are requested to report every 3 months and produce a yearly report on the total production area and total production. Different production systems are recognised but in the reports only the total pond area and production for a few species are included. In the gross statistics, the production per unit area (or volume for cages) is calculated from an actual inventory of the number of ponds, cages and paddy rice/fish systems at the village level and the total production for each species. Only a limited number of species are distinguished, in particular, shrimps/prawns, marine crabs and *Gracilaria* spp., which have export potential. All other aquaculture production is lumped together and reported simply as freshwater fish. The total production for each group is sometimes calculated as the product of the total area under culture and the average yield per unit area (or volume) as estimated by the provinces during a small sample of interviews with farmers. Since production figures are used as a basis for tax it might be expected that this system results in a certain bias in reporting.

The Ministry of Fisheries has no budget to collect their own data and rely entirely on the data supplied by provincial offices. An independent (parallel) system is in place through the General Statistics Office (GSO). This office has, since 1994, mobilised people at community level to ascertain, amongst other things, the total production area and the average production per production method by means of a sample. There seems to be some communication at different levels between the two systems, although it was admitted that this co-operation is far from optimal. No comparisons are being made between the estimates of both data collection systems.

There is a licensing system in place for fishing in the larger reservoirs, but management systems differ widely, can change rapidly and mostly do not keep records of fishermen and gears operated. Moreover capture fisheries in many water bodies have open access.

The government Ministries or Departments have been through a major reorganization and reform and this, together with the still ongoing shift to market oriented economy does not clarify matters in terms of responsibilities and competence of different offices for collecting data. Four different departments (excluding the Ministry of Fisheries) are responsible for the management of the different inland water bodies. Whilst all might lay claim to revenue from the catches, none of them collect data on the number of fishermen involved or the capture fisheries production.

A major reassessment of the fishery sector has taken place through the Fisheries Sector Master Plan Project (Danida, 1996) and the following SPS arrangement including a number of support projects for the fisheries sector. One of these deals with the reorganization of the marine fisheries statistics, but may include inland fisheries and

aquaculture, at least at the long-term perspective. Contacts have been established between this project and the MRC Fisheries Programme, and cooperation will be pursued.

Although the estimates reported by the provincial authorities do not seem to be particularly useful, they do indicate that a system, including staff, is in place which, with a few minor adaptations, might provide more accurate and useful information without incurring additional expense. It is not unreasonable to assume that such changes might indeed result in overall savings. The replicate collection system by GSO and the MOF could be merged to rationalise the investment of effort. Although more detail and accuracy could be incorporated into the present system, it seems unlikely that refined data for inland capture fisheries will be forthcoming on its own, without the inputs of the current project.

4.2 Potential improvements to existing systems

Viet Nam needs to re-assess its inland capture fishery statistics. A more representative picture of the sub-sector can be obtained with limited cost, using existing information. This might include exploring in more detail the information available at provincial and district levels and especially establishing the basis of that information. Doing this does not necessarily require substantial investments in the statistical system itself.

Regarding improving the current statistical collection system, there are two separate problems: (i) the way in which national figures are compiled (or reported to the national level), and (ii) the relevance of the original statistics. A statistical system including staff is currently in place. There are certainly low cost solutions to improving the current information, where it is already being collected. The example from An Giang suggests that at least for some areas valid corrections can be applied to current statistics, without extra costs. It is not unreasonable to suggest that such changes might indeed result in overall savings. In addition, the replicate collection system by GSO and the MoF could be merged to rationalise the investment of effort (if this has not already been done). There is no technical reason why local authorities, given limited support and advice, could not make many improvements on their own. The problem is very much one of motivation to pay attention to these fisheries. To address that problem, policy changes at national level would help.

This does not mean that Viet Nam need necessarily invest substantially more in its current inland fishery statistical system. On the contrary, this review concludes that such investments should proceed with caution. A better approach is to first ascertain what kinds of information are required for policy, planning and management purposes. The existing system, provided improvements are made where feasible, even if scaled-down, may provide the current information more effectively and cheaply, and certainly more reliably. It is the additional information that may be required, but is not currently collected, that is important. Investing in the current system may not necessarily provide that. In particular, the current system is unlikely to provide information relevant to monitoring trends in the fishery, livelihoods, poverty and food security aspects or biodiversity and the environment.

4.3 Alternative sources, and data collection tools

Inland fish production is included in national statistics of the four MRC member countries. In 1991, official statistics registered an annual fish production of 356,000 tonnes, including 8-10 percent coming from aquaculture. With a population then estimated at 50 million, this translated into an average per capita fish consumption of 7.2 kg per year. The most recent estimate of total fish production is close to two million tonnes with an average per capita consumption around 30 kg per year. The

main reason for the difference between these figures is that new data collection methods have been used to include small-scale fisheries. A distinction between farmers and fishers is very difficult in the Mekong Basin. There are very few full-time fishers and very few farmers who do not fish in rice fields or in nearby wetlands and streams. A huge variety of traditional large and small-scale gear exists, which is well adapted to the different species, habitats and seasons. In Cambodia alone, the MRC Fisheries Programme has catalogued more than 170 different types of fishing gear.

Small-scale production figures, the biggest part of the total catch, are not reflected in the national statistics because this production is not registered by traditional data collection methods. It is obvious that the traditional marine fisheries method of quantifying fish production through collection and analysis of catch and effort data is not applicable to a seasonal small-scale fishery in floodplains and rice fields with hundreds of different gear types. It is also clear that exclusive registration of more visible large-scale fisheries will only target a fraction of the real production. This is a dilemma for countries with large inland fisheries. Under traditional data collection methods only large-scale fisheries in major reservoirs and rivers and outputs from large aquaculture programmes have been registered as these are the fisheries which contribute to government revenues through taxes and license fees. More accurate data are crucial for the purposes of shifting the focus to food security for the rural poor and getting the sector included in the national and regional economic planning.

The MRC member countries, in cooperation with the MRC Fisheries Programme, have produced estimates using a number of data collection methods. While large-scale fisheries may be registered directly, consumption surveys have proven more efficient in recording the total production in small and family-scale fisheries. This method includes recording of traditional salted, dried and fermented products. These surveys are accompanied by biological surveys, which reveal information on individual fish species, their habitats and migration routes—vital information for the development of fisheries management systems.

Though the new estimates have been generally accepted by national fisheries agencies, the much larger figures have yet to enter the official statistics. The old low figures continue to be disseminated for official purposes because the new estimates are not compatible with the existing methods of collecting information. Fisheries production data are usually collected monthly or quarterly and always province-wide. They are sent to the national statistical bureaus where they are processed and disseminated together with statistics from other sectors. There are no channels for submission of overall national annual production figures and no way of breaking down the new overall figures in a way that can substitute or even complement the existing data on a monthly and province-wide basis. There is little possibility of introducing consumption surveys as the routine official methods of collecting production data through provincial and district fisheries and agriculture officers.

National and regional institutions recognise the dilemma. A request to the MRC Fisheries Programme for assistance in establishing a better statistical system has been ongoing since the start of the Programme.

The main problem is that a new method has to cope with representative data sampling in a floodplain area and in small-scale and family-scale fisheries. The consumption surveys used for creation of the new data require considerable effort and expense. The approach may serve well as a survey carried out every five or ten years but it is not suitable for routine data collection.

A second issue is to define in greater detail the objectives, target groups and scope of an inland fisheries statistics system. A minimum 'need-to-know' approach may help ensure that the most important information is collected with a sufficient degree of accuracy and at the lowest possible cost. This alone would be a huge step forward

in available fisheries information at a macro-level. Once established, such a system could be expanded to include more detail on species, value, product, operator and other parameters. A third issue concerns enabling national statistical agencies to operate such a system in a sustainable manner on a basin-wide scale in cooperation with other national fisheries and non-fisheries systems and with the international organisations involved. The underlying assumption is that a suitable data sampling system, tailor-made for the administrative area under consideration, can be developed over a reasonably short period and can be expanded to cover the entire Lower Mekong Basin.

4.4 Attitudes towards participatory data collection systems

The desirability of such collection is recognized by all sides involved in co-managed situations, but users tend to be poor and busy. Fishers need not be compensated for logging their own individual catches, but many do not keep good records. Identifying reliable data-collectors seems preferable. However, the opportunity cost of collecting such information needs to be covered if it is to be practicable.

However, within the newly established FMIS, the lowest level of data collection and sharing seems to be the provincial level. Below the provincial level there is “little knowledge and little equipment” (pers. Comm., Danida/STOFA).

4.5 Use and potential of traditional knowledge

In general, the value of traditional knowledge is recognized, but the level of appreciation thereof varies greatly among individual officials. However, in community co-managed situations, it is put to use, since fishers’ groups in such cases tend to take the lead in managing their fisheries.

Mekong communities have always depended on the fisheries resources in the river. As a result, they have accumulated a large body of ecological and biological knowledge about these resources. In many places along the Mekong, communities have established management practices, including limitations on fishing gear types, seasonal limitations and conservation zones in order to ensure that fish are harvested sustainably.

Since 1997, the Fisheries Programme of the Mekong River Commission has been accessing local knowledge in some of its basin-wide ecological research activities. The objective of this research was to obtain life-cycle information about important Mekong fish species, particularly in relation to migration and spawning. Local ‘expert’ fishers were interviewed and have provided a large amount of information on the nature, location and timing of fish migrations and spawning behaviour. By merging information from different areas along the river, migration routes and essential habitats have been identified.

This research demonstrated that by accessing local knowledge it is possible to obtain vital information that could not be obtained using conventional biological research techniques. Although local knowledge on its own cannot provide all the answers about the functioning of a large and complex ecological system such as the Mekong, it can provide a solid foundation for basin-wide planning and decision-making. Furthermore, information obtained through local knowledge can help focus future research, management and monitoring activities.

Future development and resource management in the Mekong River basin will be successful only if local communities are involved in the planning and management process. As part of this process, the knowledge that exists within these communities must be taken into account.

5. Existing/or previous activities to develop data collection and sharing systems

Presently, the Danida-funded Fisheries Sector Programme Support (SPS) is developing MOFI's fisheries management information system (FMIS). The development of FMIS is divided into 3 steps:

1. IT infrastructure (Network in MOFI, Research Institutes and Provincial DOFI);
2. Informatics, (Databases for specialist information (11 flows), Adm. Systems);
3. Manager use of FMIS: Knowledge based Management training.

All 3 steps include appropriate training at all levels, end users, specialists, Operational staff and Managers.

IT: Covers MOFI (200 staff) 4 Research Institutes (500 staff) and pt. 19 Provinces 10-20 staff each). Another 15 provinces are covered with only 2 PCs each. Coverage means Network (Domain at MOFI and RI, workgroup at Provinces): Fiber optics between buildings, UTP 100MB in buildings, Switches. Domains: Win2000 server as DC, proxy and firewall servers, Database server, mail server, library server and files server. From 50-150 PC per place. Workgroups: Database server, 3-15 PCs. Communication: Pt modem dial up, in a transition to ADSL where possible, hopefully all places by end 2004. File transfer: VPN connection via Internet to MOFI and back.

Informatics: 11 Information flows: Marine Fisheries, Vessel and Licensing, Br, Ma, Fr aquaculture, Market and Product, Legislation, Environment (incl. disease and warning), Research projects, Fresh water fisheries, Quality Assurance. Most important: Classifications: One database containing all classifications: Like Species, commune, province codes, gear types, diseases, diagnosis, commercial groups etc etc., about 100 tables. All other databases use these. The databases are distributed among the places. LG, MF, VL and are national, covering from 6 laboratories to 28 or 33 provinces. The rest are in pilot or prototype. National HUB database in MOFI receives replicas for synchronization from all places and sends back other replicas for synchronization. This covers both data and version changes. All databases are in MS-Access. In test to use MS SQL server, but this requires much more training and is much more costly in licenses. WEB server in MOFI for MOFI website and department/institute homepages: under construction, which will be the main place for FMIS (www.mofi.gov.vn).

Organization: 10 staff in MOFI for operation of network, 2-3 at RI, 1 at provinces: Min bachelor in IT/IS and min 4 week internal training by FMIS/MOFI. Long term certification training 6-18 months (3-6 hours/ week). Maintenance of HUB databases: 1-2 specialists in the responsible department. 2 month training in replication, SQL, reporting etc. Specialist teams: 2-3 persons / database. Statistical and analytical training according to needs.

End users: Staff: Windows 2000, Office 2000 prof. Beginners level + advanced level. Now planning to give them 'driving license'=6 weeks training. Specialised training in special systems, e-library etc. Training for managers: Knowledge-based management (base management on knowledge and information; and how to handle the knowledge workers and horizontal cooperation 4-6 weeks. For all: General IT and English is needed to access internet etc. End users: Use Office incl. Outlook and have access to Internet.

Data collection: Mainly by provincial offices, enumerators from resource protection and extension workers.

Responsibilities: Operations of network and computers (Operations center in MOFI, RI, Provinces); Databases (Specialists in departments); Aggregation and Interpretation (Specialist teams).

Legal basis: Government: IT plan, Public Administration reform, statistical law, fisheries law, draft environmental plan (all approved within the last 1-2 years); MOFI: Decree and regulation on organization and responsibilities.

Major problems: Organizational and management changes required to use, implement and gain from the systems is difficult. Data collection system: Not supported by MOFI/ provinces. But new regulation is expected.

Main principles in development process:

Phased development, according to the financial resources (4 years to get to 90% IT coverage etc.). Too heavy input makes it difficult for the training and other changes to take place in time. All development is done in cooperation with departments, institutes etc. They are the active parts and only if they work something happens. FMIS doesn't develop anything to try later to hand it over. Sustainability only comes if the institutions take ownership from the beginning. This is basically a bottom up approach. This is very common in Vietnam, and the managers directly say they want it that way, no top down.

Use of information: Managers need to change their administration by using filing systems, email etc. Need to change cooperation, here from vertical to horizontal and teamwork. Need to make workflow analysis based on the responsibilities and reallocate and train staff according to new workflows in the e-administration.

Use information for their planning, supervision and decision making. This is assisted by Knowledge-based Management training and by national consultants assistance to implement the administrative changes. And this is a slow and long lasting process. They often want development by certainly not changes.

To be able to do all these things the understanding and awareness of the managers is very important. They must support the process –otherwise they will not use the information. This is difficult in Viet Nam: 1/3 is interested and active, 1/3 just says ok, 1/3 say no. And none of them have any experience. Therefore the best approach here is bottom up where the managers can be convinced by seeing the need and advantages in small scale before they commit themselves for full scale.

A major problem has been the continuous collection of information to establish information flows (time series). The organization at local (province) level is very difficult. But is as essential as the awareness among managers. No good results without a good collection system. Data collectors must be properly trained part time students cannot collect valid and timely data, and be retrained when newcomers emerge or strategy changes.

Data collection below provincial level: Difficult, as there is little knowledge and little equipment.

6. Details of involvement in related research and studies

Fishery has been selected as one of the three sectors on which Danish development assistance to Vietnam is concentrated. As one of the first activities in the sector Danida supported the formulation of GoV's (Government of Vietnam) Master Plan for Fisheries to Year 2010. The plan contains operational policies and strategies to realise a wide range of fisheries development objectives.

GoV and Danida direct their support in line with the following conclusions which are based upon the current situation in the fishery sector:

- The in-shore fisheries resources are overexploited;
- The off-shore resources are very limited;
- Geographically there are potentials for aquaculture freshwater (mainly for domestic consumption), both brackish and marine aquaculture (for domestic consumption and export), but know-how is lacking;
- The potential for export is constrained by lack of know-how on quality assurance and marketing;
- There is limited managerial capacity to accommodate the requirement for enterprises to operate in open-market environment; and
- The production sector (aquaculture and processing) and trade of fish are dominated by women.

Fisheries provide an important, although insufficiently registered, contribution to the Vietnamese economy and export earning from fisheries contributes significantly to the Vietnamese export earning. Furthermore, fish is important, accounting for approximately 30% of the average person's total supply of animal proteins.

Marine capture fisheries constitutes about 70% of the total yields with aquaculture, including freshwater and marine aquaculture make up about 30%. Whereas the marine capture fisheries may be close to maximum sustainable yields, Vietnam still has a high potential for development of aquaculture production. It is predicted that the share of aquaculture of the total fish production will increase steadily in the future. Some concern has however been raised about the environmental impact of shrimp aquaculture in particular.

The sector is important for the women who are the dominant group within processing, marketing and aquaculture. The fisheries processing industry differs from the general industry by having a female participation of 80-85%.

GoV emphasises, with the Master Plan for Fisheries, that future development of the fisheries sector should effectively contribute to the improvement of the national economy through sustainable utilisation of the fisheries resources, modernisation, and increased export earning from aquaculture. Furthermore, the fisheries sector should contribute to increased employment, improved income and living standard of rural communities, and an improved nutritional standard of the population.

The Danish Sector Programme Support (SPS) contributes to the realisation of these objectives through the implementation of initially five components:

- Strengthening of the Fisheries Administration (STOFA);
- Support to Freshwater Aquaculture (SUFA);
- Support to Brackish Water and Marine Aquaculture (SUMA);
- Seafood Export and Quality Improvement Programme (SEAQIP);
- Support to Industry Restructuring and Enterprise Development (SIREN).

The first of these, STOFA, will build the capacity of the fisheries administration at national, provincial and district levels; SUFA and SUMA will pilot techniques for increasing both freshwater and marine aquaculture production; while SEAQIP and SIREN focus on the restructuring of the fisheries industry in line with Vietnam's *doi moi* economic liberalisation policy – and on quality improvement and marketing.

Danish–Vietnamese co-operation in the fishery sector dates back to 1975, when loans for cooling and freezing facilities were provided, and has been expanded

gradually since 1993, when Vietnam became one of the 20 countries in which Danish bilateral development assistance is concentrated.

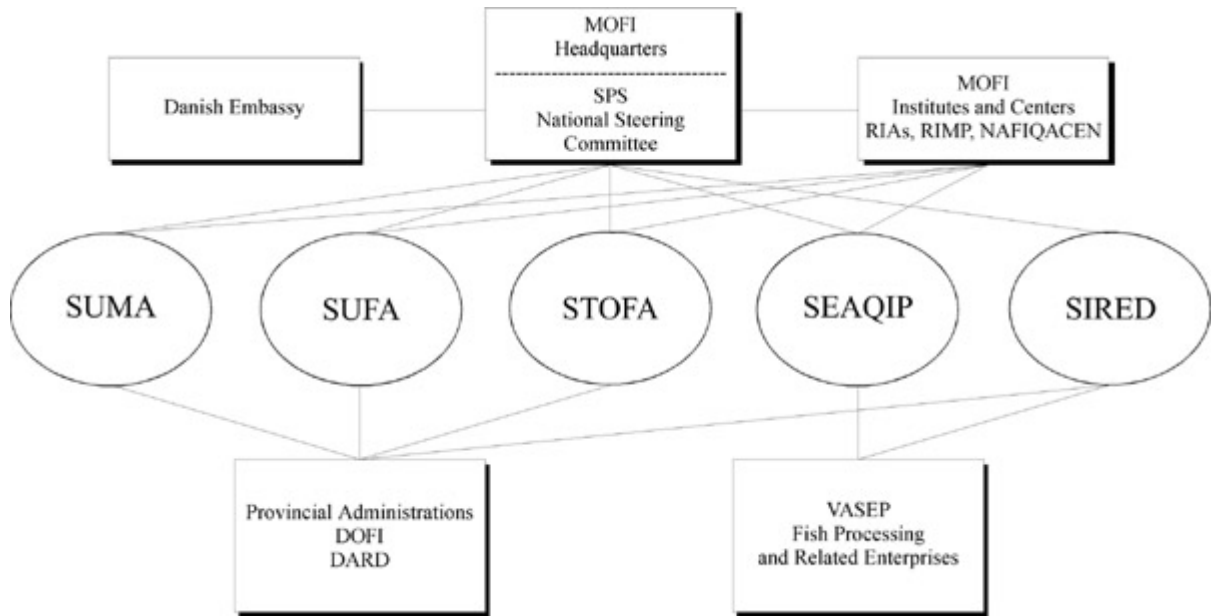
In agreement with the overall development objective of Danida's Strategy 2000 ("To assist developing countries in their efforts to achieve sustainable development based on the improvement of living conditions through socially balanced growth"), assistance to the fishery sector is envisaged to: 1) Support economic development and export in the sector, and 2) Ensure improved incomes and living conditions for low income groups in particular - the assistance can have either a direct or an indirect poverty alleviation effect.

The Sector Programme Support (SPS) in the fishery sector is directly oriented towards poverty alleviation through the two aquaculture components (SUMA, SUFA). The main target groups for these components are small scale farmers, assetless people, and fishermen and labourers in the coastal areas. Other components of the SPS (STOFA, SIREN, SEAIQIP) will benefit the poor more indirectly. Support to regulation of fisheries will in the long run help to optimise the income of fishermen and job opportunities are expected to be created through the support to a viable fish processing industry.

The SPS for the Fisheries sector was signed in October 1999. Major adjustments of the support will be decided on in connection with the joint annual GoV and Danida sector review and at the annual consultations between Denmark and GoV. The management structure of the SPS is established within this framework.

MOFI (Ministry of Fisheries) is the core administrative institution in the fisheries sector of Vietnam, and all components will be located with the MOFI. An SPS Steering Committee will be established at the national level to oversee and co-ordinate implementation within the sector. An SPS management unit will co-ordinate component activities. Figure 2 depicts the organisational structure of the SPS and its components, as well as their linkages to the national organisational framework.

Figure 6: SPS Component Linkages



Development of the fisheries sector in Vietnam will contribute to poverty alleviation indirectly through the stimulation of agricultural and overall economic growth, and directly through certain elements which target poverty groups and poor people's problems.

The workforce in the Vietnamese fish processing industry is dominated by female employees but within the fish processing industry, women are most often employed in the unskilled and poorly paid jobs. In the recruitment of staff, in income-generating fisheries enterprises, and in its training programmes, the SPS components are taking specific measures to secure the appropriate and effective participation of women.

The SPS is designed with emphasis on the environmental impact of the fishery sector. One of the main goals of STOFA is the establishment of fisheries management policies that will ensure the sustainable exploitation of fisheries resources, which will ensure the long term protection of the marine environment. Freshwater aquaculture may in fish/rice production have a positive environmental effect as the use of pesticides in rice cultivation often will have to be reduced. In order to alleviate the negative environmental impact of brackish water and marine aquaculture, support will be provided to the establishment of a legal, regulatory and control framework and to the establishment of fisheries specific coastal zone management plans. SEAQIP will concern itself with the direct environmental effects of seafood processing. The component will, as an experimental activity, support selected factories in establishing waste water treatment plants and promote environmental management in general in the industry. Experience from these experiments should determine the most appropriate form for treatment in the given legal, financial, technical and natural environment. SIRED will co-operate with SEAQIP in promoting environmental management in enterprises, and will advise MOFI on legal and enforcement instruments. The table below illustrates the main relations between the five SPS components and the Danida policy concerns with focus on poverty, women and environmental matters.

Table: Relationship of SPS Components to Danida Policy Concerns

Components:	Reduction of poverty	Gender Issues	Promotion of popular participation	Promotion of environmental sustainability
STOFA	Indirect	Women's participation and career possibilities to be promoted through staff policies. Support to women groups and associations.	Staff of MOFI and provinces will participate actively in component planning and activities.	Sustainable capture fisheries will be promoted through the FMIS.
SUFA	Main target groups are poor farmers.	Women will play an important role in aquaculture production. Improved family nutrition. Support to groups.	Delivery of extension and financial services to be organised together with recipients.	Pond, VAC, and rice field fish production is environment friendly.
SUMA	Main target groups are smallholder fishermen.	Women play an important role as traders in the sub-sector. Support to women groups.	A community based approach will be applied.	The legal and regulatory framework will reduce environmental damage from marine culture
SEAQIP	Indirect	Many women employees in fish processing industries.	VASEP is established as a members' organisation.	Clean technology, occupational safety activities.
SIRED	Indirect	Many women employees in enterprises.	Workers may get shares in enterprises.	Improved environmental management

The following is a short introduction to the five components:

STOFA: Capacity strengthening for the administration and management of fisheries was identified as a most important issue in the Master Plan for Fisheries to the Year 2010. The government's vision, as stated in the Master Plan, is that MOFI will strengthen its institutional capability and capacity, such that it can effectively administrate and manage the environment and the living aquatic resources of the nation – and can effectively provide the services and support needed by the fishing industry and its commercial activities.

The STOFA component should primarily be considered as a specialist input that has the clear purpose of establishing appropriate structures for fisheries administration, devising effective administrative procedures, developing a relevant management information system, and implementing related training programmes.

The component will work with the central administration of MOFI, as well as with provincial administrations. Nghe An and Ha Thin Provinces have been selected as the initial pilot provinces; two more provinces will be selected in the first year of implementation. The component will also work with research centres and institutes in ensuring the collection and analysis of information needed for the effective management of fisheries resources.

SUFA: Although Vietnam became the second biggest rice world exporter in 1997, malnutrition remains a serious problem, affecting some 40% of the nation's children.

Particularly the highlands have a very poor nutritional status. Poverty, inadequate distribution of food within the country and within the family and a lack of diversity in the diet are some of the contributing factors to the poor nutritional status of the population. Aquaculture has a long tradition in Vietnam and is being widely applied in the country. However a large potential for freshwater aquaculture still exists in the country. The vision is that increased aquaculture production will contribute to improved socio-economic development to the benefit of the population, including women and children.

The component will focus on Nghe An and Ha Tinh Provinces in the North Central Coast Region and Bac Can in the North Eastern Mountain and Midland Region. The component will be implemented by the MOFI, Research Institutes for Aquaculture (RIA) at the national level, and by MOFI Departments and Departments for Agriculture and Rural Development (DARD) under the MARD at the provincial level.

SUMA: The vision of the component is to increase earnings from fisheries activities, improve incomes and living conditions for low income groups, and to ensure environmental sustainability. The component will work to realise the vision through implementing the GoV strategies of: strengthening the legal and administrative framework; developing ecologically sound plans for brackishwater and marine aquaculture; developing sustainable technology and management systems; building human resources; and developing monitoring and information systems.

Two five year phases are envisaged, with implementation taking place at national and provincial levels. Five provinces will be involved. Four of them have been identified as Nghe An, Ha Tinh, Quang Ninh and Khanh Hoa. The fifth province will be identified during the inception period. The executing agency will be MOFI, with the head office in Hanoi. Sub-offices will be established in the Department of Fisheries (DOFI) of the five target provinces.

SEAQIP: The visions concerning the SEAQIP component are based on the overall objectives, programmes and strategies of the sector as described in the Fisheries Master Plan.

It is the vision that seafood export markets have also been established in the EU, America and China, and the required international standards have been acknowledged as being maintained in Vietnam. Furthermore, the vision is that an institutional framework concerning quality assurance of seafood processing is established, with a clear delegation of responsibilities between private and public sector institutions. The SEAQIP component will be implemented by the MOFI, NAFIACEN and VASEP. The SEAQIP Component constitutes the second phase of a three year project (SEAQIP 1) initiated in 1996.

SIREP: The support to industry restructuring and enterprise development in Vietnam's fishery sector is closely linked to the economic reforms that are ongoing in all sectors of the economy. GoV considers industry restructuring and private sector development as key parts of its national programme to achieve sustainable growth with an equal distribution of incomes. The fishery sector enterprises face considerable problems in sustaining their expansion in turnover and export growth, and gradual commercialisation is needed.

The component will be implemented by a new Restructuring and Equitisation Facilitating Unit (REFU). REFU will be established within MOFI and with the support of Danida. Support will be only for four years, after which time it is expected that the role of REFU has been completed. Danida will cover running costs as well as salaries of staff, all of whom will be temporarily appointed for the component period. Component interventions will be carried out in close co-ordination with the above

described SEAQIP Component, and with the GoV National Enterprise Reform Committee and the donors supporting it.

Implementation Plan

The SPS should be seen in a long term perspective in order to ensure sustainability. The first phase described in this document is planned for five years from mid-1999 to mid-2004, but a minimum frame of 10 years should be considered.

Geographical Location

The geographical locations of the Fishery Sector Programme are chosen with special reference to reach the poorest part of the population. In a country as big as Vietnam it is important to ensure the efficiency of the SPS-programme through a geographical concentration which at the same time promotes dialogue and interplay between the local counterparts.

Coastal Area Development in Nghe An and Ha Tinh Provinces was identified as a component in the MOU of September 1997. Coastal Area Development in the two provinces is not included as a separate component in the SPS. Instead the two provinces will be the focal areas of three of the components of the SPS; that is STOF A, SUFA and SUMA. Other SPS components will also, where feasible, have activities in the two provinces. This choice is based on an assessment of the poverty profiles of the two provinces. Poverty incidences are particularly high in the northern up-lands and the north and central regions and average per capita consumption is below average in both provinces.

Some programme interventions are by nature national in their scope. The STOF A component will build capacity in the central ministry and this support should benefit nation wide development of the fisheries sector. Furthermore, some specific activities, such as the establishment of national broodstock centres under SUFA and the preparation of a plan for development of brackish water and marine aquaculture will cover the entire nation. SEAQIP and SIRE D activities are national in scope, but can also take place in the provinces of concentration.