

fish landings. Arnason *et al.* (2000) estimated ratios ranging between 3 percent in Iceland, 8 percent in Norway and 20 percent in the Province of Newfoundland, Canada (Shrank and Sokoda, 1999), and Cox (2002) estimated expenditures on the order of 7.2 percent in the Commonwealth fisheries of Australia (Cox, 2002).

Table 10: Ratio of the government expenditures for fisheries management in relation to the value of the catch landed in Nicaragua

	2002	2003	2004	average
	percentages			
Research	0.20	0.23	0.28	0.24
Monitoring, control & surveillance	0.23	0.21	0.20	0.21
Management	0.21	0.24	0.18	0.21
TOTAL fisheries management services	0.63	0.69	0.66	0.66

Table 11 shows some indicators of fisheries management services costs in Nicaragua in relation to the coastline (km), number of fishers, weight of the fishery exports (ton), number of industrial and artisanal vessels and boats, area of the continental shelf (km²) and the value of the fishery exports (in US\$).

The highest expenditure in each fishery service is related to the cost related to the industrial fleet (US\$/vessel) which ranges from US\$1 746 per vessel (research service) to US\$1 083 per vessel in the management service. In all fishery services, the lowest expenditures are related to the continental shelf area (from US\$3 to US\$5 per km²) and the value of the fishery exports (US\$0.002–US\$0.003 per US\$).

Table 11: Indicators of fishery management services expenditures in Nicaragua (2004)

Fishery Management Services				
Cost in relation to	Research costs	Monitoring, control and surveillance costs	Management costs	TOTAL
coast line (us\$/km)	291	205	181	677
number of fishers (US\$/fisher)	17	12	10	39
Ton (US\$/tonne)	21	15	13	49
industrial fleet (US\$/vessel)	1746	1228	1083	4057
artisanal fleet (US\$/boat)	65	46	41	152
continental shelf (US\$/km ²)	5	3	3	11
Value of exports (US\$/1US\$)	0.003	0.002	0.002	0.007

Other analyses regarding investment on fisheries management in Nicaragua (Ehrhardt, 2000; 2003 and 2004) show that in the last 12 years the ADPESCA budget decreased significantly showing a trend that is inversely correlated with the fishery exports (Figure 8). Figure 8 shows that the ADPESCA budget in 1993 was almost US\$2.5 million when fishery exports were in the order of US\$30 million while in the last four years both fishery exports and the ADPESCA budget stabilized at about US\$95 million and US\$0.5 million respectively. Noticeably, fishery exports do not show a significantly increasing trend since 1995 with the exception of a peak in 2000 (Figure 8). Figure 9 shows the relation between the ratio of the ADPESCA budget in relation to fishery exports where a substantial decrease from more than 7 percent in 1993 to about 0.5 percent in the last 5 years is observed.

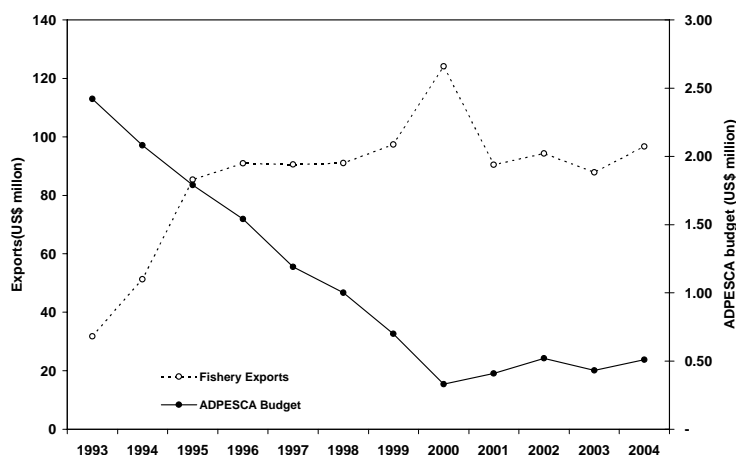


Figure 8: Fishery exports and National Fisheries and Aquaculture Administration annual budget, 1993–2004. (Modified from Ehrhardt, 2004)

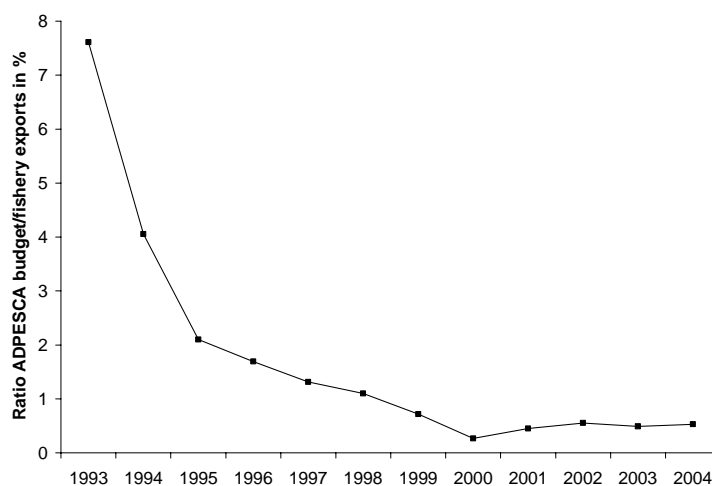


Figure 9: Ratio in percentage of the ADPESCA budget in relation to fishery exports. Nicaragua, 1993-2004 (Modified from Ehrhardt, 2003)

Data available from 1996 to 2002 from Ehrhardt (2003) indicate that the ADPESCA experienced a significant decline in the application of penalties for not complying with fishery regulations (Figure 10) which could be an index of the inefficiency of the activities of the fisheries inspectors and of the decisions made in ADPESCA regarding the validity of the infractions.

This is relevant considering the low compliance levels in most of the Nicaraguan fisheries⁸ which, in turn, affect the implementation of an efficient cost recovery system. Fines and charges defined in the new Fishery Law are considerable and, if properly used and managed, could contribute enough funds to better implement the fisheries management services in support of the sustainability of the fisheries.

Table 12 shows the results of a preliminary financial exercise from 2004 CIPA data (César Rivera, pers.comm.) carried out to estimate and compare the potential government revenues from user and access

⁸ One exception is made in 2004 when a substantial fine of US\$250 thousand was imposed on a Nicaraguan exporter by a U.S.A. Court for trading undersized Caribbean spiny lobster in Florida. The money from this fine is being used to support MCS during Caribbean spiny lobster closed seasons and to implement the satellite based industrial vessels tracking and monitoring system.

rights fees in the Caribbean spiny lobster and shrimp industrial fisheries versus the reimbursement to be made by the Government for the tax exemptions for the use of fuel in the fishery operations (based on the average fuel consumption in gallons per day). A description of fishery tax exemptions and fishery fees can be found below in Chapter 7.

The highest total Government's estimated revenues in 2004 (5th column in Table 12) were in the Caribbean spiny lobster fishery (US\$195 thousand in the trap fishery and US\$160 thousand in the diving fishery) and in the Caribbean coastal shrimp fishery (about US\$158 thousand). In 2004, the total Government's revenues were in the order of US\$571 thousand. However, the same fisheries are the ones with the highest amount of money to be reimbursed from fuel tax exemptions (10th column in Table 12).

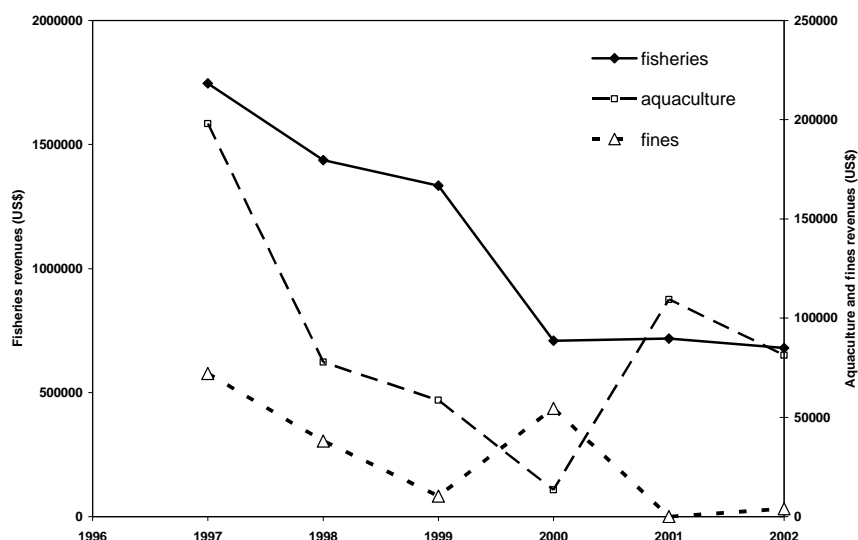


Figure 10: Revenues from aquaculture and fisheries, and revenues from fines in US\$. 1996–2002 (from Ehrhardt, 2003)

According to Table 12, in 2004 the total negative balance (last column of Table 12) for the Nicaraguan Government was in the order of US\$2 million. Other conclusions that can be drawn from Table 12 are that in the Pacific deep water shrimp fishery the reimbursement paid by the Government is 13 times higher than the revenues obtained while in the Caribbean spiny lobster diving fishery is only 0.8 times.

As a general result, this financial exercise suggests that financing fisheries management in Nicaragua with cost recovery systems with revenues from fishery fees is not possible under the current tax exemption system for fuel use in fishery operations.

Following the previous analysis, Table 13 shows actual 2005 revenue data from use and access rights fees to be allocated according to the new Fishery Law. Details on the allocation of funds are presented below in Section 7. It should be noted that no funds from the most important fisheries (the Caribbean spiny lobster and Caribbean coastal shrimp) will be allocated to the Fisheries Development Fund. Instead, a significant fraction of the Central Government share of the revenues is to be allocated to the local and regional Governments.

In the first quarter of 2005 no revenues were reported from fishery activities in the Pacific coast while 71 percent of the revenues came from the Caribbean fisheries (Table 13). In total, only 11 percent (US\$16 785) of the total revenues is allocated to the Fisheries Development Fund. This has a high impact on fishery management activities since the Local/Regional Governments lack of scientific and technical capabilities to provide fishery services. This situation is out of control of the ADPESCA and the DGRN and it is not strategic or efficient to dilute the funds into many peripheral institutions. There is also no guarantee that the funds allocated to the National Treasury will be reinvested in the fishery sector.

Table 12: Comparison of the estimated Government's revenues from use and access rights fees in industrial crustacean fisheries versus the reimbursement to be made for fuel consumption for tax exemption (Average data, January–December 2004).

	Caribbean coastal shrimp fishery		Pacific Coast coastal shrimp fishery	Pacific Coast deep water shrimp fishery	Caribbean spiny lobster fishery		TOTAL
	shrimp tails	whole shrimp	shrimp tails	shrimp tails	traps	diving	
Recorded landings in pounds	2 982 691	775 642	390 892	199 580	672 018	614 740	
Estimated Government revenues							
from user rights fees (US\$)	140 261	24 084	18 382	0	158 764	145 232	486 723
from access rights fees (US\$)	17 600	4 400	6 400	4 400	36 600	15 600	85 000
Total Government Revenue	157 861	28 484	24 782	4 400	195 364	160 832	571 723
Days at sea	10 903	2 443	1 643	565	12 199	3 688	
Average gallons of fuel per day	224	224	200	200	190	190	
Total fuel consumption	2 442 272	547 232	328 600	113 000	2 317 810	700 720	
US\$/gallon exemption	0.4092	0.4092	0.5415	0.5415	0.4092	0.4092	
Amount in US\$ to be reimbursed	999 378	223 927	177 937	61 190	948 448	286 735	2 697 614
Balance: revenues - reimbursement	-841 517	-195 444	-153 155	-56 790	-753 084	-125 902	2 125 891

The findings shown above indicate that the Nicaraguan government is not capturing the rent from fishery resources in an efficient and appropriate way and, as a consequence, it is gradually decreasing its economic capacities to adequately finance fisheries management. The fishing industry is, in fact, subsidized by the government because what the government recovers under the present cost recovery mechanisms is much less than the government provides to the industry. This situation contradicts the fact that the Nicaraguan State, as owner of the fish resources, requires to control fisheries development to enhance the economic and social impact of the use of the national fishery resources. This has not allowed the proper development of fisheries management services, and particularly those regarding monitoring, control and surveillance, resulting in insufficient adherence to fishery regulations by the users and overcapitalization of the system.

Table 13: Actual data on monthly allocation of revenues (in US\$) from access and use rights fees according to the percentages established in the new Fishery Law (First quarter, 2005).

	Percent	01– 31/01/05	01– 28/02/05	01–31/03/05	TOTAL COLLECTED
PACIFIC COAST					
Fisheries development fund	50				0
Local governments (Alcaldías)	35				0
National Treasury	15				0
Sub-total Pacific coast		0	0	0	0
AQUACULTURE					
Fisheries development fund	40	7 768	0	9 017	16 785
Local governments (Alcaldías)	40	7 768	0	9 017	16 785
National Treasury	20	3 884	0	4 508	8 392
Sub-total aquaculture		19 420	0	22 542	41 962

	Percent	01– 31/01/05	01– 28/02/05	01–31/03/05	TOTAL COLLECTED
CARIBBEAN COAST					
Indigenous Communities	25	8 521	7 681	9 853	26 055
Local governments (Alcaldías)	25	8 521	7 681	9 853	26 055
Regional Governments and Councils	25	8 521	7 681	9 853	26 055
National Treasury	25	8 521	7 681	9 853	26 055
Sub-total Caribbean coast		34 084	30 724	39 412	104 220
TOTAL		53 504	30 724	61 953	146 182
Total Allocation to the Fisheries Development Fund			16 785		
Total Allocation to the Local Governments			42 840		
Total Allocation to the National Treasury			34 447		

Source: DGRN

7. SOURCE OF FUNDING

The new Fishery Law in its Article 106 mandates that all revenues obtained from access and use rights fees from fishing licenses, permits and aquaculture concessions; fines, auctions, donations and any other sources of income, domestic or international, will be allocated to a Fisheries Development Fund specifically created by the new Law. The Fund will then finance all fisheries management services: research, management and enforcement. However, the procedures and administration of the Fund are yet to be implemented. Nevertheless, Article 108 of the new Law expresses that not all revenues from access and use rights fees from fishing licenses, permits and aquaculture concessions will be entirely allocated to the Fisheries Development Fund.

In fact, some of the revenues from these sources of income are also to be allocated to local and regional governments, to Caribbean indigenous communities and to the National Treasury according specified terms. The allocation will be carried out by the General Treasury Department of the Ministry of Finance according to the percentages shown in Tables 13 and 14. The allocation has also been divided by geographical areas: Caribbean coast (North and South Atlantic Autonomous Regions), the rest of the country and the areas where aquaculture operations are taking place. Hence, the two Articles of the Law appear to contradict themselves, and the consequences of distributing the rent obtained from fisheries among several governmental institutions does not contribute to the enhancement of the fishery management controls that the Government needs to impose on the users of the resources.

The money allocated to local and regional governments are for fisheries development activities such as infrastructure construction and rehabilitation, e.g. wharfs, dams, shipyards, and any other intended to strengthen fisheries development. The use of the funds is to be under the supervision of the Ministry of Finance, the regional authorities and audited by the Government oversight body, the Office of the Comptrollers General of the Republic. It should be noted again that the most valuable fisheries are in the Caribbean coast, but no money is to be allocated to the Fisheries Development Fund derived from fishery resources use and access fees recuperated from these regional fisheries.

Table 14: Percentages of allocation of fisheries and aquaculture revenues from fisheries access and use rights fees as mandated in the Fishery Law of 2004

Area	Percent
CARIBBEAN COAST	
Indigenous communities	25
Local Governments	25
Regional Governments and Councils	25
National Treasury	25

Area	Percent
REST OF THE COUNTRY	
Fisheries Development Fund	50
Local governments	35
National Treasury	15
AQUACULTURE AREAS	
Fisheries Development Fund	40
Local governments	40
National Treasury	20

The Fishery Law endorses what it was established in Articles 103 and 104 of the Fiscal Fairness Law (Law 453) published in the Official Gazette 82 of the 6th of May 2003 regarding the payment of fees for access and use rights in fisheries and aquaculture. Fees were defined by the Ministry of Development, Industry and Trade (MIFIC) and the Ministry of Finance and Public Credit (MHCP). The General Internal Revenue Department (DGI) of the Ministry of Finance is in charge of collecting the fees⁹.

7.1 Fisheries Access Rights Fees

In Nicaragua the fishery access rights fees are paid in US dollars or in the domestic currency (Córdoba) at the official exchange rate with respect to the US dollar the day of payment according to: an annual fixed rate per feet of vessel length in the case of the industrial and sport fisheries; a fixed annual fee for the industrial fishery storing centers; and an annual fixed rate per hectare in aquaculture and per boat in the artisanal fisheries. Artisanal storing centers and scientific fisheries are tax free (Table 15).

A distinction should be made between a fishing license and a fishing permit. A fishing licence is a document issued by the fishery authority that allows a person or a legal entity that owns a fishing craft to harvest fishery resources, while a fishing permit allows a person or a legal entity to carry out smallscale commercial fishing, to have artisanal storing centers or to carry out scientific or sport fishing for noncommercial purposes.

Table 15: Fees for access rights in fisheries and aquaculture in Nicaragua

Annual access rights fees in fisheries and aquaculture	
a. For each industrial fishing license by vessel:	
1. Lobster	US\$30 per feet of vessel length
2. Shrimp	US\$20 per feet of vessel length
3. Finfish	US\$10 per feet of vessel length
4. Other	US\$10 per feet of vessel length
b. For each storing center of other coastal marine and freshwater resources	US\$500, artisanal storing centers are tax free
c. For each sport fishing permit	US\$5.00 per feet of boat length
d. For each land, bottom or water hectare under concession	US\$10.00
e. For each artisanal fishing permit	US\$5.00 per boat. Payment should be made in the Alcaldías (Municipality)
f. For each scientific fishing permit	Tax exemption

7.2 Fisheries Use Rights Fees

All fishing licenses, fishing permits and aquaculture concessions holders exploiting any fishery resource must pay use rights fees on an annual basis. The payment is made to the General Internal Revenue

⁹ In general, taxes are paid by the fishers when selling their product to a seafood processing company (Companies are authorized to collect taxes from fishers). The total final amount paid to the fisher has then already a deduction of 1 percent (sales municipal tax), 2.25 percent (use rights fee), 2 percent (income tax) plus a charge of 5 percent for the weight loss of the product.

Department of the Ministry of Finance either in US dollars or in Córdoba at the official exchange rate the day of payment. The fees rates are the following:

- a) Traditional Products: Coastal shrimp and Spiny lobster: 2.25 percent of the value of the landings or production of the shrimp farms;
- b) Non Traditional Products¹⁰: tax free the first three years (2004–2006). From 2007 onwards: 1 percent of the value of the landings or production; and
- c) Finfish artisanal fisheries: tax free the first three years (2004–2006). From 2007 onwards: 0.5 percent of the value of the landings.

The value of the fishery landings and farmed shrimp production per unit of weight is revised and defined by the MIFIC every 6 months according to the average price in the market and, by ministerial decree, is issued and published.

Long-range tuna fisheries are considered under a special access and tax regulation system defined in an Executive Decree (Executive Decree 40–2005). Fees are paid on an annual basis according to the nationality and the net tonnage of the vessel, and the place the catch is landed. This is done according to the following criteria:

Nicaraguan Flagged Fishing vessels:

- US\$50 per ton of net register of the vessel or the equivalent amount in Córdoba at the official exchange rate the day of payment if the catch is not landed in Nicaragua;
- US\$20 per ton of net register of the vessel or the equivalent amount in Córdoba at the official exchange rate the day of payment if the catch is landed in Nicaragua; and
- Tax free if the catch is landed and processed in the country.

International Fishing vessels:

- US\$70 per ton of net register of the vessel or the equivalent amount in Córdoba at the official exchange rate the day of payment if the catch is not landed in Nicaragua; and
- US\$20 per ton of net register of the vessel or the equivalent amount in Córdoba at the official exchange rate the day of payment if the catch is landed and processed in Nicaragua.

7.3 Other fiscal charges in Nicaragua

They include national taxes such as the Income tax (IR), Value Added tax (IVA), Excise tax (IEC) and Customs tax (DAI). Municipal taxes include Sales tax and Real State tax. However, they are not described in this document due to the complexity of the system and the lack of data available.

8. INCENTIVES (“SUBSIDIES”) TO THE FISHERY SECTOR

A seafood export Company with a minimum of US\$50 000/year in exports has the following incentives:

- Accelerated depreciation of the capital goods;
- DAI and IVA exemptions for supplies, raw material, spare parts and equipment directly utilized in the production process of the export goods;
- Fiscal credit equivalent to 1 percent of the FOB value of the exports; and
- Fishery fees can be paid back with the fiscal credit.

Industrial and artisanal fishing and aquaculture companies are IEC exempted for the purchasing of diesel and gasoline in Nicaragua if utilized in export-oriented fishing or aquaculture operations. The beneficiaries are paid back by the Government US\$0.4092 per gallon (in the Caribbean coast) and US\$0.5415 per gallon in the Pacific coast and inland waters. These data were the basis for the calculations of the financial exercise presented in Table 12 above.

¹⁰ This category includes all fishery and aquaculture products not included in a) or c).

In Nicaragua these incentives are highly demanded because they are effective palliative measures in the short term for most users. However, in the medium term they do not solve the economic problem, for which they were originally intended – keeping income from fisheries sustainable. This type of measure is easy (but costly) to apply, but it is politically difficult to withdraw if the economic problems of the fishery sector has not been solved or because of the political pressure exerted by some organized groups of fishery users.

9. OTHER ISSUES

9.1 Use of nongovernment funds

At present most of the expenditures on key fisheries management activities are being done through budget provided by foreign aid programmes. The best example is the PASMA–DANIDA programme implemented in the DGRN where several national and international consultancies have been carried out on several key issues for fisheries management:

- Development of sustainability criteria for Nicaraguan spiny lobster and shrimp fisheries;
- Development of the stock assessment method for the computation of the ABC for spiny lobster and coastal shrimp fisheries;
- Bioeconomic Assessment of the impact of fishing undersized spiny lobster in the Caribbean Nicaraguan;
- Design of the monitoring, control and surveillance system;
- Design and implementation of a new statistical database for fisheries and aquaculture with computer based routines for collection and data processing;
- Design and implementation of a new statistical database with computer based routines for collection and data processing to compute the payment of use and access rights fees in fisheries and aquaculture;
- Planning and administration of aquaculture concessions;
- Training on monitoring and control procedures for the fisheries inspectors;
- Fisheries and aquaculture regulations; and
- Management plans for artisanal fisheries.

The results of these consultancies have been used to set the current general legal and fisheries management framework in Nicaragua. For example, Nicaragua is very well advanced in stock assessment methodologies for the computation of the ABC which are used to set the TAC in the fully exploited fisheries. It has also contributed to set the computer based fishery statistical databases used in the country and new approaches for carrying out the monitoring, control and surveillance yet to be implemented.

For a five year period that ends in 2005 the total amount of money spent by the PASMA programme in the MIFIC was in the order of US\$500 thousand out of a total of about US\$30 million invested in the country. This is a great achievement for the MIFIC and it is considered an efficient use of the PASMA–DANIDA budget by the Danish Government. A second phase of PASMA (2006–2010) has already been negotiated for an amount of US\$1.6 million.

In the ADPESCA, the Spanish Agency for Development Cooperation (AECI) has contributed to develop artisanal fisheries in the northern coast of Lake Nicaragua under an artisanal fisheries management plan. It has also contributed in the organization of fishers and, most significantly, in the decentralization process of management and monitoring, control and surveillance services functions to the local governments with particular reference to artisanal fisheries. The total budget of this project for a 3 year period is US\$300 thousand. The AECI programme has also contributed with a US\$35 thousand to the research programme in 2005 whose results will be the input to develop fishery regulations in Lake Nicaragua.

At present, the Government has given high priority to use the money generated from a fine imposed by a USA Court to a Nicaraguan exporter (trade of undersized Caribbean spiny lobster). The money was transferred to the MIFIC from the United States and it will be used to finance the satellite based monitoring system for all industrial vessels with fishing licences in Nicaragua. The fine has also financed the control and monitoring during the closed seasons for lobster and coastal shrimp.

In some special cases, nongovernmental funds for fisheries management have been provided by local entrepreneurs, e.g. retrieval of illegal lobster traps during closed seasons, research on some specific fish species.

9.2 Cost recovery mechanisms

The cost recovery system established in the new Fishery Law through the creation of the Fisheries Development Fund has not yet been implemented. The purpose for the use of the money is clearly established: implementation of fishery management services, but the level of cost recovery will be low under the current incentives system for the fishery sector and the allocation of money from fishery fees to several peripheral institutions.

If it is assumed that the level of cost recovery should be in the order of 2 percent of the value of the fishery landings then an appropriate budget for fisheries management services in Nicaragua could be in the order of US\$2 million per annum. Use and access rights fees are to be paid in all fishing activities for commercial purposes.

9.3 Issues associated with ability to pay

Keizire (2001) points out that from information provided by empirical studies the potential economic rents in fisheries typically range from 10–60 percent of the gross value of landings. In Nicaragua, the gross value of landings may be estimated in the neighbourhood of at least US\$100 million. Hence, the potential rents should be at least US\$10 million and quite possibly as high as or higher than US\$50 million annually.

In comparison, the annual expected costs of fisheries management have been estimated at approximately US\$2 million. Thus, it seems clear that it is technically possible to recover from the industry the full costs of fisheries management services. It is another question whether it is economically feasible to aim for full rather than a partial cost recovery.

It is important to note that although full cost recovery may be technically achievable, it may not be politically feasible. The Nicaraguan fishing industry has resisted the imposition of charges, especially under the argument that “the financial situation of the fleets and companies are not in good shape”, and the Government has been trying to promote the increase of exports in general through a general policy of incentives (usually through a generous system of vast tax exemption rules). For this case of natural resources exploitation, the result has not been positive in terms of sustainable use and proper management.

Some of the analyses presented in this document clearly show that an appropriate level of cost recovery in Nicaraguan fisheries will be difficult to attain under the current level of fiscal incentives, poorly chosen ways of allocation of the fishery fees, and poor monetary value given to the fishery resources.

10. FISHERIES MANAGEMENT SERVICE PROVIDERS

10.1 Types and levels of services provided by nongovernment sources

At present all fishery services in Nicaragua are provided by the National Government. In aquaculture some scientific research is provided by local universities on new species for fish culture and new culture methods. They also support small cooperatives with training on production systems and organization.

The recent process of decentralization of management functions from the National Government, i.e. MIFIC, to local Governments (Alcaldías or Municipalities) in districts where there are fisheries is a unique process in Central America of local empowerment. However, it does require recognition of the difficulties to manage a complex fishery system with a top-down approach.

In a sense, the central objective of decentralization is promoting comanagement with the Alcaldías administering the management of artisanal fisheries, particularly in registering all artisanal fishers, in issuing fishing permits and identification cards, developing the collection of catch statistics and the creation of statistical databases. The Alcaldías also benefit from collecting taxes. At present, 13 Alcaldías out of 40 have already signed the decentralization agreement with the DGRN of the MIFIC. The plans are to have 100 percent of the local governments decentralized by year 2010.

10.2 Services delivered by fishery participants

At present no services are delivered by fishery participants in a formal and regular manner. Since 2002, some control and surveillance has been carried out during closed seasons, particularly for spiny lobster, but has

involved fully provisioned industrial boats provided by some fishing companies looking for lobster traps not hauled out from the water prior the beginning of the closed season.

In compensation for provisioning the boats, the companies keep the ropes recovered. Some vessels also carry fishery inspectors to check the operations and biologists to sample the lobsters retained in the traps. All lobsters found alive are returned to the sea. All of these operations are carried out in close cooperation with the Navy.

10.3 Actions to meet fisheries management objectives and/or options to do so

Actions that have improved the overall capability to meet fisheries management objectives have been the development of an updated fishery legal framework, particularly the development of the guidelines of the national fishery policy in 2001 and the approval of the Fishery Law in 2004 and its bylaws in 2005. This fishery legal framework has clearly established management objectives and the instruments and ways to achieve them. Other actions have been the development of sustainability criteria for shrimp and lobster fisheries and advanced stock assessment methods whose results (biomass and fishing mortality levels) are the basis for computing TACs. Also a complex computer based statistical database of landings, fishing effort, processing and exports have been developed.

Several actions have been taken to improve management services. Among these are the development of the National Register of Fisheries and Aquaculture, a computer based database for computing the revenues from user and access rights fees, and a general diagnosis of the aquaculture sector to improve its planning. One very important step towards the development of a co-management approach has been the decentralization process of management services in artisanal fisheries to local governments, a course of action started in 2004.

Improvements need to be made in terms of monitoring, control and surveillance. Currently, there is a lack of both the personnel and the means to carry out the service in a more efficient way.

Although the Fishery Law mandates the creation and administration of a fisheries development fund for all fisheries management services, the way the revenues from fishery fees are allocated is not particularly useful. The funds available are to be distributed among several actors in such a way that allows little money to be left to the Fund. Moreover, fishery fees are low and not in proportion to the value of the fisheries resources, and the process is distorted by several incentives or subsidies in the form of tax exemptions given to fishers and exporters.

The tax exemption system and the allocation of funds from fishery fees have to be revised and set according to the actual value of the fish resources. However, doing so implies not only amendments in the Fishery Law and also to other related laws, e.g. the Fiscal Fairness Law, which can only be made by the National Assembly (Legislative Branch), but also assessments of the actual value of the fish resources. These aspects will not likely be resolved in the short or medium term, given the political framework currently in place in Nicaragua and the usual strong opposition of many participants in the fishery who collect the incentives provided.

A strong educational campaign and lobby with fisheries stakeholders and decision makers in the Executive and Legislative branches of the Government could promote the idea that properly funded fishery management services are to the benefit of the fishing industry as a whole. As a result, no segment of the industry will benefit from strangling these services through a lack of funds.

Rapid action is required to effectively regulate the fishery sector development by strengthening the implementation of an effective institutional framework with proper financing. Deregulation, decentralization, privatization and the opening up of the economy since the early 1990s is bringing about situations that are very difficult to turn back, once initiated.

A strong institutional fishery management structure can have an important influence on the strength of the link between management and industry. In principle, an institutional framework incorporating a co-management ethos is likely to generate greater industry involvement in (and acceptance of) management decisions.

To better the fishery management process it is also recommended that the Government should clearly distinguish between the expenditures on the administrative aspects of fishery management – such as licenses and permits issuing, fishery data collection from the industry, basic data analysis, etc. – from those required to maintain a productive sector in a long term sustainable way.

Budget preparation and expenditures tracking should also be carried out in close cooperation with the MIFIC central administrative division. This would encourage the realistic definition of the expenditure policy in terms of fishery management objectives, and it would help to ensure that funds are allocated in accordance with policy priorities in an effective manner that allows for increased efficiency in the use of funds. It would also help increase transparency in the budget preparation and tracking process.

11. CONCLUSIONS

Several factors have negatively influenced the sound development of the fisheries sector from a fisheries management point of view.

The organizational component has undergone different changes through the fisheries development. In the 1980s the fishery sector was state-owned: from industrial fishing fleets and the vessels to the processing plants and exporting companies. On that time the fishery sector was ruled by the Nicaraguan Fisheries Institute (INPESCA) with more than 1000 employees receiving a strong support from the national government.

Paradoxically, industrial fisheries operated at very low levels of fishing effort due to the lack of supplies, spare parts, skilled captains, the civil war, and the commercial blockade from the US Government.

Fisheries research had the support from INPESCA and the cooperation from a number of former socialist countries. Monitoring, control and surveillance was carried out by INPESCA in close cooperation with the Navy which on that time had coastguards and ample surveillance coverage at sea.

Although no financial data is available from that period, the INPESCA budget seemed to be high if we consider the number of employees, fishing companies and the companies in charge of domestic and foreign trade. INPESCA was the manager, harvester and trader and was reorganized as a Fisheries Corporation around 1988.

The situation changed at the beginning of the 1990s, after the end of the civil war and with the election of a new government, when a large privatization process was initiated. All fishing companies were given back to the former owners or leased/sold to new investors and all industrial fishing vessels were sold to the captains and sailors or others interested. The trading companies were also sold and privatized. The INPESCA was downsized dramatically.

As the fishery sector was economically depressed after the war, the main objectives of the new government were to recover the operational and exporting levels of the 70s and to rebuild the fishery sector. This meant a change in the role of the State: the new role was to be a facilitator of the business development in the sector in order to increase exports and the earning of foreign exchange. However, the process was not accompanied by an appropriate fishery management strategy. As a result, the fisheries sector developed without proper planning and guidelines for fisheries management and without the supervision of the State.

The process described above has resulted in overcapitalization and overexploitation of the main fish resources. There is no capacity to effectively implement the fisheries management services due to the deficient budget allocated for these purposes, and the chance of obtaining additional funds from penalties on infractions is severely hampered if illegal actions are not prosecuted in an effective way. Fines defined in the new Fishery Law are considerable and – if properly used and managed – could contribute significant funds to the Fishery Management Authorities for the implementation of the fishery management services.

The Nicaraguan fisheries have developed in a direction where the valuable lobster and shrimp stocks have become fully or overexploited both in economic and biological terms. Fishery management faces problems that relate to several well-identified factors, such as organizational structure, conflicting interests, short term interests, overinvestment in fishing effort, and a lack of compliance with regulations. However, there are various positive aspects that could have a constructive impact:

- There is a substantial potential of unexploited resources;
- The shrimp and fish culture have plenty potential for expansion;
- A legal and institutional framework has been worked out that would improve the administration and create the legal mechanisms for effective fishery management;
- There is a substantial improvement in the organizational aspects of the fishery sector; and

- The fishery sector offers very interesting investment opportunities.

As in most other fishing nations, Nicaragua faces significant problems with hard fishing pressure on the important fish stocks. The principal management measures used to control the crustacean fisheries are licence limitations and quotas, closed season regulations, and minimum size regulations. In spite of the different management measures, the fishing effort has increased to a level that is both too high and costly. Nicaragua lacks patrol vessels and their operational funding for controlling its fisheries, both in the inshore and offshore areas. The current fisheries surveillance system is based on a few fisheries inspectors that carry out port, beach and processing plant controls. A satellite based VMS system is considered for the industrial fleet. Four patrol vessels have been pledged by Spain for the future, the funding to operate these expensive vessels is not available, and their existence will impact the budget allocated to fishery management.

The Nicaraguan fishery sector provides a substantial contribution to the overall economy of the country in terms of employment and net income of foreign currency. The overall fishery industry offers solid possibilities to further expansion of its contributions in terms of foreign exchange earnings and food supply for the country's population. Still the fishery sector has plenty of potential to create more productive employment within the harvesting, transformation and fish and shrimp culture branches, provided resources are managed in order to guarantee rational and sustained exploitation on both the artisanal and industrial level.

Under the current circumstances, characterized by an open access policy for the artisanal fisheries and almost lacking MSC to guide the current fishing operations, it is very unlikely that sustainable exploitation can be guaranteed. A strong institutional incidence and funding will be required to successfully provide fisheries management services.

The above mentioned is related with the fact that the State has not accredited the true value of a Nation's property that should carefully and dutifully be administered by the Government. In addition, the development of the fishery sector has lacked an appropriate planning process and the full involvement of the Government in the management of the fish resources. The result has been that all the main fisheries are presently either fully exploited or overexploited by uncontrolled fleets exhibiting high fishing capacities, there is a lack of compliance with fisheries regulations by most users, and the fisheries are generating only low levels of revenues for the Government.

Currently, fishery management in Nicaragua is less than optimal due to under funding of the fishery management authority. This under funding is in sharp contrast with the fact that the fishery sector is currently the third largest foreign exchange earner after coffee and tourism. The fishery sector shows the more dynamic growth since 1990 when fish exports were US\$9.3 million compared to US\$124 in 2000 and US\$96.7 million in 2004.

Fishery management funding has come from the central government treasury, from direct contributions of international donors that funded specific projects, and from fines for illegal fishing activities. In order to improve the financing of fishery management the Nicaraguan government developed the concept of a Fisheries Development Fund, which was introduced in the 2004 Fishery Law. However, one important drawback of this Fund is that not all the revenues drawn from fisheries will enter directly into the Fund; instead some are allocated to local and regional governments and to the National Treasury. This is particularly important concerning the fees generated from access and use rights in the fisheries carried out within the Autonomous Regions in the Caribbean.

Since 1990 the Government of Nicaragua started a downsizing programme of the governmental fishery sector where the role and participation of the State has been greatly reduced. The Government reduced the budget for providing fisheries management services from US\$2 million per annum to almost half a million dollars. With this significant reduction the capacities to deliver efficient fishery management services were severely diminished, particularly in terms of monitoring, control and surveillance. (For example, there were 25 fisheries inspectors in 1996, but not there are less than 15.) The new role of the government as the facilitator for investment is likely not the best solution for the fishery sector, which is a natural resource which requires a major presence in the areas of research, monitoring, surveillance and controls. In the hands of the private industry, the race for fishing is leading to the collapse of various fisheries.

The process described has resulted in large losses of money for the State to capitalize the fishery management services. At the same time, the fishery sector is losing money for improper MCS of illegal size products, trans-shipment and illegal fishing in Nicaraguan waters. A recent study (Ehrhardt, 2005) shows

that unreported landings of undersized Caribbean spiny lobster could represent accumulated losses of about US\$60 million in the last five years. The Government has allowed the fishing industry to self-manage, but the MIFIC has not had the proper level of authority to impose penalties without the opposition from the industry. In turn, the industry has not acknowledged the long term consequences for not adopting proper fishery management actions.

Nicaraguan fishery management expenditures appear to be small in comparison to the other countries for which estimates have been made. The discrepancy between the costs of fisheries management and the actual benefits generated by this management is fundamentally the result of the absence of a direct link between those who benefit from the expenditures and those who pay for them. The industry is happy to enjoy any perceived benefits of fisheries management without worrying about excessive management expenditures as long as they do not actually pay for them. There exists a generous system of incentives (subsidies) to the fishery sector which impedes the establishment of a proper cost recovery system.

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FUNDING FISHERIES MANAGEMENT: THE CASE OF NEW ZEALAND, 1985–2004

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ABBREVIATIONS

ACE	annual catch entitlement
CRAMAC	Crayfish Management Company
CSEC	Challenger Scallop Enhancement Company
DoC	Department of Conservation
EEZ	exclusive economic zone
ITQ	individual transferable quota
MFish	Ministry of Fisheries
NRLMG	National Rock Lobster Management Group
QMA	Quota Management Area
QMS	Quota Management System
RCC	Research Coordinating Committee
RLIC	Rock Lobster Industry Council
SeaFIC	New Zealand Seafood Industry Council
SOI	Statement of Intent
TAC	total allowable catch
TACC	total allowable commercial catch

EXECUTIVE SUMMARY

Introduction

The funding of fisheries management in New Zealand over the last two decades is a story of fundamental principle, public policy experimentation, legal challenge and collective resolution of difficulties through research, review and constructive dialogue between stakeholders and the government. Importantly, funding issues cannot be separated from the evolution of fisheries management itself. Reviewing this history and tracing the maturing of fisheries management and its funding in New Zealand reveals many legal and institutional design lessons for fisheries managers in developed and developing countries.

Institutional Context

The Fisheries Act 1996 forms the statutory basis for all fisheries management by the Crown (Government) in New Zealand. Separate management systems exist for recreational, customary Māori, (New Zealand's indigenous peoples) and commercial fisheries. The purpose of the Fisheries Act 1996 is to enable the utilization of fisheries resources while ensuring sustainability.

The Ministry of Fisheries performs the majority of the Crown's fisheries management responsibilities. The primary purpose of the Ministry of Fisheries is to ensure that marine fisheries are sustainably used within a healthy aquatic ecosystem.

The Fisheries Act 1996 allows many duties and powers that are the responsibility of the Chief Executive of the Ministry of Fisheries to be delivered by the Ministry or by a service delivery agency under a contract. The Act also provides for devolved services where an external organization has responsibility for both purchasing and ensuring the provision of relevant services.

Funding of Fisheries Management 1985 to 2004

The current system for funding fisheries management has developed over many years in response to external public sector reforms and changes to internal operating practices within the Ministry of Fisheries. The Ministry receives its funding as an appropriation from Parliament. The Fisheries Act 1996 enables the Crown to recover some of these costs from the commercial fishing industry through the cost recovery regime managed by the Ministry.

History

1985 to 1994

Prior to cost recovery there was limited recovery of the public costs of fisheries management. Government recovered some costs through transaction fees. The Government also required the commercial fishing industry to pay resource rentals for both quota and non-quota species. Approximately \$22 million per annum of resource rentals were being paid by the commercial industry in 1994.

1994 to 2001

A cost recovery regime was introduced for the first time from 1 October 1994. The obligation to pay rentals was also repealed. In the first year of cost recovery the industry paid levies of around \$34.6 million. There was an expectation, however, that the amount of levies payable would reduce over time as cost recovery brought about efficiency gains within the Ministry and as the industry moved to undertake a more direct role in fisheries management and the purchase of research.

The key features of the cost recovery regime operating from 1994 to early 2001 were:

- The purpose of the cost recovery regime was to “enable the Crown to recover its costs” in respect of fisheries services and conservation services.
- The Ministry applied a policy known as the “avoidable cost” principle as a matter of administrative practice. This attempted to recover all costs incurred by the Government due to the existence of the commercial fishing industry.

Levy rates were set annually and recovered management costs incurred during a fishing year in monthly payments over the course of that fishing year. Prior to fixing any annual levy, the Minister was required to consult with the commercial fishing sector on the costs to be recovered by way of levies.

As a result of external reviews held during 1996 and 1998 changes were made to the cost recovery regime in 1999. The new regime came into full effect in early 2001 and remains the regime in operation today.

Current funding regime

The central feature of the revised cost recovery regime is a statutory statement of principle on which cost recovery is based. Five principles in the Fisheries Act provide that:

- Persons who request a service must pay for that service.
- Costs of services “provided in the general public interest, rather than in the interest of an identifiable person or class of person” cannot be recovered and are borne by the Crown.
- Costs must, so far as practicable, be “attributed” to the persons who benefit from the expenditure.
- Persons who cause risk to or an adverse effect on the aquatic environment must, as far as practicable, pay the costs of services required to manage those risks or adverse effects.

Private costs of fisheries management

Little formal study of the private cost of complying with fisheries management legislation and participating in public fisheries management processes has been carried out in New Zealand. Costs imposed on the sector by government regulation have a major impact on the viability of the industry:

- International competitors are often subsidized. New Zealand does not subsidize its seafood industry.
- The seafood industry’s share of the world markets is small and there are many competing seafood products so the industry is unable to pass along increases in costs.
- Māori have significant interests in commercial fishing and increasing cost recovery levies would reduce the value of the Treaty settlement over the allocation of commercial fishing rights potentially leading to further Treaty grievances against the Crown that hinder the development of the industry.

Statutory funding of private fisheries management costs

New Zealand’s government recognizes that private costs can be incurred in “industry good” activities such as industry representation by professional staff during consultative processes. The Commodity Levy Act 1990 enables many commodity producing industries, including the seafood sector, to finance industry-good activities where voluntary funding would lead to a 'free-rider' problem or would be impracticable. To raise a levy under the Act an industry group must first hold a referendum and gain 50 percent support of those responding and 50 percent by volume of production. The levy is compulsory and all producers of the commodity must pay. The Commodity Levy Order lasts for 5 years. To renew or amend the Order a new referendum is required.

The Seafood Industry Commodity Levy came into force on 1 April 2002 and lasted until 31 March 2007. The levy is used to fund core activities of the New Zealand Seafood Industry Council, including:

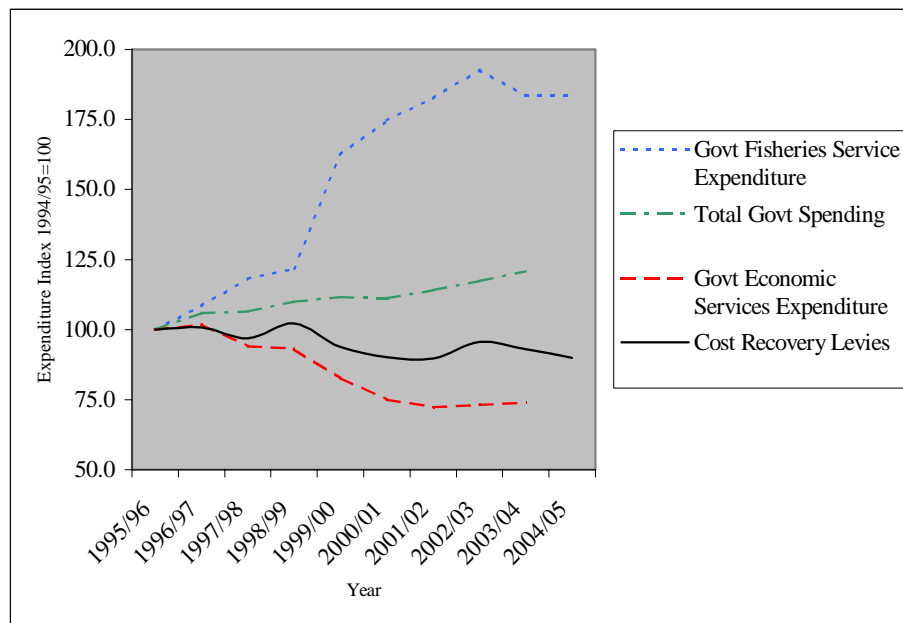
- Policy issues affecting the New Zealand seafood industry.
- Promotion of the New Zealand seafood industry.
- Research, science and technical services relating to the New Zealand seafood industry.

Patterns and trends in public fisheries management funding 1985 to 2004

Total fisheries management costs in New Zealand have increased in real terms far faster than commercial fisheries cost recovery levies, general government expenditure or in like sector-based government agencies.

The drivers of this increase appear to be non-commercial such as recreational and customary fisheries management, non-commercial fisheries and marine environment related research and the detection of criminal black market and poaching activities. These management costs are not cost recovered because they

are not directly attributable to the commercial fishing sector. Cost recovery from the recreational and customary sectors is politically unacceptable in New Zealand.



In contrast, the cost of managing commercial fisheries has stayed constant in real terms and fallen dramatically as a proportion of total fisheries management expenditure over the period of the study. This suggests the cost-recovery regime for commercial fisheries has been successful in driving efficiency gains in the public costs of commercial fisheries management. Relative stability in real terms of the cost recovery levies since the introduction of the present regime in 2001 also suggests that it has been successful in give certainty to commercial fishers about the level of cost recovery.

Although not conclusive, the quantitative evidence available indicate that the commercial cost recovery system has been fiscally successful as well as giving rise to greater accountability and transparency in fisheries management funding.

Lessons learnt

The system of funding commercial fisheries management in New Zealand is successful in:

- Recovering the costs of fisheries management from the commercial industry.
- Creating transparency and accountability in the delivery of commercial fisheries management services.
- Involving industry in both the determination of commercial fisheries management services and, in some instances, the delivery of fisheries management services.
- Generating efficiencies in the delivery of commercial fisheries services.

Fisheries management regimes with the following characteristics are the most likely to be successful in implementing a New Zealand style of cost-recovery:

- A general public sector ethos of transparency, efficiency and accountability.
- A clearly identifiable and commercial fishing sector.
- A system of fishing rights that have a high degree of durability and hence form the basis for attributing costs and collecting levies.
- Effective commercial stakeholder organizations that represent the commercial industry and can engage government agencies in constructive dialogue and negotiation over cost recovery.
- Government agencies that have strong policy and administrative capabilities.

Clear principles and cost recovery rules are required from the start of any cost recovery regime. The initial absence of any legislated cost recovery principles came close to destroying the integrity of New Zealand's cost recovery regime. Although some tension remains about cost recovery rules as currently legislated, their existence at least provides a foundation for ongoing constructive dialogue between the MFish and the commercial industry.

Accountabilities must be clearly defined and accepted by all parties. Management agencies must provide financial information to industry at a sufficiently detailed level so that it is transparent as to what services the industry is contributing to and whether these costs are consistent with specified cost recovery rules.

Designing and administering a cost recovery system based on cost attribution is complex and resource intensive. Engaging stakeholders in the process has high transaction costs for both participants and the management agency. Nevertheless, not to engage stakeholders reduces the likelihood of acceptance of the attribution system and will do little to bring about efficiencies in the delivery of fisheries services since it tends to be the levy payers who have the greatest incentives to see efficiencies occur.

Any jurisdiction considering implementing a comprehensive cost recovery regime should anticipate initial high transaction costs and perhaps a short-term reduction in efficiency. There is a need to implement new procedures and processes to ensure transparency and accountability. These will inevitably need revision and review in light of actual performance. Stakeholders will naturally demand a greater say in the delivery of services once they become responsible for their funding. At times it will be difficult to separate out behaviours intended solely to reduce industry costs in the short-term from those genuinely intended to improve the performance of the systems. Management agencies must be committed not just to the recovery of costs of fisheries management but to maximising the value derived from the management of a nation's fisheries resources through a suite of policy instruments, of which cost recovery is one.

INTRODUCTION

The funding of fisheries management in New Zealand over the last two decades is a complex story. It is a unique tale of fundamental principle, public policy experimentation, legal challenge and collective resolution of difficulties through tens of thousands of hours of research, review and constructive dialogue between stakeholders and the government. Importantly, funding issues cannot be separated from the evolution of fisheries management itself. Reviewing this history and tracing the maturing of fisheries management in New Zealand reveals many legal and institutional design lessons for fisheries managers in developed and developing countries.

By international standards New Zealand has a low cost system of fisheries management. The cost of fisheries management relative to the landed value of New Zealand's catch is four percent compared to an OECD average of 17 percent (Ministry of Fisheries, 2004a; OECD, 2003). Such international comparisons refer to the costs of fisheries services provided by public agencies and for mostly data collection reasons ignore private costs incurred by fishers and other stakeholders.

This convention is generally followed in this paper. Only costs directly attributable to public sector management are measured for the whole period 1985 to 2004. The OECD (2003, p. 12) considers that public management costs relate to:

- Research to inform fisheries management decision-makers (research services).
- Creating and implementing fisheries management systems (management services).
- Enforcing fisheries management rules (enforcement services).

Nevertheless, where appropriate, private sector costs are described where they can be identified as directly contributing to these fisheries management activities.

This paper is organized as follows. Part One provides an overview of New Zealand's fisheries, their management and key institutions.

Part Two traces the evolution of fisheries management funding in New Zealand from 1985 to 2001. It looks at both changes in funding policy and changes in funding itself. Two periods are examined: 1985 to 1994 when resource rentals were charged, and 1994 to 2001 where resource rents were replaced by a system of cost recovery of management costs from the commercial fishing industry.

Part Three looks at funding regime for fisheries management in New Zealand that has been in place since 2001. It addresses the funding of central Government fisheries management activities and describes the devolution and delegation of some commercial management activities to New Zealand's commercial fishing sector.

Part Four examines patterns and trends in fisheries management expenditure from 1985 to 2004 with particular emphasis on era of cost recovery 1994 to 2004. Part Five explores case studies that highlight issues of funding policy, cost-effectiveness and accountability. These case studies are:

- Fisheries research services and cost recovery.
- Delegation and devolution of fisheries management responsibilities and efficiency gains.
- Complexities of moving from cost recovery principles to implementation.
- Cost recovery and financial accountability: The saga of "unders" and "overs".

Part Six discusses key issues, possible future directions and broad lessons for funding the management of commercial fisheries.

1. OVERVIEW OF NEW ZEALAND'S FISHERIES, MANAGEMENT AND KEY INSTITUTIONS

1.1 Overview

The New Zealand exclusive economic zone (EEZ) is the fourth largest in the world at approximately 1.3 million square nautical miles. A characteristic of the EEZ is its depth, with 72 percent in waters more than 1 000 metres deep, 22 percent between 200-1000 metres, and only 6 percent less than 200 metres. Fishing

within the EEZ is heavily reliant on species found in waters at depths ranging from 200-1200 metres, rather than species found in shallower waters.

Despite the size of the New Zealand EEZ, its fisheries resources are not as abundant or productive as in many other parts of the world. Contributing factors include a narrow continental shelf, a lack of nutrient upwellings, and being on the periphery of the range of highly migratory species such as tuna. Nevertheless marine ecosystems and species are considered diverse (Ministry of Fisheries, 2004). About 8 000 marine species have been found in New Zealand waters, including 964 species of fish, 2 000 species of molluscs (snails, shellfish, and squid), 400 species of echinoderms (sea urchins, starfish), and 900 species of seaweed.

The commercial fisheries sector is New Zealand's fifth largest export earner. In 2003, the export value from the fishing industry was NZ\$1.2 billion. Exports account for by far the largest proportion of the product with about 88 percent by value being exported. The industry is also a large employer, involving some 26 000 people through direct employment and flow on effects. Unlike most other countries, the New Zealand industry receives no government subsidies.

The Fisheries Act 1996 forms the statutory basis for all fisheries management by the Crown. Separate management systems exist for recreational, customary Māori, (New Zealand's indigenous peoples) and commercial fisheries. The purpose of the Fisheries Act 1996 is to enable the utilization of fisheries resources while ensuring sustainability, and it includes provisions for:

- Environmental protection.
- Customary fishing regulations.
- Recreational fishing regulations.
- Bringing new species into the quota management system.
- Resolving disputes between fishers over access.
- Consultation on fisheries management.

Recreational marine fisheries are managed as open access fisheries and, as such, are either non-exclusive or excludable at only very high cost, and the rights to the fisheries are held in common. Recreational regulations determine daily bag limits, minimum fish sizes, method and gear restrictions, closed areas and closed seasons.

The management of customary Māori fisheries is based on a territorial use rights system where harvesting rights are restricted to specific groups or communities. Shares are allocated within the group through a variety of administrative or negotiated processes such as rahui (ban on taking of kai moana (seafood)), mataitai (area of seashore that is managed as a traditional subsistence fishery by iwi or hapu (tribe or sub-tribe)), taiapure (area of coast that is managed by an iwi committee that has customary authority to make rules regarding access and exploitation rates that are legally binding on all fishers). Tangata Kaitiaki (guardians) are nominated by iwi or hapu and appointed by the Minister of Fisheries to approve the collection of kai-moana for customary purposes. In most cases there is no exclusivity to the stock, though spatial exclusivity is guaranteed in the case of mataitai, so they are affected by (and in turn affect) extractions from the same stock by commercial and recreational fishers.

The main method for managing commercial fisheries is the quota management system (QMS). The characteristics, strengths and weaknesses of the New Zealand QMS are well documented in the fisheries management literature (see, for example, Bess and Harte, 2000; Batstone and Sharp, 1999; Clark *et al.*, 1988; Dewees, 1989; Harte, 2001; Hersoug, 2002; Memon and Cullen, 1992; Sissenwine and Mace, 1992). For each QMS species, New Zealand's 200 mile Exclusive Economic Zone is divided up into a number of management areas known as quota management areas (QMAs). The Minister of Fisheries sets an annual total allowable catch (TAC) for each fish stock in each QMA. In general, the TAC is set at a level that ensures the fish populations remain at or above a level that will produce the maximum sustainable yield. An allowance is made within the TAC for customary Māori fishing, recreational fishing and any other sources of fishing-related mortality. The remaining portion of the TAC is known as the TACC or total allowable commercial catch.

Comprehensive in its application, 93 species or groups of species – representing over 85 percent of the total known fish catch in the EEZ – are currently managed as 550 separate fish stocks under the QMS. The large number of stocks arises for historical, biological and administrative reasons. Generally, New Zealand's EEZ

is divided into 10 QMAs. Unless there are biological reasons for aggregating quota management areas (or subdividing them further) each species is managed as 10 separate stocks. The few remaining non-QMS commercial fisheries are managed through restricted entry licensing, catch limits and gear restrictions. Table 1 provides an overview of New Zealand's fisheries.

Table 1: New Zealand fisheries: an overview

EEZ size	3.37 million square km
NZ Coastline	113 000 km
Marine species described	8 000
Species commercially fished	130
<i>Quota Management System stocks</i>	
Number of species/species complexes in the QMS	93
Individual stocks	550
Information available on stock status	60-70% of stocks
Stocks at or near target level	80%
<i>Customary Fisheries</i>	
Taiapure-local fisheries	7
Mātaitai reserves	3
Tangata Tiaki appointed (South Island)	124
Tangata Kaitiaki appointed (North Island)	135
<i>Recreational Fisheries</i>	
Recreational fishers (as a percent of the population)	20%
<i>Commercial Rights Holders</i>	
Tonnes caught	> 580 000
Total quota asset value	NZ\$3.5 billion
Total export value 2003/04	NZ\$1.2 to NZ\$1.5 billion
Marine farming exports	NZ\$200 to NZ\$300 million
Direct subsidies	Nil
Persons with quota holding	2 200
Commercial vessels	2 100
Processors and Licensed Fish Receivers	200
Direct employment	10 000
<i>Ministry of Fisheries</i>	
Staff	378
Budget 2004/05	NZ\$76.5 million

Source: Ministry of Fisheries, 2004, p 3.

1.2 Government agencies with fisheries management responsibilities

Two government agencies give effect to the majority of the Crown's fisheries management responsibilities:

- The Ministry of Fisheries.
- The Department of Conservation.

The costs incurred by these agencies in the management of fisheries are considered government fisheries management costs for public finance purposes.

1.2.1 Ministry of Fisheries

The primary purpose of the Ministry of Fisheries (MFish) is to ensure that marine fisheries are sustainably used within a healthy aquatic ecosystem. The role of MFish in collaboration with other government agencies, is advising on and implementing government policy in the following areas of responsibility: ensuring ecological protection and sustainability; meeting international and Treaty of Waitangi obligations; enabling efficient resource use; and ensuring the integrity of management systems.

For each of these core responsibilities, MFish exercises many functions, for example:

- Ensuring ecological sustainability:
 - Researching and monitoring the health of fisheries and the aquatic environment and the effects of fishing on the aquatic environment.
 - Specifying environmental standards related to the use of fisheries and the impact of fishing on the aquatic environment.
 - Maintaining the potential of fisheries resources to meet the reasonably foreseeable needs of future generations.
 - Setting, implementing and enforcing sustainability measures.
- Meeting Treaty of Waitangi obligations:
 - Involving Māori in fisheries management decision making.
 - Delivering 20 per cent of new quota to Māori.
 - Providing for and protecting customary fishing rights.
- Enabling efficient resource use:
 - Defining and allocating rights to use fisheries resources.
 - Providing management frameworks to allow rights holders to exercise those rights.
 - Recognising and protecting New Zealand's fishing and conservation interests during the negotiation of international agreements.
- Ensuring the integrity of management systems:
 - Evaluating and monitoring fisheries plans.
 - Setting standards and specifications for services such as research and registry administration.
 - Managing fisheries and aquatic environment information.
 - Delivering criminal law enforcement and prosecution services.
 - Ensuring management and information frameworks are consistent with New Zealand's international fisheries obligations.

MFish has approximately 380 staff and has offices in 20 locations around New Zealand.

1.2.2 Department of Conservation

The Department of Conservation (DoC) has a statutory function to advocate for conservation of natural and historic resources. It has responsibility for marine reserves and protecting marine mammals and seabirds. MFish works with DoC on operational advice concerning protected species interactions with fishing, and marine reserve proposals under the Marine Reserves Act. The views and input of DoC officials are often sought in the development of MFish policy. DoC regional offices interact with MFish staff at a local level on fisheries related issues.

A Memorandum of Understanding formalizes the way MFish and DoC work together. It is aimed at ensuring co-operation in a number of areas including: protected species fisheries interactions, marine reserves, biosecurity risks, research and the nature and extent of fisheries and conservation services.

1.2.3 Other central government agencies with fisheries related roles

A number of other government agencies have fisheries-related roles. These are carried out during the exercise of wider duties, functions and powers and as such are not generally considered fisheries management costs for public finance accounting purpose. With the exception of the NZ Defence Force, these costs are likely to be small relative to overall agency budgets. However, the inability to accurately account for the cost of these activities will result in an underestimate of the public cost of fisheries management.

These other agencies include the following:

- Ministry for the Environment that works with MFish on environmental indicators for fisheries, marine farming, and oceans policy. The Ministry for the Environment also provides input on a range of fisheries policy issues and a statutory role in relation to devolution of fisheries services to an Approved Service Delivery Organization.
- Ministry of Foreign Affairs and Trade is the lead government agency on most international fisheries issues, MFish provides specialized technical support to the Ministry of Foreign Affairs and Trade.
- Ministry of Agriculture and Forestry has the lead role in implementing the Biosecurity Act 1993 in terrestrial, marine and freshwater environments.
- The New Zealand Food Safety Authority is a separate organization attached to the Ministry of Agriculture and Forestry. It is New Zealand's controlling authority for imports and exports of food and food related products.
- Ministry of Research, Science and Technology and Foundation for Research, Science and Technology assist MFish to determine research and funding priorities in fisheries research and minimize the overlap of research between funding organizations.
- New Zealand Police provide MFish with operational assistance for enforcement activities. Sworn members of Police are deemed to be Fishery Officers under the Fisheries Act 1996.
- New Zealand Defence Forces have responsibilities for surface and aerial surveillance of the EEZ. MFish and the Defence Forces share information on offshore fishing operations to ensure that surveillance efforts are directed at the areas of highest risk and that fisheries related surveillance capacity is efficiently utilized.

1.3 External service providers

The Fisheries Act 1996 allows many duties and powers that are the responsibility of the Chief Executive of the Ministry of Fisheries to be delivered by MFish or by a service delivery agency under a contract. The Chief Executive retains accountability for the provision of a contracted service. Most fisheries research services in New Zealand are contestable services.

The Act also provides for devolved services where an external organization has responsibility for both purchasing and ensuring the provision of relevant services, with the agreement of the Minister of Fisheries. In such cases, the Chief Executive of the Ministry of Fisheries is no longer accountable for provision of the service. Once functions, duties and powers are devolved to an external organization the specific related services become the sole responsibility of the organization to deliver. Failure to comply with the statute and standards and specifications can lead to civil sanctions imposed on the organization.

1.3.1 FishServe

Many registry-based QMS services are devolved or contracted to the New Zealand Seafood Industry Council Ltd (SeaFIC) as an approved service delivery organization. Commercial Fisheries Services, a wholly owned subsidiary of SeaFIC, delivers these services. It operates under the brand name "FishServe".

Functions, duties and powers devolved to FishServe include:

- Registering clients and vessels.
- Licensing fish receivers.
- Issuing catch return books and operating returns management processes including electronic data transfer for statutory reporting.
- Processing quota and annual catch entitlement transactions, including mortgages and caveats.
- Reconciliation of fishers' actual catches against their catch entitlements.

In addition to devolved services, FishServe provides services under contract to MFish. Contracted services include:

- Delivery of catch effort services, including issuing return books and the returns management process.

- Issuing fishing permits.
- Registering foreign owned vessels, charter vessels, and fish carriers.
- Monitoring catch limits.
- Delivery of revenue services, including invoicing, receiving and debt management of cost recovery and deemed values.

1.3.2 National Institute for Water and Atmospheric Research

Research projects are let through a contestable tendering process where tenders are evaluated on a best value basis, combining aspects of both quality and cost. Most contracts for fisheries research, in what is still a relatively “weak” market, have been awarded to the National Institute for Water and Atmospheric Research Limited (NIWA). As well as its research activities, NIWA maintains, under contract to MFish, research databases and other research information.

1.4 Stakeholder Groups

The Fisheries Act 1996 requires the Minister of Fisheries to consult with stakeholders including Māori, the commercial fisheries sector, recreational fishing interests and environmental groups before making many statutory decisions. The costs incurred by these groups through engaging in the public fisheries management process are part of the private costs of fisheries management in New Zealand.

1.4.1 The New Zealand Seafood Industry Council Limited

SeaFIC is an industry owned limited liability company that represents the interests fishers, harvesters, the marine farming sector, processors, retailers and exporters. It provides professional advice to Government and the industry on fisheries management policies and practices and scientific issues.

A board of directors manages SeaFIC. The shareholders are principally commercial stakeholder organizations. The company is organized into the following business units:

- Science.
- Business Policy.
- Trade and Information
- Industry Training.

The Science group are responsible for fisheries science, research and development, while Business Policy are concerned with fisheries law and regulations, property rights in capture fisheries and marine farming, and environmental issues. Trade and Information incorporates trade and international policy, seafood standards and the provision of information services to industry. The Seafood Industry Training Organisation (SITO) is responsible for facilitating competence-based training across all areas of the seafood industry, including both industry-specific and generic skills. SeaFIC owns Commercial Fisheries Services Ltd as described previously.

SeaFIC’s shareholders are Commercial Stakeholder Organisations which represent 94 percent of the productive value of the industry, the New Zealand Federation of Commercial Fishermen, the New Zealand Fishing Industry Association, the New Zealand Fishing Industry Guild and the New Zealand Seafood Retailers and Wholesalers Association.

There are over 30 Commercial Stakeholder Organisations representing specific fisheries or geographic regions. They have several key functions in common (Bess and Harte, 2000):

- To facilitate the collection of funds to finance fisheries management activities, such as research or by-catch mitigation monitoring, and to manage the delivery of such services.
- To represent the interests of commercial fishers in government processes that involve consultation such as the determination of government required fisheries management services and the setting of sustainability regulations.
- To promote the expansion and development of commercial management rights.

The Commercial Stakeholder Organisations are varied in organization and structure to best meet the needs of the commercial fishing interests they represent.

1.4.2 Te Ohu Kaimoana

Te Ohu Kaimoana (Te Ohu) was established by the Māori Fisheries Act 2004. Te Ohu is the corporate trustee of Te Ohu Kai Moana Trust – the trust responsible for advancing the interests of iwi (tribal groups) in the development of fisheries, fishing and fisheries-related activities. Its main task is the administering, allocating and transferring treaty settlement fisheries assets to mandated iwi organizations.

Te Ohu plays a vital advocacy role on behalf of Māori. Te Ohu aims to provide a central voice when any legal reforms are proposed that relate to either the seafood sector, or ownership/management of marine and freshwater environments.

1.4.3 Other stakeholders

There are a number of environmental groups with strong interests in the sustainability of fisheries and the effect of fishing on the environment.

Marine recreational fishers do not belong to recreational fishing organizations. However, several recreational fishing stakeholder organizations represent or advocate for the recreational fishing sector.

Most customary Māori fishers are not adequately resourced to participate in statutory consultation processes, although programmes are in place to address this.

1.5 Marine farming

Until the end of 2004 MFish was responsible for allocating rights for marine farming in the form of marine farming permits, and assessing the impact of marine farming on capture fisheries. Regional Councils (a level of local government) manage the effects of aquaculture on the wider marine environment.

A reform of marine farming management that came into effect at the beginning of 2005 gave regional councils greater powers to manage and control the development of marine farming by requiring new developments to take place within marine farming management areas. Regional councils now have sole responsibility for managing the adverse effects of marine farming on the environment, including effects on fisheries resources. To provide ongoing protection of fisheries interests, including the Crown's obligations to Māori under the Deed of Settlement, MFish will retain the role of determining whether the establishment of a proposed Marine Farming Management Area will have an undue adverse effect on fishing. MFish will also maintain a registry of fish farmers, to impose restrictions in relation to the acquisition and disposal of farmed stock.

For the purposes of this paper, marine farming costs incurred by MFish in managing the impacts on capture fisheries resources and permitting activities are counted as fisheries management costs. The costs incurred by Regional Councils in managing marine farming impacts on the wider environment are not included as fisheries management costs.

2. HISTORY OF FISHERIES MANAGEMENT FUNDING IN NEW ZEALAND 1985–2001

2.1 A brief historical context

The evolution of fisheries management funding in New Zealand cannot be separated from the significant and far reaching changes in public sector management philosophy generally and in fisheries management philosophy specifically, that occurred in the mid 1980s (Stokes *et al.*, 2006; Hersoug, 2002). Boston *et al.* (1999) note that public sector reform was dominated by issues relating to:

- The appropriate design of incentive structures and governance arrangements.
- Avoiding provider capture.
- Contestability and external contracting of services.
- The minimisation of transaction costs and agency costs.
- The tighter specification of public services as outputs and outcomes.

The resulting public sector reforms are characterized as (Stokes *et al.*, 2006; Hersoug, 2002):

- The decentralisation of management responsibilities.
- A shift from input to outcome based management reflected in an output related appropriation system.
- Commercialisation of many public services (e.g. science).
- A shift in emphasis from public service to customer service.
- Separation of policy and operational responsibilities and an output related appropriation system.

As the following sections will show, these forces shaped the evolution of fisheries management funding. Several specific fisheries related developments are also seminal forces (MFish, 2004a). These are:

- The establishment of New Zealand's EEZ in 1982, from which time New Zealand assumed management control of all fishing in the 200 nautical mile zone.
- Reflecting market-based public sector reforms, the introduction of the Quota Management System in 1986 and its application to most major commercial fisheries.
- The Treaty of Waitangi (Fisheries Claims) Settlement Act 1992 providing for the settlement of Māori fishing claims. The settlement gave Māori a stake in New Zealand's fishing industry and provided for ongoing non-commercial customary fishing rights.
- The implementation of cost recovery in 1994 requiring the commercial sector to pay the costs of the services that support their fishing activities.
- The establishment of the Ministry of Fisheries as a stand alone Government agency in 1995 and the concomitant commercialisation of fisheries research services by transferring them to the National Institute of Water and Atmospheric Research, an independent Crown Research Institute.
- The Fisheries Amendment Act 1999 establishing the framework within which approved service providers could supply specified fisheries services.

2.2 Fisheries funding policy 1985 to 1994

Prior to the introduction of the QMS in 1986, nearly all the costs of fisheries management funding were borne by the Crown and funded through budget appropriations. These appropriations were ultimately funded through New Zealand's general taxation system. The exceptions were some transaction fees charged for commercial fishing licences and related administrative services.

In 1986 the QMS was introduced for 29 species and fishers were allocated individual transferable quotas based on catch history and a secondary assessment of their commitment and dependence to the fishery. Quota owners were required to pay resource rents on the quota they held.

Resource rental rates were set out in a schedule to the Fisheries Act 1983. Under section 107G of the Act, the Minister was required to set rentals having regard to:

- The value of individual transferable quotas for the species or class of fish.
- The net returns and likely net returns to commercial fishermen for fish caught; including any difference in operating costs of foreign owned New Zealand fishing vessels and other New Zealand fishing vessels.
- Any relevant changes in total allowable catches.
- Any submission made to the Minister under subsection (6) of this section.
- Such other matters as the Minister considers relevant.

The rates could be varied by the Governor General by Order-in-Council on the recommendation of the Minister of Fisheries. Rental increases were not to exceed 20 percent in any one year and the Minister was required to consult with the industry before making any recommendation.

The rationale for charging resource rents was complicated. McClurg (2000) suggests the government had three distinct yet simultaneous objectives with its rental policy:

- Provide revenue to offset fisheries management costs. Government intended that the QMS would be self funding but did not directly link the costs of managing commercial fisheries to the resource rents charged.
- Minimize the fiscal impact of the Crown's QMS management risk. When the QMS was created ITQ was awarded as a fixed tonnage. If the TACC was reduced, the Crown was required to buy back quota. If the TACC was increased, the Crown was entitled to sell ITQ. Resource rents were intended to "tax away" super profits and keep the price of quota low. The Crown's fiscal liability in the event of having to buy back quota was therefore minimized.
- Capture some of the economic rent generated by TACCs/ITQs as a return to the public. Conventional thinking held that excess rents or super profits were generated under the QMS because rent dissipating behaviours such as the race for fish and overcapitalisation were suppressed under ITQ systems.

McClurg (2000) states that the rental regime was designed to encourage low quota prices. Minimizing entry costs to the industry and discouraging speculative ownership of fishing quotas were two secondary objectives of this policy. The then Fisheries Act's mechanisms for setting resource rents were intended to identify these super profits and give effect to the low quota price policy. Not surprisingly given its complexity the resource rental regime began to unravel quickly. There were many reasons for this including:

- Rent seeking behaviour by fishers who during the annual statutory consultation processes presented much evidence that fishing did not generate excess rents beyond normal profits in a risky and capital intensive business.
- An apparent misconception that because fishers did not directly pay for the initial allocation of quota based on catch, supernormal profits and hence rents were generated on the sale of ITQ. However, this ignored the fact that the value of quota could only be realized on its sale and those subsequent purchasers of the rights paid a price based on the discounted value of expected future rents generated in the fishery. In other words rents were captured in the price paid for quota and on the basis of the capitalized value of quota, profits were unlikely to super-normal.
- The Crown was able to sell unallocated quota and itself benefited from higher rather than lower quota prices. In 1987, the Crown raised NZ\$77 million from the sale of quota and NZ\$19.5 million from the lease of quota. In the same year reductions in some TACCs required it to pay out NZ\$42 million leaving it with a net revenue of NZ\$54 million (McClurg, 2000).

By the late 1980s government officials were becoming concerned about the Crown's contingent liability to buy back quota in the event of TACC reductions. TACC reductions had occurred in a number of important fisheries and the Crown had little surplus quota left to sell. In 1990 the Government amended the Fisheries Act 1983 to replace fixed quota with proportional quota thereby transferring the risk of quota cuts from itself to the commercial fishing industry.

ITQs now represented a proportion of the TACC rather than a fixed tonnage. For example in a fishery with a 1 000 tonne TACC, a fixed tonnage of say 200 tonnes was transformed into a 20 percent quota share. If the TACC now decreased to 800 tonnes, the same quota holder's share would be 160 tonnes. Government no longer had to buy quota back at the market price through a complex tendering and compulsory buy-back system.

The commercial industry sued the Crown for NZ\$130 million in damages because of the change to proportional quota. A negotiated settlement resulted in an agreement which caused resource rents to be directed into a compensation fund for quota owners affected by quota cuts. Increases in resource rents were also restricted to the rate of inflation.

Alongside this unravelling of the resource rent regime, two reviews of the QMS system were carried out. Both called for the replacement of resource rents with a cost recovery regime. Pearse (1991, p. 15) wrote:

... the guiding principle in distributing the burden of government charges should be cost recovery: that is, the required revenue should be raised through charges on holders of fishing rights, distributed among them in a way which corresponds, as closely as possible, to the costs they impose on the Treasury.

The second review called for increased accountability and use of market mechanisms in fisheries management (Fisheries Task Force, 1992 pp. 24-25):

The government can ultimately determine the nature and standard of the compliance, research and monitoring services it will purchase in order to ensure environmental bottom lines are met. It is assumed that the costs of supplying these services will be recovered through user charges. Cost recovery is important to ensure the efficient production of those services.

Stakeholders in fisheries are often best positioned to decide what form services should take and what relative priority should be given to different activities. They may choose to purchase certain compliance or research services directly, rather than to pay for them through user charges. The specification of services to be purchased by the government and users is therefore a task which should be carried out within a context of close consultation between the parties.

Also, a uniquely New Zealand factor came into play – the final settlement of Māori claims under the Treaty of Waitangi to commercial fisheries in 1992. In 1989 an interim settlement provided Māori with 10 percent of all quota for species in the QMS at that time. In late 1992, the final settlement provided Māori a guarantee that 20 percent of the quota for any new species introduced into the QMS would be allocated to Māori. During settlement negotiations the concept of Crown ownership of fisheries resources came under intense challenge from Māori and the maintenance of a valid resource rental regime based on the notion of Crown ownership of fisheries resources became untenable. The settlement was therefore the final nail in the coffin of resource rentals. The settlement continues to play a major role in the evolution of fisheries management as it the QMS that is the “currency” of the settlement between Māori and the Crown (Stokes *et al.*, 2006).

By 1992 the debate had become one of cost recovery versus resource rents. The then Ministry of Agriculture and Fishery supported the abolition of resource rentals and replacement with cost recovery on three grounds (Ministry of Agriculture and Fisheries, 1995):

- Under the Treaty settlement it had been established that the Crown had no right to charge resource rents for a resource it did not own.
- Cost recovery would foster efficiency in government provision of fisheries services through accountable and transparent matching of costs and services.
- Cost recovery would encourage greater industry responsibility because more responsible behaviour by industry would mean the need for less regulation and hence lower management costs.

The commercial industry also supported cost recovery in spite of the expectation that cost recovery would collect more than resource rentals since (McClurg, 2000):

- Industry would gain greater say in the specification and efficient delivery of fisheries management services under cost recovery.
- Cost recovery was a more certain way of determining levies compared to a resource rentals calculated by some estimate of economic rent.

Other government agencies and environmental groups opposed the abolition of resource rents on a number of grounds:

- ITQ was a form of exclusive property right granted by the Crown and therefore a return to the community was justified over and above the cost of managing the system.
- The removal of resource rents for fisheries may lead other sectors such as minerals and oil to question the validity of resource rents charged against them.
- That cost-recovery would give the commercial industry an undue influence on quality and quantity of fisheries services provided, particularly research services.

When the commercial compensation agreement for quota reductions expired in 1994, the Treasury supported by other government agencies proposed the retention of resource rents plus the addition of cost recovery (McClurg, 2000). This was supported by the Government of the day. Resource rentals were renamed as “access charges” out of sensitivity to the ownership issues raised in the fishery settlement with Māori. Māori protested that the 1992 Deed of Settlement had been negotiated on the basis that quota owners would face either resource rentals or cost recovery, but not both. They argued that the proposed dual system of rentals

and cost recovery undermined the value and integrity of the settlement. The commercial fishing industry was outraged at the apparent breach of faith given extensive consultation over the introduction of cost recovery. Faced with this opposition, the Government abandoned any notion of charging resource rentals and enacted cost recovery provisions within the Fisheries Act in October 1994. Most other government agencies regarded implementation as hasty because nearly all prior debate had been about principle rather than the implementation and administration of a cost recovery regime. As the next sections shows they were right to be concerned.

2.3 Fisheries funding policy 1994 to 2001

Cost recovery replaced resource rentals in 1994. MFish (1996) considered that:

“its application would introduce transparency and accountability incentives for both the industry and the Government. That is, it would highlight the level of cost created by the industry and also encourage the Ministry to examine its own cost models and structures to ensure that unnecessary costs were not being passed onto industry participants.

The effect for the commercial industry was to move from paying resource rentals of approximately NZ\$22 million in 1993 to paying NZ\$34.6 million in cost recovery levies in 1994. Since cost recovery levies directly replaced resource rentals there was no need for a transitional regime. The commercial industry and MFish expected that the amount of levies payable would reduce over time as cost recovery brought about the efficiency gains and increased industry responsibility for fisheries management (McClurg, 2000; Stokes *et al.*, 2006).

The features of the cost recovery regime operating from 1994 to 2001 included:

- A purpose to “enable the Crown to recover its costs” in respect of fisheries services and conservation services.
- A requirement for the Crown to bear a share of the costs of required services, with the Crown’s percentage contribution in relation to particular categories of expenditure specified initially in the Act and later in an Order in Council.
- The setting of levy rates annually that recovered the industry’s share of management cost incurred during a fishing year. Levies were payable monthly over the course of that fishing year. In 1997 the basis of levying was changed so that levies were set to recover costs relating to a Crown financial year (July-June) but were recovered over the course of the fishing year (October-September).

Prior to fixing any annual levy, the Minister was required to consult on the costs to be recovered by way of levies. The Act required consultation as to:

- The “*nature and extent*” of the fisheries or conservation services, and the costs of those services.
- The “*amount or level or standard*” of the fisheries or conservation services.
- The particular “*projects and activities*” entailed in the fisheries or conservation services, and the “*costs and priorities*” of those “*projects and activities*”.
- The method by which the above costs must be “*shared or borne*” by persons in the industry and the “*rate or levy*” necessary to recover those costs.
- When determining the amount required to be recovered, the Minister was required to have regard to “*fisheries-related fees, levies, and other charges fixed by or under the 1983 or 1996 Act*” and the amount of fees or levies or other charges “*recovered, or recoverable*” under those Acts.

McClurg (2000) suggests that though the concept of cost recovery was discussed in detail between 1991 and 1994, the statutory provisions that introduced the cost recovery regime were drafted hastily with little consultation. There was considerable industry opposition to the actual mechanisms selected by the government for determining the cost recovery charges to be levied. Other government agencies also expressed concern about the speed of implementation and had called for a delay. The Ministry of Agriculture and Forestry and Cabinet Ministers rejected this call.

The rushed introduction soon saw major conflict arise between MFish and the commercial fishing industry. This centred on two issues:

- The interpretation and subsequent application of what services should be cost recovered.
- The accountability of MFish for its expenditure.

2.3.1 The principle of avoidable cost

The Fisheries Act in 1994 did not contain a statement of the “principles” under which cost recovery was to operate. As a matter of administrative practice the Ministry applied a policy known as the “avoidable cost” principle that looked to recover all costs incurred by the Crown due to the existence of the commercial fishing industry. Consistent with the principle of avoidable cost, MFish and the Government held the view that:

all expenditure that arise [sic] purely as a consequence of the existence of commercial fishing should be recovered from the industry. In addition, some non-avoidable costs which are “jointly” shared between the commercial and non-commercial sectors, such as research, should be chargeable to the industry, in recognition of the degradation of non-commercial values as a result of commercial exploitation” (MFish, 1993).

The commercial industry supported by other groups such as the New Zealand Law Commission, questioned the legality of the avoidable cost principle by suggesting its application was unreasonable (Primary Production Select Committee, 1998):

- Even if there was no quota management system or local industry there would be an international obligation for New Zealand to manage its fisheries resources for commercial use and this cost would fall on the Crown.
- There would always be an imperative to manage fisheries for commercial purposes because of the net national benefit of doing so.

The commercial industry preferred an attributable cost approach to cost recovery. The industry believed the objective of cost-recovery should be to identify who drives the need or demand for particular costs. By placing responsibility for the costs of services on those who cause them, appropriate incentives would ensure fisheries management activities are focussed and delivered in the most efficient manner.

2.3.2 MFish accountability

Although MFish was legally required by the Fisheries Act to consult on individual projects and services and collected levies related to those projects, the Ministry retained a high degree of flexibility to re-prioritize its activities within broad output classes within a year. This meant that certain projects were funded but not completed or less activity was carried out than budgeted for. Accountability and transparency were key attributes of the supposed cost recovery regime.

At that time the Ministry’s position (MFish, 1996) could be summarized thus:

- It is not desirable, practical or efficient to require the Ministry to expend considerable resources in the continuous generation and exchange of information as well as in the justification of costs at a detailed level.
- Cost recovery is not user pays and industry is wrong in attempting to relate levies to individual services and the benefits provided.
- The Ministry has no accountability downwards to levy payers for the delivery of projects and to be held accountable for these expenditures would place a higher degree of accountability to stakeholders compared to Ministers and Parliament.

From an industry perspective, this lack of accountability was unsatisfactory, as was a lack of responsiveness from the Ministry to industry submissions produced during the “nature and extent” consultations after which expenditure decisions were made. MFish maintained this position until 2001 when legal action proved the MFish wrong and forced a change in the MFish position.

2.3.3 Amendments to the cost recovery regime in 1996

By 1996, only 2 years after the implementation of cost recovery, the Government was clearly finding that the cost recovery regime was unwieldy, more complex than anticipated, time consuming and costly in terms of

Government resources (MFish, 1996). It was also concerned that key problems with the cost recovery regime could at some future date result in legal action against the Crown.

The passage of a completely new Fisheries Act in 1996 to replace the 1983 Act created an ideal opportunity to address key issues. Industry continued to argue that the cost recovery regime based on the principle of avoidable cost was really just a device to levy a special tax from the fishing industry. This was largely confirmed when the Primary Production Select Committee suggested that the Fisheries Bill it was reviewing should make it clear that cost recovery provisions were intended to recover a designated total amount from the industry (McClurg, 2000). In the Select Committee's view there should be no close relationship between actual services and benefits the services delivered. This position was not contained in the final version of the Bill passed into law in 1996 because of intense industry arguments that this change went against the primary intent of cost recovery since its inception. Financial expediency should not override incentives to encourage efficiency in the delivery of fisheries services and to encourage the commercial industry to behave in a way that required less regulation. The final Select Committee Report simply indicated that further discussion on the principles of cost recovery was necessary (McClurg, 2000).

In the end, the major changes to the cost recovery regime brought about through the 1996 Act were:

- An express provision was included requiring consideration of under and over recovery of levies.
- Separate (but substantially similar) consultation processes to determine MFish fisheries services and DoC conservation services.

The commercial industry's concerns were still not addressed. These can be summarized as:

- Failure to deliver on the benefits of cost recovery: When introducing a cost recovery regime, rather than a selective tax, Parliament was attempting to create efficiency, accountability and transparency within MFish and DoC. The fact that this had not occurred was to the industry's cost.
- Failure to manage expenditure revenue to the approved required services: Once required services were approved annually and the levy struck, the Ministry essentially put the approved services budgets to one side and managed themselves only in terms of their obligations under the Public Finance Act. No management systems were in place to monitor the delivery of fishery services paid for by levies under the Fisheries Act.
- Lack of change following the 1996 Act. Notwithstanding that the 1996 Act created an express obligation on the Minister to have regard to the under and over collection of levies between the years, MFish and DoC made no management or systems changes to enable this to occur. This provision was included in the Act specifically because of industry's growing concerns at the failure to account for levies between the years, particularly for CSL projects. Parliament's clear intent in adding this section to the Act was ignored.

The period 1994 to 1997 was thus characterized by a deteriorating relationship between the Ministry of Fisheries the commercial industry. The level of anger in the commercial industry was such that the integrity of the cost recovery system itself was threatened.

2.3.4 Review of the cost recovery regime in the 1996 Act

In response to the deteriorating relationship between MFish and the commercial industry the Government agreed to an inquiry into cost recovery by the Primary Production Select Committee. The Select Committee convened in May 1997 and reported in April 1998. Its recommendations were wide ranging covering many issues including:

- A review of the avoidable cost principle of the fisheries cost recovery regime.
- Improving the consultation process.
- Increasing the Crown contribution towards fisheries management costs, particularly policy advice and poaching and black-market enforcement.
- Improving accountability mechanisms.

Concurrently, in February 1998, the Minister of Fisheries announced an independent review of the Fisheries Act 1996. The review was to include the area of cost recovery. The recommendations of the Independent Reviewer in relation to cost recovery were (PricewaterhouseCoopers, 1998):

- That an allocation model be developed based on an efficiency approach where those who benefit pay for the service.
- Services are matched to revenue in a manner consistent with the Public Finance Act 1989.
- That the Act be amended to provide the Minister with the ability to apply a contingency sum of no more than 10 percent of the total costs recovered for additional services.

The theme of providing incentives for greater industry responsibility was again becoming a driver behind the evolution of fisheries funding management and cost recovery. Both the Parliamentary inquiry into cost recovery and the Independent Reviewer found that the avoidable cost principle was acting as a barrier to effective stakeholder participation in the management of fisheries. Government policy papers reflected these views emphasising that (MFish, 1999):

the cost recovery regime... needs to be considered in the context of evolving arrangements for increased stakeholder involvement in the purchase of fisheries services, the devolution of some non-core government functions and the introduction of multi-year sustainability plans.

The New Zealand Treasury also undertook a broad review of charging in the public sector, with a view to establishing common principles for charging. A report from the New Zealand Institute of Economic Research (NZIER, 1999) on how to implement charging guidelines from the Treasury report showed they were not specific enough to incorporate directly into the Fisheries Act. As a consequence, a set of fishery specific “cost recovery principles” was developed and approved by Cabinet in February 1999. Cabinet also approved the establishment of a joint industry MFish working group to find a way to give these principles practical application.

In July 1999 the working group provided a unanimous report to Government. Later that year the Fisheries Act 1996 was amended to incorporate a revised cost recovery regime. Significantly, the regime replaced the “de facto” avoidable cost principle with a statutory principles based on beneficiaries-pays and risk-creator pays approaches. At the same time the statutory obligation to consult stakeholders was removed although consultation continues to occur as a matter of administrative good practice. The new regime came into effect on 1 February 2001. This is the current cost recovery regime described in more detail in Part Three.

3. CURRENT FUNDING OF FISHERIES MANAGEMENT

The current system for funding fisheries management has developed over two decades in response to external public sector reforms and changes to internal operating practices within MFish. Since 1984 the aim of these reforms has been the accountability and efficiency of government services. Stokes *et al.* (2006) describe the components of efficiency and transparency for MFish financial management as:

- A value for money approach to service determination, including clear links to fisheries management objectives.
- Improved efficiency in the purchase of services (e.g. competitive pricing of services, reduced administrative overheads).
- Elimination of wasteful or unnecessary practices and personnel.
- Transparent processes for fisheries service determination.
- Costs of services attributed to & recovered from those who benefit or generate risk.
- High level of reporting of management outcomes, research results, expenditure and revenue.

The remainder of Part Three describes the current funding regime for fisheries management in New Zealand.

3.1 Public funding of fisheries management costs

MFish and DoC receive their funding as an appropriation from Parliament. The Fisheries Act 1996 enables the Crown to recover much of the cost of managing commercial fisheries from the commercial fishing industry through the cost recovery regime. There is no recovery of costs from recreational or customary fishers. It is important to note that the funding of MFish and DoC is not contingent on the payment of cost recovery levies by the commercial industry. The agencies would still receive their full appropriations whether or not levies were paid.

3.1.1 Fisheries and conservation services

Fisheries and conservation services are legally defined in the Fisheries Act 1996. Fisheries services include:

1. The management of fisheries resources, fishing, and fish farming.
2. The enforcement of provisions relating to fisheries resources, fishing, and fish farming.
3. Research relating to fisheries resources, fishing, and fish farming, including stock assessment and the effects of fishing on the aquatic environment.
4. The performance or exercise, by the Minister or the chief executive or any other person, of a function, duty, or power conferred or imposed relating to fisheries resources, fishing, or fish farming.

Conservation services include:

1. Research relating to the effects of fishing on protected species.
2. Research on measures to mitigate the adverse effects of commercial fishing on protected species.
3. The development of population management plans under the Wildlife Act 1953 and the Marine Mammals Protection Act 1978.

3.1.2 Statement of intent

All government agencies are required to demonstrate the need for the appropriations requested each budget year. Each department produces an annual Statement of Intent (SOI), which details the strategic direction, the outcomes to be achieved, programmes to be undertaken over the next two to five years and an annual output plan that includes a budget for fisheries services. The SOI is presented to Parliament at the time of the Government's budget statement.

In developing its SOI MFish consults with Māori and stakeholders on the fisheries services to be provided for the forthcoming year. The purpose of consultation is to seek the views of stakeholders on fisheries management issues, and to incorporate those views into the subsequent advice given to Ministers. MFish does not equate this consultation with either "negotiation" or "agreement" with stakeholders about the provision of fisheries management services (MFish, 2004a).

Distribution to stakeholders of the draft SOI occurs in December and this marks the start of the consultation process for the following year's fisheries services. A stakeholder meeting is held in February and written submissions from stakeholders are sought. MFish then provides a final advice paper to the Minister of Fisheries on recommending services for the coming year.

Fisheries related conservation services make up a very small proportion of the DoC budget so only the Conservation Services Programme component of their SOI is consulted on with fisheries stakeholders. This is conducted in much the same manner as MFish consultation on its SOI.

3.1.3 Outputs classes and outputs

Following public sector practice, the SOI categorizes fisheries services as outputs and these are grouped into output classes. Table 2 lists these for 2005 and Appendix I explains them in more detail.

For each output class described in the SOI there is:

- A description of the output class.
- A description of output class objectives.
- An actual budget for the year preceding.
- The current year's approved budget.
- The proposed budget for following year.
- An explanation of year on year changes in the budget.

Changes in the output class budgets can be due to:

- Changes in funding needs and/or priorities
- Outputs within an output class being redefined or reassigned to other output classes.

The SOI reconciles accounts in the latter case, but this has only been standard practice in recent years. For example, in 2004 responsibilities for marine biosecurity were transferred from MFish to another government agency. For 2005/06 a new output class called “aquaculture settlement” is proposed to manage the introduction of new aquaculture legislation. Over time changes to output classifications and even output classes can make expenditure reconciliation difficult.

Table 2: MFish output classes and outputs for 2005/06

Output class	Output
Fisheries policy advice	New Zealand fisheries policy advice provided
	International fisheries policy advice provided
	Ministerial services provided
Fisheries information and monitoring	Utilization and sustainability of New Zealand’s fisheries resources measured
	Biodiversity of New Zealand’s marine environment measured
	Observer services provided
Fisheries management	New Zealand fisheries utilization and sustainability reported
	Deed of Settlement implemented
	Cost recovery process managed
	Statutory decision processes administered
	Registry services managed
Fisheries enforcement	Commercial fishing rules enforced
	Customary fishing rules enforced
	Recreational fishing rules enforced
	New Zealand’s international fishing rules enforced
	Poaching and black market activities deterred
	Prosecutions managed
Aquaculture settlement	Aquaculture settlement implemented

Source MFish (2004a)

For all outputs described in the SOI there is:

- A budget for the current year and following financial year.
- An output description.
- Description of performance expectations.
- An explanation of the output.
- A description of expected results.

The SOI also summarizes new services and their cost and any major changes in current service delivery.

Figure 1 shows the make up of MFish expenditure for 2004/05. Total expenditure for the year is approximately NZ\$76.5 million.

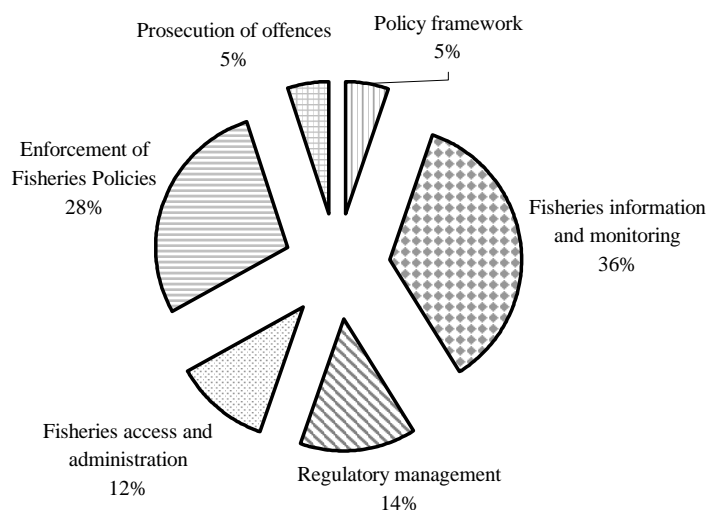


Figure 1: Proportion of MFish fisheries management spending by output class

3.1.4 Cost recovery

Only the cost of commercial fisheries management is recovered in New Zealand. Recreational fishers and customary Māori fishers do not directly pay towards the cost of managing their fisheries. Recreational license fees are strongly opposed by marine recreational fishers and by elected politicians. The general tax system is held to be the equivalent of cost recovery on the grounds that recreational fishing, unlike commercial fishing, is a public good activity. Customary fisheries management costs are not recovered because this would mean Māori as owners of the resource are being charged for access to their own resource. This view is based on a consensus interpretation of the Treaty of Waitangi signed in the middle of the 19th century between Māori and the Crown.

Once the nature and extent of services is described in the SOI is agreed by Parliament, the industry share of those costs is established.

3.1.4.1 Cost recovery principles and rules

Five principles set out in section 262 of the Fisheries Act along with rules set by regulation determine whether, and to what extent MFish costs can be recovered from the commercial industry. Cost recovery levy orders, set by Order in Council, occur annually.

The principles set out beneficiaries-pays and risk-creator pays approaches for the recovery of commercial management costs. The cost recovery principles are:

- If a conservation service or fisheries service is provided at the request of an identifiable person, that person must pay a fee for the service.
- Costs of conservation services or fisheries services provided in the general public interest rather than in the interest of an identifiable person or class of person, may not be recovered.
- Costs of conservation services or fisheries services provided to manage or administer the harvesting or farming of fisheries resources must, so far as practicable, be attributed to the persons who benefit from harvesting or farming the resources.
- Costs of conservation services or fisheries services provided to avoid, remedy, or mitigate a risk to, or an adverse effect on, the aquatic environment or the biological diversity of the aquatic

environment must, so far as practicable, be attributed to the persons who caused the risk or adverse effect.

- The Crown may not recover the costs of services provided by an approved service delivery organization.

The cost recovery rules can be altered as the characteristics of fisheries management services change. Certainty is provided through the cost recovery principles, while the rules and levies change more regularly. Levy orders are currently based on cost recovery rules set in 2001.

Rules must be made by Order in Council, and must be consistent with the principles. The rules prescribe:

- The portion of the costs of conservation services and fisheries services to be recovered from industry as levies (with the balance being paid by the Crown);
- Who must pay the levies; and
- How the costs are to be apportioned between the persons who must pay the levies.

The full text of the rules forms Appendix II. Based on these rules, the proposed funding splits between Government and industry by output class for 2005/06 are given in Table 3.

3.1.4.1 Administration of the cost recovery system

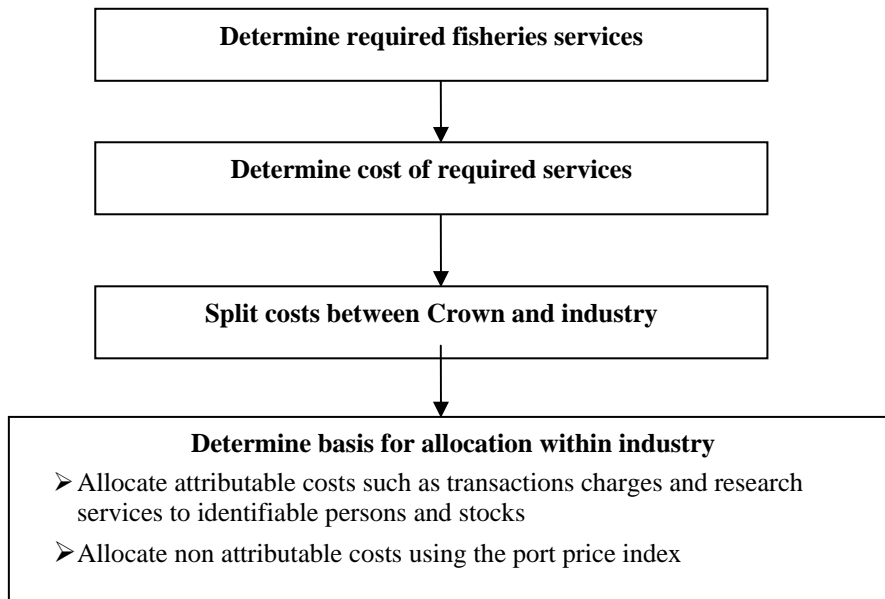
The commercial industry's share of management costs is apportioned between categories of levy payers using a cost allocation model (Figure 1). The model gives rise to a levy rate payable for each fish stock. Ideally costs are recovered at the level of a quota management fish stock and quota holders are levied their respective share. For example a stock assessment for ziffle fish costs NZ\$100 000. The total allowable catch, including customary and recreational take is 1 000 tonnes. The total allowable commercial catch is 800 tonnes. There are eight commercial fishers each owning an equal quota share in the stock. The total cost recovery levy for the fishery is NZ\$80 000 and the levy payable by each fisher is NZ\$10 000.

Table 3: MFish proposed expenditure and cost recovery for 2005/06

Output class/output	Expenditure NZ\$'000	Cost recovered NZ\$'000	Proportion cost recovered (%)
Fisheries policy advice			
New Zealand fisheries policy advice provided	2 517	0	0
International fisheries policy advice provided	2 200	0	0
Ministerial services provided	927	0	0
Total	5 644	0	0
Fisheries information			
Utilization and sustainability of New Zealand's fisheries resources measured	25 030	16 693	67
Biodiversity of New Zealand's marine environment estimated	4 921	0	0
Observer services provided	3 706	3 706	100
Total	33 657	20 399	61
Fisheries management			
New Zealand fisheries utilization and sustainability reported	8 275	0	0
Deed of Settlement implemented	4 661	0	0
Cost recovery process managed	524	0	0
Statutory decision processes administered	1 524	1 524	100
Registry services managed	5 844	5 844	100
Total	20 828	7 368	35
Fisheries enforcement			
Commercial fishing rules enforced	7 669	7 669	100
Customary fishing rules enforced	2 183	0	0
Recreational fishing rules enforced	5 462	0	0

Output class/output	Expenditure NZ\$'000	Cost recovered NZ\$'000	Proportion cost recovered (%)
New Zealand's international fishing rules enforced	668	0	0
Poaching and black market activities deterred	11 320	0	0
Prosecutions managed	3 369	0	0
Total	30 671	7 669	25
Aquaculture settlement			
Aquaculture settlement implemented	1 835	0	0
Grand total	92 635	35 436	38

Source: MFish (2004a)



Source Deloitte (2004)

Figure 2: Cost recovery allocation process

For example, a stock assessment is carried out of an offshore fishery consisting of three stocks, ziffle, piffle and diffle fish species. The cost of the research service is NZ\$100 000. Tables 4 and 5 show the basic workings of the attribution model.

Table 4: Calculation of price weighted index

Stock	Allowable catch (kg)	Port price per kg (NZ\$)	Weighted index calculation		Price weighted index
Ziffle fish	10 000	4	$10\ 000 \times 5 = 50\ 000$	$50\ 000/71\ 000 =$	0.70
Piffle fish	8 000	2	$8\ 000 \times 2 = 16\ 000$	$16\ 000/71\ 000 =$	0.23
Diffle fish	5 000	1	$5\ 000 \times 1 = 5\ 000$	$5\ 000/71\ 000 =$	0.07
Total			$= 71\ 000$		1

Table 5: Calculation of Compliance Research Levy per fish stock

Stock	Total research cost (NZ\$)	Index	Levy per stock (NZ\$)
Ziffle fish	100 000	0.70	70 000
Piffle fish	100 000	0.23	23 000
Diffle fish	100 000	0.07	7 000

Using the price-weighted index owners of Ziffle quota shares would pay NZ\$70 000, owners of Piffle quota shares NZ\$23 000 and owners of Diffle quota shares NZ\$7 000. To simplify the math of trading of quota, the Fisheries Act 1996 provides that quota shares in a fishery always total 100 000 000 irrespective of the total allowable catch set. If fisher 1 owns 15 000 000 shares of ziffle fish quota the levy payable by the fisher is $15\,000\,000/100\,000\,000 \times \text{NZ\$}66\,000 = \text{NZ\$}9\,900$.

The multitude of fisheries and conservation services being cost-recovered, different methods for 550 QMS fish stocks and non-QMS stocks make for an extremely complex levy order. To assist levy payers calculate their liabilities, MFish provides a cost recovery levy model in Microsoft Access each year. This can be downloaded from the MFish website (www.fish.govt.nz). Levies are payable monthly. Marine farm levies are annual.

3.1.5 Under and over recovery of levies

An under or over recovery is a variation from the consulted conservation and fisheries services budgets (e.g. MFish SOI and DoC Conservation Services Levy Plan). This can either be an expenditure variance or a revenue variance. An over expenditure occurs when MFish or DoC actual expenditure on a service is higher than budgeted, e.g. a research project costs more than estimated. An under expenditure variance occurs when price for a research project is lower than estimated.

An under recovery of revenue occurs when less revenue is invoiced than projected. An over recovery of variance occurs when more revenue is invoiced than projected. Revenue variances generally occur in fisheries that are outside the QMS because levies are set based on expected catches rather than fixed quota shares in a fishery. For example, MFish may anticipate a catch of 10 000 tonnes of non-QMS species such as albacore tuna. A seabird by-catch programme solely for the albacore tuna fishery costs NZ\$100 000. A levy of one cent a kilogram is then estimated for albacore fishers. Because levies are paid on actual catches for non-QMS species, if only 5 000 tonnes of albacore is caught levy revenue would only be NZ\$50 000. There would then be an under-recovery of revenue and albacore fishers would owe the Crown NZ\$50 000 in under-recovered levy fees. This would be collected in the following levy year.

In contrast if the same fishery were in the QMS then basing the levy on quota shares would mean that NZ\$100 000 would be collected irrespective of the catch taken. Each quota shares owner pays the levy based on the number of quota shares owned, not the catch actually taken or the total allowable commercial catch set.

Analyses of the previous years' under and over recoveries are carried out annually as soon as financial data becomes available. This is then consulted on with industry, and forms part of a revised levy order typically made six months into the fishing year. Under recoveries are charged through higher revised levies and over-recoveries through lower revised levies. Over and under recoveries are in effect charged against the fishery rather than individual permit or quota holders. This is not a major problem if under and over recoveries are identified quickly. This is the intent of the revised levy order. In some situations current permit and quota holders have incurred gains or costs from historical unders and overs. Under and over recoveries for a given fishstock can only be offset against subsequent levies for that fishstock. Bad debt (unpaid levies) are not treated as an under or over recovery and are collected from the individual levy payers who has failed to pay the levy.

This current treatment of unders and overs is the outcome of a long and complex process of first conflict and then co-operation between MFish and the commercial industry. This is described in a case study in Part Five of this document.

3.2 Private cost of fisheries regulation

Little formal study of the private cost of complying with fisheries management legislation has been carried out in New Zealand. SeaFIC in 2001 carried out a brief review as part of a submission to a Ministerial Panel on Business Compliance Costs convened to address the problem of excessive or unnecessary business costs arising from government legislation, regulations and interventions.

SeaFIC submitted that that excessive business compliance costs are not just a factor of how the Government delivers regulatory services but also how those services are specified and how responsibility for delivery is allocated. The seafood sector, SeaFIC claimed, experiences the costs of jurisdictional overlaps between departments, the consequences of vague and contradictory regulatory objectives and the burden of historic layers of regulations that are still being administered and enforced long past their 'use by date'.

Costs imposed on the sector by central government regulation have a major impact on the viability of the industry given:

- International competitors are often subsidized. New Zealand does not subsidize its seafood industry.
- The seafood industry's share of the world markets is small and there are many competing seafood products so the industry is unable to pass along increases in compliance costs to its international customers.
- The majority of Government costs associated with managing commercial fisheries are cost recovered from the commercial fishing industry.
- Māori have significant interests in commercial fishing and compliance costs erode the value of fisheries-related Treaty settlements potentially leading to further grievances that hinder the development of the industry.

The major Acts regulating seafood industry activities are:

- Fisheries Act 1996
- Resource Management Act 1991
- Health and Safety in Employment Act 1992
- Animal Products Act 1999
- Maritime Transport Act 1994

Private management costs summarized in Table 6 include:

- Fisheries management costs including cost recovery charges and other charges under the Fisheries Act and the cost to the industry of being involved in the fisheries management process.
- Fisheries specific costs of complying with the Animal Products Act to ensure hygiene and food safety standards.
- Maritime Transport Act costs associated with safe ship management and crew registration.
- The indirect costs of complying with reporting requirements for areas such as research, fisheries compliance and safe ship management.

In many instances the costs of complying with regulations correlate closely with the costs of conducting good business practice. This includes many of the costs associated with complying with regulations under the Animal Products Act and the Maritime Transport Act.

SeaFIC submitted that government agencies should explicitly consider:

- The extent to which regulation is necessary to meet the purpose of governing statutes.
- Other non-regulatory means that may be used in achieving the purpose of governing statutes.
- The reasons for and against regulating over a particular issue.
- Carrying out an evaluation of the benefits and costs of the alternative ways of achieving an intended outcome and the likely implementation and compliance costs of the alternatives.

Table 6: Summary of the estimated fisheries specific compliance costs by statute in 2001

Legislation	Direct costs (NZ\$millions)	Percent	Indirect costs (NZ\$millions)	Percent	Total cost (NZ\$millions)	Percent
Fisheries Act ⁽¹⁾	40	85	18	90	58	87
Animal Products Act	3	6	0.85	4.3	3.85	6
Maritime Transport Act	4	9	1.15	5.7	5.15	7
Total cost	47	100	20	100	67	100
	Port price (ex-vessel) value of harvest		NZ\$750m	Fisheries specific compliance costs as percent of landed value		9

⁽¹⁾ Ministry of Fisheries levies, deemed values and DOC conservation services levy.

Source New Zealand Seafood Industry Council (2001)

3.3 Statutory funding of private fishery management costs

New Zealand's government recognizes that private costs can be incurred in "industry good" activities such as industry representation by professional staff during consultative processes. The Commodity Levy Act 1990 enables commodity based industry sectors to finance industry-good activities where voluntary funding would lead to a "free-rider" problem or would be impracticable. To raise a levy under the Act an industry group must first hold a referendum and gain 50 percent support of those responding and 50 percent by volume of production. An Order-in-Council can then be imposed on certain commodities making levies payable to organizations representing the views and interests of the persons primarily responsible for paying those levies. The levy is compulsory and all producers of the commodity must pay. The Commodity Levy Order lasts for 5 years. To renew or amend the Order a new referendum is required.

The Seafood Industry Commodity Levy came into force on 1 April 2002. The levy is used to fund core activities of SeaFIC, including:

- Policy issues affecting the New Zealand seafood industry.
- Promotion of the New Zealand seafood industry.
- Research, science and technical services relating to the New Zealand seafood industry.

A second, stock specific component of the commodity levy order funds stock or region specific commercial stakeholder organizations. These "second-tier" levies each had to be approved in the same manner as the core levy during the levy order referendum process.

3.3.1 Estimation of the levy

The levy is set against the port prices (ex-vessel price) for all commercially caught and produced fish, including fish produced from aquaculture. The port price is the simple average of independently surveyed prices paid for fish in each of the last three years. The port price is established by an independent survey of the prices that would be paid during each 12 month period for the by an independent processor buying from an independent fisher or fish farmer. Where survey data is inadequate an estimate is made. Port prices are based on the best available information known to SeaFIC.

3.3.2 Levy rates

The levy is calculated in two components. The core services levy that funds the generic industry services provided by SeaFIC in its Business Plan is set at a rate of 0.525 percent of the port price. The second component of levy in a number of cases is the stock specific levy. This is a levy to be collected to pay for projects mandated by levy payers for the stocks which are so levied and will purchase projects related to those stocks to be undertaken by commercial stakeholder organizations that represent those fish stocks as shareholders in SeaFIC. The maximum total levy that is permitted in the levy order is 5 percent. The maximum levy that has been set in all cases is less than the maximum.

4. PATTERNS AND TRENDS IN PUBLIC FISHERIES MANAGEMENT FUNDING 1985 TO 2004

Part Four explores patterns and trends in fisheries management funding for the 15 years from 1990 to 2004. It had been hoped to obtain comparable data for the full 20 year period 1985 to 2004 but this was not possible due to the way in which information was recorded prior to 1990. Particular emphasis is placed on the era of cost recovery from 1994 to 2004. The analysis is limited by several factors:

- The availability detailed expenditure data prior to 1994.
- The creation of the Ministry of Fisheries in 1994/95 that created abnormal spending patterns during its creation and also changed the way in which fisheries management costs were accounted for.
- Changes in outputs and output class specifications that make consistent reporting of expenditure trends difficult prior to 1999.

Nevertheless the information available demonstrates some interesting trends.

The following sections look at:

- Overall trends in public fisheries management expenditure 1990 to 2005
- Relative trends in fisheries management expenditure and industry cost compared to overall government spending.
- Trends in cost recovery levies and differences between levy orders pre and post consultation over the nature and extent of fisheries services.
- The makeup of fisheries management expenditure.

Unless otherwise stated all financial data is adjusted for inflation using the official consumer price index with 1985 as the base year. Financial data is therefore recorded as 1985 dollars.

4.1 Overall trend in fisheries management expenditure 1990 to 2004

Fisheries management expenditure from 1990 to 2005 is shown in Figure 3. The trend is for a decline in management costs from 1990 to 1994/95 followed by an increase after 1994/95. The reason for the decline in expenditure from NZ\$33 million to NZ\$22 million is between 190 and 1995 is unclear. It is likely to be associated with the creation of a standalone Ministry of Fisheries and the commercialisation of fisheries research services into a standalone Crown Research Institute thus significantly reducing overheads for the new Ministry of fisheries.

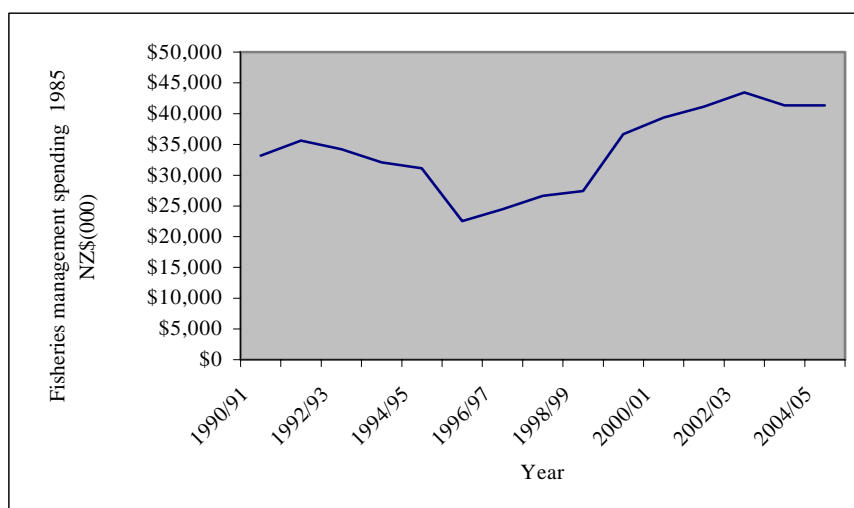


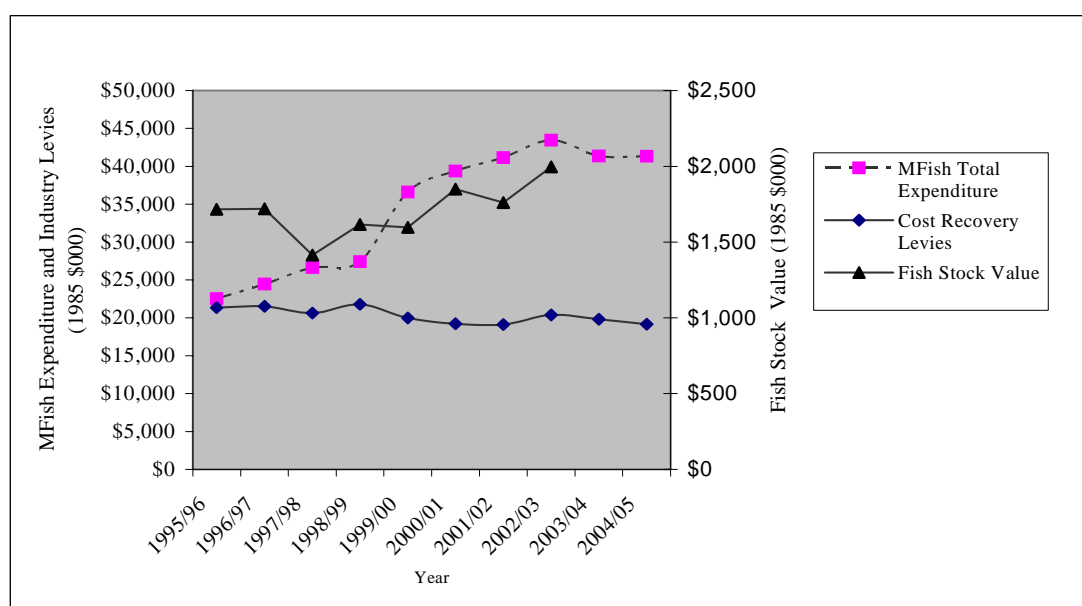
Figure 3: Fisheries services expenditure 1990 to 2005

MFish expenditure increased rapidly from 1995/96 to 2001/02 from NZ\$22 million to NZ\$40 million, and then stabilized at around NZ\$41 million in the period 2001/02 to 2004/05. This stabilisation in inflation adjusted expenditure coincides with the delegation and devolution of registry related functions to the

commercial industry. This may in part explain the stabilisation but another contributory factor is the stabilisation of the fisheries management regime that occurred when the full Fisheries Act 1996 finally came into force in October 2001. Many of aspects of the new Act allowed for administrative simplicity compared to previous statutory requirements. Moreover MFish was not compelled to work under a dual regime where some management functions occurred under the Fisheries Act 1983 and some under the Fisheries Act 1996.

4.2 Relative trends in fisheries management expenditure and industry cost recovery

Figure 4 shows trends in MFish expenditure and cost recovery levies during the era of cost recovery from 1994/95. It also shows the estimated total value of New Zealand's commercial fish stocks based on quota value. Unlike total MFish expenditure, commercial cost recovery levies have remained constant at between NZ\$19 million and NZ\$22 million since 1994/95. This compares to a steady increase in the overall asset value of New Zealand fishstocks.



Source: MFish (2005); Statistics New Zealand (2005)

Figure 4: Fisheries expenditure and cost recovery levies 1994/95 to 2004/05

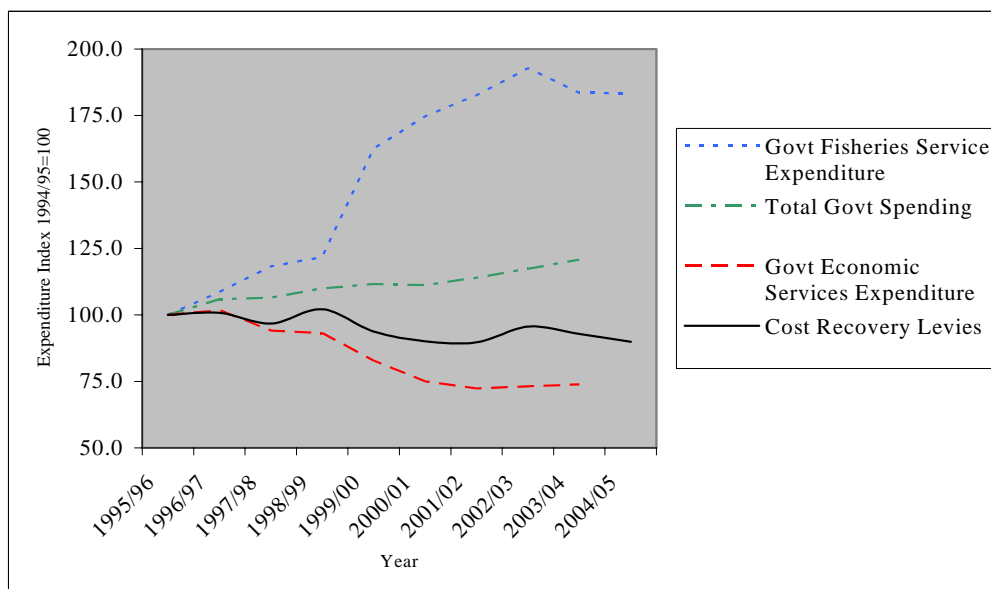
The first half of the period saw recovery costs hover around NZ\$21 million and then decline towards NZ\$19 million from 2001 through 2004. This slight decline in levies is partially explained by the devolution of quota registry functions to FishServe. This adds approximately NZ\$1 million per annum back into the industries statutory contribution to public fisheries management costs. The costs of devolved services are directly charged to industry by FishServe.

Figure 5 provides an indexed comparison of changes in MFish expenditure and cost recovery levies with the change in total Government expenditure and in like Government agencies for the period 1994 to 2004. MFish is classified as an economic services department for public finance purposes. Like departments include the Ministry of Commerce and Ministry of Agriculture and Forestry.

Total Government expenditure on fisheries service has increased dramatically compared to changes in overall government expenditure. The difference in overall trends is even more marked when compared to other like agencies. Overall government expenditure increased by 21 percent in inflation adjusted terms between 1994 to 2004. Expenditure in similar government services fell by some 23 percent as government continued its policy of less direct intervention in the economy. In contrast MFish expenditure increased 85 percent in this time period.

This trend suggests that fisheries management overall became more complex and more expensive in the period 1994 to 2005. Addressing this complexity was supported by Government Ministers through increases in the total MFish budget and approval for the hiring of additional staff to work on non-commercial fisheries management issues. The fact that cost recovery levies stayed relatively constant and most closely reflected

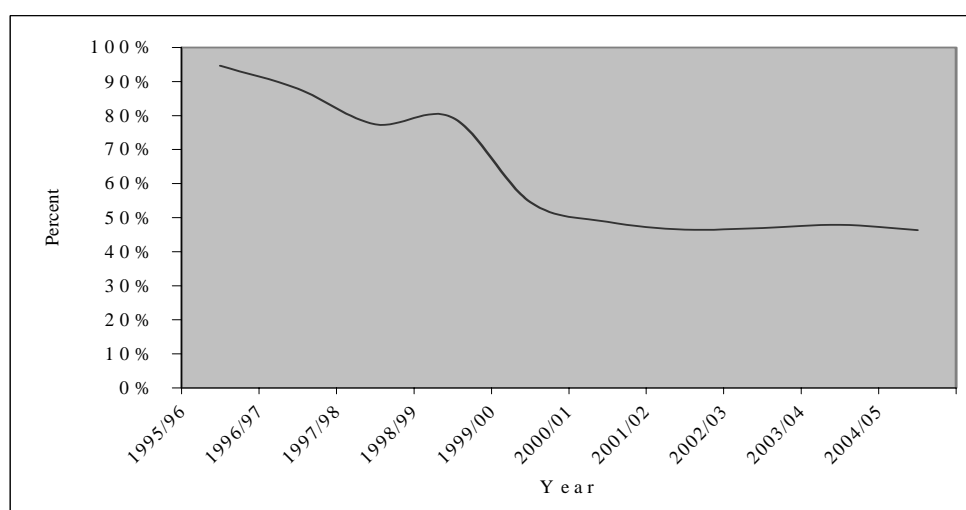
changes in expenditures in similar economic service agencies indicates that the direct costs of commercial fishery management did not increase during this period and saw many of the efficiency gains evident in other government agencies. Rather expenditure increases have been due to non-commercial drivers such as biosecurity issues (now no longer part of the MFish outputs), recreational and customary fisheries management, non-commercial fisheries related research and the detection of illegal black market and poaching activities.



Source: MFish (2005), Statistics New Zealand (2005)

Figure 5: Indexed comparison of MFish expenditure, industry levies, total government spending and government economic services expenditure

This view is supported by Figure 6 that shows industry cost recovery levies as a percentage of total MFish expenditure from 1995/96 to 2004/05. Assuming that the data is accurate cost recovery levies declined as a percentage of overall Ministry expenditure funding between 1995/96 and 2001/02. It has remained relatively constant since 2001/02. MFish (2004a) is predicting a further fall to 38 percent for the 2005/06 year.



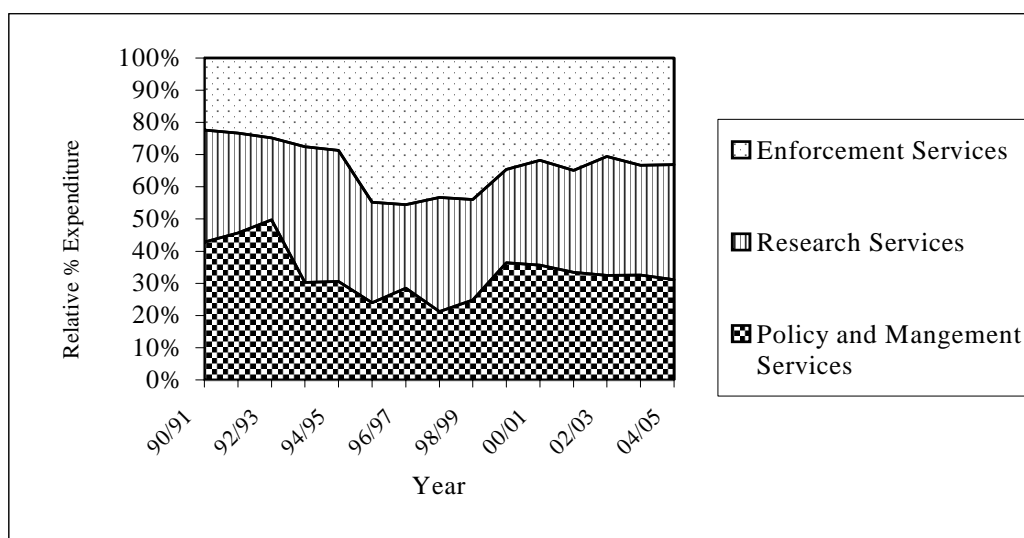
Source: MFish (2005)

Figure 6: Industry cost recovery levies as a percent of total MFish expenditure

4.3 The make up of fisheries management expenditure 1990 to 2004

Data limitations and changes to the way MFish and its predecessors defined outputs and output classes mean that for the entire period 1990 to 2004 publicly funded fisheries services can only be separated into three categories (Figure 7):

- Fisheries management and policy.
- Fisheries research and monitoring.
- Fisheries enforcement and prosecutions



Source: MFish (2005)

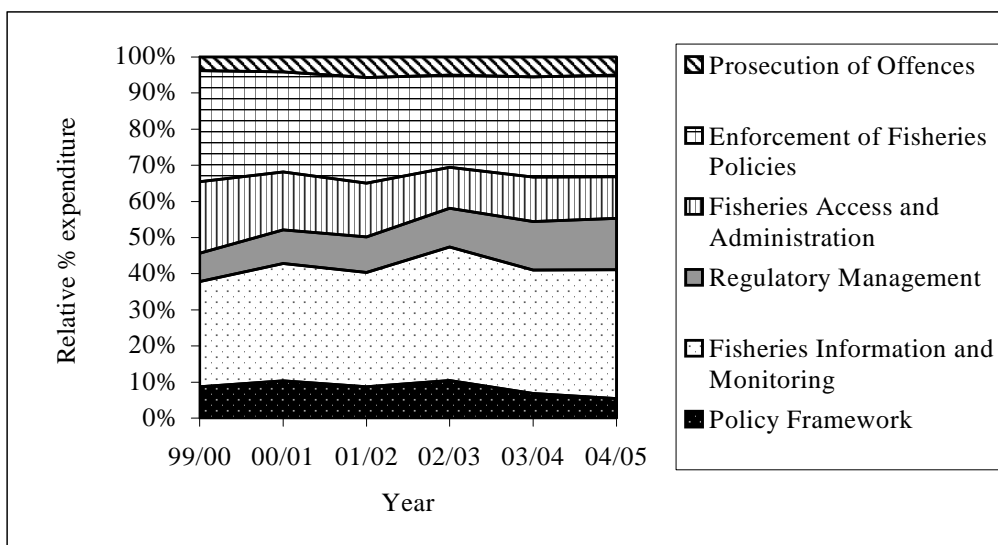
Figure 7: General fisheries outputs as a percent total MFish expenditure 1990/91 to 2004/05

Few overall trends are evident from Figure 7. Research spending as a proportion of total management expenditure as remained more or less constant. The fall in the relative proportion of policy and management services spending in the mid 1990s probably reflects the:

- Creation of the standalone Ministry of Fisheries that took time to define its policy and management outputs.
- Implementation of a new Fisheries Act that added to challenge of defining policy and management outputs.

At the same time research and compliance services were largely unaffected by the administrative and legal changes. Since the 1996 Act became fully operational 2001 the relative proportion of spending in the output classes has stabilized.

Figure 8 shows a more detailed breakdown of fisheries services for 1999/00 to 2004/05. A more detailed breakdown is possible for this period since MFish publish a reconciliation of changes to output classes and outputs. Overall expenditure within the six output classes has been relatively consistent with few trends apparent. The policy framework output class has declined due to a restructuring of MFish operations to focus more on regulatory management following the full implementation of the Fisheries Act 1996. Fisheries access and administration output class has declined relatively to other classes with the delegation and devolution of many functions to FishServe. Fisheries information and monitoring and fisheries enforcement are the largest output classes in terms of expenditure. They have remained relatively constant as an overall proportion of MFish expenditure of the five-year period. At least in terms of service delivery, MFish appears to be in a mature phase with few major changes.



Source: MFish (2005)

Figure 8: Fisheries service outputs as a percent total MFish expenditure 1999/00 to 2004/05

This situation will change for 2005/06. MFish has a new initiative to increase enforcement capacity including taking a multiagency approach to protect paua (abalone) and rock lobster stocks from poachers (MFish, 2004a). This will see a NZ\$5.3 million increase in the poaching and black market detection output. These actions include monitoring, detection and provision of recommendations to prosecute. Enforcement will therefore make up a bigger proportion of MFish expenditure from 2005/06 than it has in the past. The driver for this increase is a recent marked increase in organized crime groups poaching and selling paua and rock lobster to far eastern buyers through very elaborate criminal operations.

4.4 Summary

Fisheries management costs in New Zealand have risen in real terms far faster than general government expenditure or expenditures in similar sized and similar functioning government agencies. The drivers of this increase appear to be non-commercial such as recreational and customary fisheries management demands, non-commercial fisheries and marine environment related research and the detection of criminal black market and poaching activities.

In contrast, the cost of managing commercial fisheries has stayed constant in real terms and fallen dramatically as a proportion of total MFish expenditure over the period of the study. This suggests the cost-recovery regime for commercial fisheries has been successful in delivering efficiency gains in the public costs of commercial fisheries management. Relative stability in real terms of the cost recovery levies since the introduction of the present regime in 2001 also suggests that it has been successful in giving certainty to commercial fishers about the level of cost recovery.

5. FUNDING AND COST EFFECTIVE FISHERIES MANAGEMENT: FOUR CASE STUDIES

The description of the historical development of the fisheries management regime in Section 2 and its current form described in Section 3 cannot fully describe two fundamental aspects of the funding of fisheries management in Zealand:

- The link between cost recovery, efficient service delivery and stakeholder involvement in managing fisheries resources.
- The administrative complexity of giving effect to the cost-recovery regime in a legally defensible, transparent and accountable manner.

This section uses four mini-case studies to illustrate further these key dimensions of fishery management and funding in New Zealand:

1. Cost-recovery and the specification of fisheries research services.
2. Efficiency gains from the devolution and delegation of registry services and from directly purchased fisheries services.
3. Conflicts over the translation of cost recover principles into operational rules.
4. Cost recovery and accountability: The example of unders and overs.

5.1 Cost-recovery and the specification and delivery of fisheries research services

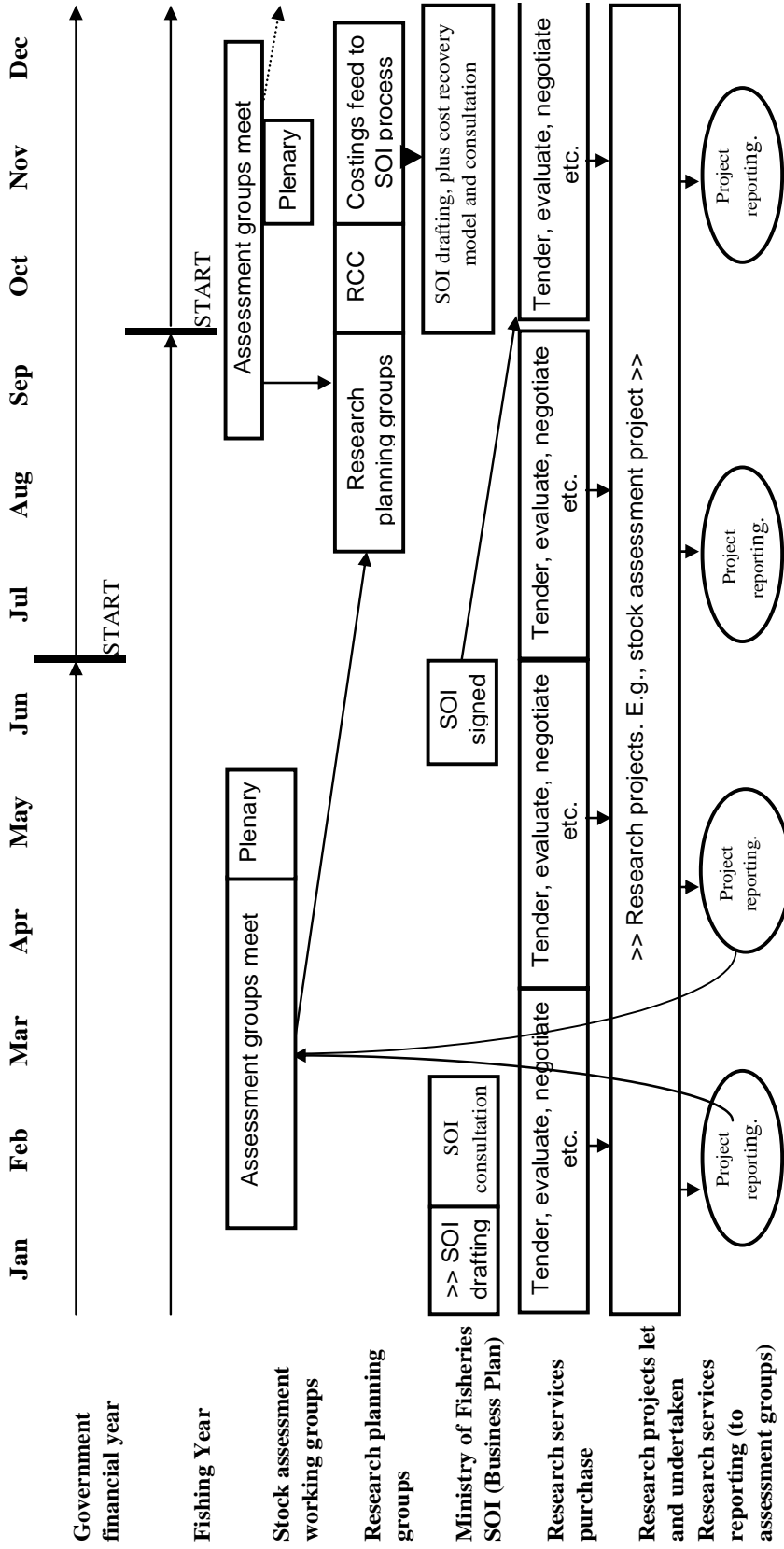
MFish operates a comprehensive and integrated system of planning, purchasing and ensuring delivery of research services. Stokes *et al.* (2006) describe the following features of the process:

- Service delivery for decision making purposes (primarily through stock assessment results feeding in to annual sustainability decisions).
- Planning of future research service requirements.
- Incorporation of service requirements in to the MFish SOI.
- Cost recovery implications and research service procurement (tendering, evaluation, negotiation etc.).
- Service delivery evaluation and eventual feedback.

This is demonstrated in Figure 9.

The MFish research planning and evaluation framework is widely perceived as a good example of a collaborative consultation process that, relative to other cost recovery consultation processes, results in little conflict over the recovery of research costs. The process is structured around research planning groups. Some of the planning groups focus on individual or groups of fish species, and others focus on more general issues such as recreational fishing, marine environmental research, and socio-economic research. Each group discusses, evaluates and makes recommendations about research activities. Membership of the groups includes MFish staff, research providers, environmental organizations, customary Māori, recreational, and commercial fishing interests.

The groups receive input from regional fisheries liaison committees on general fisheries research needs and more specific information on research needs from the stock assessment working groups (discussed below). The research planning groups are supposedly guided in their activities by strategic and medium term research plans and in turn input to the review of these plans. Planning groups must consider MFish's various business planning documents such as the SOI and Strategic Plan and policies being drafted or in effect.



Source: Stokes *et al.* (2006)

Figure 9: Processes involved in Ministry of Fisheries research planning

Proposals from the research planning groups are considered by the Research Co-ordinating Committee, made up of MFish staff, environmental organizations, customary Māori, recreational, and commercial fishing interests. The Research Co-ordinating Committee (RCC) considers the recommendations of the planning groups and makes a final recommendation for operational research to MFish. MFish scientific staff provide cost estimates for the proposed projects. These estimates are integrated into the SOI consultation process for the coming financial year.

Stokes *et al.* (2006) discuss several impediments to the research planning process that have implications for cost recovery and which are only slowly being addressed:

- Few planning groups have medium term research plans and make little reference to other MFish strategic documents. This means that proposed projects cannot be judged in terms of their contribution to overall fishery management objects and therefore their benefit and cost-effectiveness is difficult to assess.
- There is not enough involvement of fisheries managers in the process and the majority of research projects are suggested by research providers who are driven by the need to raise research funds and continue existing research programmes rather than by the need to provide information for the management of fisheries.
- Until 2004 RCC was an informal meeting. Despite considerable input from the commercial industry on some projects that appear to have little additional benefit for fisheries management, nearly all projects tended to be included in the SOI. In 2004, the RCC became a formal consultative meeting and written submissions will require a formal response from MFish.

Table 7 shows proposed research services and their estimated cost for 2005/2006.

Table 7: Proposed MFish Direct research expenditure for 2005/06

Proposed fisheries research	NZ\$000
Deepwater fisheries	1 775
Hoki and middle depth fisheries	6 682
Inshore finfish and freshwater eels	3 086
Shellfish fisheries	2 063
Non-commercial fisheries	1 761
Aquatic environment	1 815
Pelagic fisheries	683
Stock assessment methods	891
Other services	615
Data management	834
Total fisheries research	20 205
Proposed biodiversity research	1 835
Total proposed research	22 040

Source: MFish (2004a), p. 16.

There is also a related research evaluation process. Thirteen stock assessment working groups cover either individual species, or life-histories (e.g. pelagic), fisheries (e.g. inshore) or supporting activity (e.g. stock assessment methods). The main task of the groups is to estimate the level of sustainable harvest for each fish stock and to determine whether or not current total allowable catches and total allowable commercial catches are sustainable. Each group consists of MFish staff and where appropriate representatives from commercial, customary Māori, and recreational fishing sectors and environmental organizations.

Private fisheries management costs are increasingly incurred in this process as SeaFIC and other industry-employed scientists participate in all these meetings. In some cases large commercial stakeholder organizations have purchased parallel stock assessments to the MFish contracted ones, or collaborative research has occurred with industry purchasing additional scientific effort from SeaFIC or other science providers to work with MFish's primary research provider. From 1999 to 2004, commercial stakeholder

organizations increased spending on research projects undertaken directly by SeaFIC from less than NZ\$300 000 to over NZ\$900 000 per year (Stokes *et al.*, 2006). This spending is additional to the “generic” science work funded under the SeaFIC Commodity Levy Order discussed in Section 2.

The stock assessment working groups prepare a fishery assessment report for each of the stocks in the quota management system. If new information indicates a change in the stock and a need to change catch levels, this is referred to the fishery assessment plenary for further consideration and consultation. If further research is required this is referred to the research planning groups described previously.

The outcome of the fishery assessment plenary is released as an advice paper to the Minister of Fisheries and forms the basis for adjusting harvest levels through a further sustainability measures process. The stock assessment recommendations are augmented during sustainability measures consultation by social, economic, cultural and environmental considerations.

Stokes *et al.* (2006) state that there are many instances when industry would have directly purchased work carried out under the MFish research services output from research providers. This would have avoided MFish overheads and large transaction costs. However, supposedly independent Crown Research Institutes, of which NIWA is one, have been unwilling to enter into contracts, fuelling industry claims that provider capture is preventing the efficient delivery of fisheries research service. Research providers in turn claim that their ability to offer free and frank advice would be eroded if industry directly purchased such research. This claim ignores the fact that industry has carried out a large number of privately funded research projects that have fed in to MFish fisheries management processes. These have included biological data gathering, stock assessments, adaptive management programme and mitigation measures for seabird and marine mammal by-catch.

Overall, however, research planning and stock assessment consultations tend to be less contentious than consultation on the nature and extent of fisheries services included in the SOI. Moreover, they are characterized by a significant degree of collaboration between Ministry of Fisheries staff, fishing sector representatives and other interests. Though deserving of more detailed analysis and noting the negative aspects raised by Stokes *et al.* (2006), several general observations can be made (Harte, 1999, 2001):

- They have clear purposes, the analysis of research needs and the health of fish stocks, that are not disputed by participants.
- They are based on scientific assessment or the need for scientific assessment, and hence, tend to be relatively objective. All stakeholders have a commitment to the scientific basis of fisheries management.
- Participants in both processes tend to be experts or well versed in the science of fisheries management. They share similar backgrounds and training and, hence, have a common understanding of issues being debated and the range of solutions available.
- The outcomes of both consultation processes are subject to further consultation. Disputes between stakeholders can be put off to consultation on the SOI which finalizes the research services to be purchase for the year.

5.2 Devolution, delegation and efficiency gains from industry purchased research and registry services

The 1998 Independent Review of the Fisheries Act 1996 contained many recommendations about the role of the Crown and the role of stakeholders. The reviewer recommended that the Act be amended to enable the Minister to devolve fisheries management functions to rights holders groups, provide for mandated quota owner associations in the form of commercial stakeholder organizations, and provide suitable compliance regimes for management functions devolved to quota owner associations. The 1999 amendments to the Fisheries Act and their subsequent administration go part of the way to implementing these recommendations.

5.2.1 Devolved registry services

As explained in Part Two of this paper, the Fisheries Act 1996 provides for the devolution of some fisheries services to external organizations that then have responsibility for both purchasing and ensuring the provision of the services, with the agreement of the Minister of Fisheries.

Registry services devolved to SeaFIC and provided by FishServe have been an unqualified success (MFish 1994b). FishServe, as explained in Part One, delivers both devolved and contracted registry management and fisheries data management services on a long term basis to MFish set standards. The annual cost of registry services to the industry has decreased annually from NZ\$8.65 million in 2000/01 to NZ\$5.76 million in 2003/04 (Table 8). The volume of data transferred electronically grew in the same period from 68 percent to 94 percent of all registry transactions.

The reasons for the success of FishServe are fourfold (Campbell, pers. comm., 2005):

- The Fisheries Act 1996, when all its provisions were fully implemented in 2001, provided for more streamlined administrative processes.
- Devolution has allowed FishServe to be a lot more innovative and less bureaucratic because it is a private sector company rather than Government agency and therefore has more operational flexibility to make changes.
- Industry has been prepared to invest in FishServe given that they own it, and consequently FishServe have been able to invest in new technology that brought about major efficiencies.
- Given industry ownership, all the incentives exist for FishServe to want to reduce costs. There is always the risk that if FishServe loses industry support, the industry would look elsewhere for devolved services.

Table 8: Cost of FishServe to the industry (nominal millions)

Year	Contract (NZ\$)	Devolved (NZ\$)	Total (NZ\$)	Staff
2000/01	8.65	N/A	8.65	84
2001/02	5.65	1.98	7.63	82
2002/03	4.57	1.78	6.35	73
2003/04	4.12	1.64	5.76	69

Source: Gibbs, pers. comm.

5.2.2 Stakeholder purchased research and related services

The 1999 amendments to the Fisheries Act 1996 also provide for stakeholder purchased services (direct purchase). These are services that the Chief Executive retains accountability for but agrees to allow stakeholders to purchase directly. The costs of directly purchased services are then removed from the cost recovery regime. It was initially intended that some approved fisheries research services could be purchased directly by industry groups, thus avoiding high MFish overheads and giving the industry more responsibility for fisheries management. In late 2000 a new Minister of Fisheries became reluctant to delegate research responsibilities and direct purchase was officially “put on hold” before it was implemented.

Despite the Government’s reluctance to devolve management responsibilities beyond registry services, two successful examples of stakeholder purchase and devolution of fisheries services exist. The Challenger Scallop Fishery and the Rock Lobster Industry Council are both successful models of delegated management

5.2.2.1 Challenger Scallop Enhancement Company

The drivers behind the establishment of Challenger Scallop Enhancement Company (CSEC) in 1994 were:

- A desire by scallop quota holders to manage the fishery “privately” under the QMS to capture the systems full potential.
- To minimize free-riding by non-levy paying commercial fishers.
- To establish an ownership structure for collective capital investment in the management of the fishery. For example, the CSEC purchased a vessel at a cost of about NZ\$1 million purpose designed for enhancement activities including spat collection and reseeded of scallops.

Challenger Scallop Enhancement Company formally agrees its fishery management arrangements with government through two agreements:

- A scallop stock enhancement plan approved by the government that sets objectives for and specifications for enhancement activities. It also includes reporting and audit requirements.
- An agreement with MFish about providing information that is scrutinized by MFish to determine whether the company's activities are resulting in sustainable outcomes for the fishery and the wider aquatic environment.

There is provision in this latter agreement for the MFish to approve specifications and standards for research and to audit the data collection and analysis. Furthermore, CSEC must consult with recreational fishers, customary Māori fishers and environmental interests before providing the Minister with a set of annual harvest recommendations.

Although the company's annual harvesting plan relies on some government regulation, CSEC has greatly reduced the need for direct government involvement. For example, CSEC sets the total allowable commercial catch for the scallop fishery at an arbitrary level and manages lower actual catches each year by getting quota owners to lease a defined percentage of their quota to CSEC. The company holds these rights in trust not to be fished unless scallop availability warrants the release of some or all of the quota.

The main research programme carried out by CSEC to meet government information requirements for the scallop fishery is an 'annual abundance survey' of stocks. CSEC has improved the precision of this survey at least three fold since taking over responsibility from government for information delivery as a result of standards demanded from shareholders and fishers. The company needs the information for its business plan and to set levies, as well as to provide the scallop fleet with accurate data about the location of scallops. CSEC runs its own geographic information system for this purpose. In addition, the company commissions independent researchers to provide information on the possible environmental impacts of its scallop harvesting and the company's enhancement activities.

CSEC fisheries management activities are funded according to a business plan that is agreed at its general meeting and aligned with principles set out in its agreement with government. Quota holders in the fishery pay a levy based on their quota share holding. The matter of company performance is an organizational issue that is audited by the shareholders.

5.2.2.2 Rock Lobster Industry Council

The New Zealand rock lobster fishery is managed through the multi-stakeholder National Rock Lobster Management Group (NRLMG). Membership of the NRLMG comprises MFish, commercial, recreational and indigenous fisher representatives, environmental non-governmental representatives and science advisers. It is the primary source of advice to Ministers on all rock lobster management issues. The marriage of the practical working knowledge of rock lobster fishers, the research and management experience of government agencies, and the expectations of other sector groups has been a successful and productive one (Metzner *et al.*, 2003).

Key to the success of the NRLMG is a commercial sector committed to the sustainable and inclusive management of the rock lobster resource. The New Zealand Rock Lobster Industry Council (RLIC) is an example of the potential that commercial stakeholder organizations have to succeed in a number of fields of fisheries management including research.

RLIC is an umbrella organization for nine commercial stakeholder organizations operating in each of the rock lobster management areas of New Zealand (Sykes 2000). These organizations have been established as incorporated societies or limited liability companies and are known as CRAMACs.

Membership of CRAMACs comprises quota owners, processors, exporters, and fishermen (owner-operators and lease holders) in each region. Governance is based on a two-tiered voting procedure that gives priority to quota ownership on issues affecting total allowable commercial catch decisions, levy setting, and certain government consultation processes. All nine CRAMACs hold a majority mandate of crayfish quota holders in the regions. CRAMACs are shareholders in RLIC and appoint the nine person board of directors, one from each CRAMAC.

Taking advantage of provisions in the Fisheries Act 1996, in 1997 RLIC became an accredited research provider to the Minister of Fisheries, and since then has successfully tendered for, and executed, a number of

rock lobster stock assessment and related contracts. Research contracts are undertaken in collaboration with national science providers and internationally recognized stock assessment consultants contracted to RLIC. RLIC also uses accredited technicians employed by science providers and by CRAMACs to undertake an extensive stock-monitoring programme.

5.3 Conflict over the translation of cost recovery principles into operational rules

The current cost recovery regime introduced in 2001 based on the beneficiaries-pays and risk-creators pays approaches for the recovery of commercial management costs is a vast improvement on the previous cost recovery regime based on the avoidable cost principle. Nevertheless there remain several areas where there is contention about the translation of the principles into the cost recovery rules contained in Appendix II and their subsequent application.

The commercial industry's concerns fall into three categories (Gibbs, pers. comm.):

- Failure of the rules to ensure that "public good" research costs are not recovered from the industry. The industry perception is that this occurs due to rules that are not consistent with the principles and is exacerbated by poor application of the rules by MFish officials.
- The rules don't effectively enable spreading of costs in relation to environmental risk. For example some conservation service levies should be attributed by way of gear type rather than the stock fished as required by existing rules.
- Failure of some of the rules to fairly attribute costs on the basis of benefits received from services.

The third concern is the one that has received most attention. It relates to the use of the port price weighted index to apportion non-attributable costs such as the research, compliance and registry components of fisheries services. In the 2004/05 fishing year the port price index was used to allocate over half (NZ\$18 million out of NZ\$35 million) of cost recovery levies to fishers.

There are several reasons for the concern about using the port price index as a way of spreading the non-attributable costs of some fisheries services:

- Due to potential game playing in survey responses, the port price may not reflect the relative values of the fish stocks.
- There is a low response rate to the port price survey.
- There is much vertical integration in the fishing industry, so for some fishstocks there is no port or ex-vessel price only an export or processed value.
- There may be no link between the relative value of the fishstock and the value of the service being cost-recovered.
- The benefit received does not necessarily equate to the cost allocated.

In response to these concerns SeaFIC and MFish set up a joint working group to explore alternative methods for allocating non-attributable costs. The working group commissioned a study looking at alternative cost spreading indexes etc. The final consultant's report recommended replacing the port price index mechanism and defining all the services better, so that the costs can be properly attributed rather than spread using a proxy. The report recommended a cascading approach to cost attribution (Deloitte, 2004):

- Directly attribute costs to the maximum extent possible by transaction charges where individuals benefit, or by way of levy where the benefit is only definable by fishstock.
- Where direct attribution is not possible, place responsibility on the commercial industry to decide how to apportion costs.
- Where no consensus is able to be reached by the industry apply a default rule where the Chief Executive of MFish applies discretion to fit particular circumstances.
- Apply this process in an appropriate manner to research, compliance and registry components of fishery services.

For research services this means extending the research planning process discussed previously to include a decision on how costs for each project should be recovered. For example, for research project on a single

stock direct attribution would be applied. For a multi-stock fisheries the recommendation agreed during the research planning process would be used if consensus were reached. If not the default of Chief Executive's discretion, after appropriate consultation, would apply.

For registry services not allocated by way of transaction charges, costs would be levied equally across all levy payers. Compliance costs would be allocated in a similar way to research costs. Industry would decide how to allocate these costs among themselves and if no consensus were reached, the default of the Chief Executive's discretion would apply.

Working group members liked this outcome, but the working group's final recommendations were put aside to be incorporated in the wider review of the rules that is planned for 2005. MFish (2004a) has indicated the reassessment of rules is likely to focus on fisheries management regulatory outputs and international fishing issues that, under the current rules, are not cost recovered. MFish also considers there is also scope for encouraging stakeholder participation by using cost recovery as an incentive for greater stakeholder involvement in fisheries management and service delivery.

5.4 Cost recovery and fiscal accountability: the example of the under and over recovery of cost recovery levies

As described in Part Three, the under or over recovery of levies occurs when more or less expenditure is incurred by MFish than original budgeted. It can also occur when more or less levy revenue is collected than was forecast. This latter situation can occur with non-QMS species where levies are based on forecasts of actual catches.

The Fisheries Act 1983 did not have an express requirement for the Minister to 'have regard to' unders and overs in previous financial years. However there was an express requirement under the 1983 Act for the amount recovered or recoverable under the levy order in force to be taken into account in the consultation process. No specific advice was provided to the Minister on unders and overs relating to setting the 1995/96 and 1996/97 levy order because MFish did not believe this was necessary under the 1983 Fisheries Act .

The Fisheries Act 1996 created mandatory obligation on the Minister of Fisheries to have regard to any under and over recovery of a previous year's levy order when setting a new levy order. Between 1997 and 2001 advice to the Minister in relation to the annual cost recovery levy order generally (MFish, 2003):

- Noted the industry's concern in relation to taking into account under and over recovery as expressed during the annual consultation process.
- Noted the progress of a joint working group on unders and overs (from 2000).
- Provided a specific recommendation that the Minister have regard to but not incorporate the under and over recovery into the levy order until the working group reported.

MFish advice to the Minister was based on the assumption that under and overs were a net amount, as required to be recorded in the Crown accounts under the Public Finance Act.

The commercial industry had maintained since the introduction of the cost recovery regime that the Minister of Fisheries failure to have regard to the under and over recovery of levies was illegal. In the latter half of 2001 proceedings filed in the High Court for judicial review raised doubts as to whether all the fisheries cost recovery levy orders from 1994 to 2001 were validly made. In particular, there was concern as to whether the Minister of Fisheries, in making the levy orders, had been provided with advice that allowed him to have sufficient regard to the under and over recovery of levies.

The Government sought validating legislation, with retrospective effect, to protect the Crown from a potential fiscal exposure of NZ\$240 million (the total amount of levies collected under the levy orders in question). The validation was given effect through the legislation in 2002. This validated cost recovery levy orders from 1995 to 2001 by deeming the Minister:

- To have complied with the sections of the Act requiring regard to be had to under and over recovery.
- To have taken into account any other fees, charges, or levies paid or payable under the Act.

The commercial industry was dismayed by what appeared to be legalized taking of over-recovered levies, but the government had been primarily concerned with the need to mitigate the total NZ\$240 million liability for all levies paid since 2004 rather than the liability for over-recoveries. The validating legislation, for

example, did not actually remove the Minister's obligation to consider under and over recoveries when making new cost recovery levy orders. An amendment was subsequently made to the Fisheries Act requiring the Minister of Fisheries, when making the 2003/2004 levy order, to have regard to under and over recoveries in the years to which the validated levy orders related.

A joint working group comprising representatives of the commercial seafood industry and officials of the Ministry of Fisheries had been established as early as December 1999 to review the under and overs issue because of the industry's concerns.

The objectives of the working group were to:

- Determine the extent of the historic under and over recoveries of cost recovery levies since 1994.
- To develop a process for dealing with both the historical and future under and over recoveries.
- Make recommendations to the Minister of Fisheries on ways to finally resolve the issue.

Following the legal and legislative actions of 2001, the pressure on the working group to find a satisfactory solution to the unders and overs issue grew immensely. The working group reported in 2003 to the Minister of Fisheries with recommendations on a settlement process.

The unanimous recommendation to settle the 1994/95 to 2001/02 period was a package consisting of:

- A net credit of NZ\$24.1m, for the under and over recovery of cost recovery levies for the period 1 October 1994 to 30 September 2002, to be applied against future levy orders
- An allowance of nearly NZ\$500 000 representing the future time value of money, relating to the time the settlement will take to complete
- An agreement that the question of future deemed value revenue should be the subject of another joint working group made up of industry representatives and Ministry officials to be set up in 2003 and that it should report to the Minister of Fisheries.

The Minister of Fisheries accepted these recommendations.

The working group also agreed that a reduction of future levies was the most equitable way to distribute the settlement credits. Distribution would be made on the same basis as the initial allocation of the levy charges in the year in which the over or under recover was made. Table 9 shows the different components of the settlement.

Table 9: Financial elements of the unders and overs settlement (million NZ\$)

Observer over-recovery	1.5
Research over-recovery	2.4
Departmental over-recovery	7.6
Revenue over-recovery	3.0
Conservation Services over-recovery	1.0
Transition quarter adjustment	7.5
2001/02 Net over recovery	1.1
Deemed values	0.0
Total	\$23.0

5.4.1 Deemed values

Deemed values are an important part of the QMS's balancing regime. The balancing regime is the range of civil and criminal incentives that act to constrain commercial catch to the sustainability measures set under the Fisheries Act 1996. The regime acts on individual fishers to ensure catch is covered by annual catch

entitlement (ACE) by monthly and annual balancing dates. ACE is generated once each year by quota shares of the total allowable commercial catch.

If a fisher catches an amount of fish in excess of his or her ACE, then he or she must pay a deemed value. Deemed values are the primary deterrent to taking fish that is not covered by ACE. If deemed values are not paid, a fisher's permit is suspended and fishing without a valid permit is a criminal offence. Deemed values are treated as non- departmental Crown revenue.

Annual deemed value demands made by MFish range from NZ\$6 to NZ\$7 million per annum prior to 1 October 2001, to an average of NZ\$9 to NZ\$10 million per annum in recent years. Until a 1999 amendment to the Fisheries Act that explicitly exempted deemed values from consideration by the Minister in setting levies, the industry asserts the Minister failed to have regard to millions of dollars of deemed value revenue received by the Government between 1994 and 2001. The Primary Production Select Committee agreed with this interpretation in its 1998 report on cost recovery as did the Independent Reviewer of the Fisheries Act.

Industry's reasoning is straightforward. Under the QMS balancing regime, fishers have a set time to buy ACE from quota holders if they do not hold enough ACE of their own to cover their catch of a particular fish stock. If they do not acquire ACE they pay a deemed value to MFish. Since they should have bought ACE from quota holders in the first place, and did not, part of the deemed value payments should be returned to quota holders in the relevant fishery. If the stock is overfished by non-ACE holders even if they all pay deemed values, it is the quota holders who face the risk of a cut in the total allowable commercial catch. This impacts both the amount of fish that can be caught and the value of quota shares.

As part of the agreement on the unders and overs issue Government agreed that a MFish and industry joint working group on deemed values should be convened. The working group is currently looking at the entitlement of quota holders to a proportion of revenues collected from deemed values. This work is progressing slowly due to a fundamental difference of views between MFish and the industry. MFish has long viewed deemed values as a punitive fine for failing to comply with the catch balancing regime. Industry views it as 'civil' charge intended to remove any financial benefit from catching fish without ACE. MFish is also insisting on involving non-commercial stakeholders in the working group on the grounds that they have a legitimate stake in the operation of the commercial catch balancing regime. Although this true, these same stakeholders have a record of being hostile to any change to the cost-recovery regime if it is in favour of the commercial sector and to be in support of changes that impose additional costs on the commercial sector.

6. LESSONS LEARNT AND CONCLUSIONS

Without a doubt the system of funding commercial fisheries management in New Zealand is successful in:

- Recovering the costs of fisheries management from the commercial industry.
- Improving transparency and accountability in the delivery of fisheries management services.
- Involving industry in both the determination of fisheries management services and in some instances the delivery of fisheries management services.
- Generating efficiencies in the delivery of fisheries services.

Nevertheless some difficult and costly lessons have been learnt over the last 20 years and some key questions about the future funding of commercial fisheries management remain.

First, it is not clear whether the New Zealand system of cost recovery is directly transferable to other fisheries management regimes around the world. For example, New Zealand's public sector reforms throughout the 1980s and 1990s were some of the most market oriented introduced anywhere in the world. The entire QMS was designed and implemented in this policy environment. Efficiency and cost-effective service delivery was a given for all public services. Fisheries management regimes with many of the following characteristics are the most likely to be successful in implementing a New Zealand style of cost-recovery:

- A general public sector ethos of transparency, efficiency and accountability.
- A clearly identifiable and commercial fishing sector.
- A system of fishing rights that have a high degree of durability and hence form the basis for attributing costs and collecting levies.

- Effective commercial stakeholder organizations that represent the commercial industry and can engage government agencies in constructive dialogue and negotiation over cost recovery.
- Government agencies that have strong policy and administrative capabilities.

With all the difficulties encountered in the development of the New Zealand cost recovery system it is perhaps unclear why successive Governments persevered with the system and did not replace it with an industry specific tax. Three unique factors may explain this:

- A general preference among the finance and treasury agencies for cost recovery rather than sector-specific taxes that are potentially punitive and inefficient.
- The Māori fisheries settlement meant that major changes to the cost recovery regime could be seen as reducing the value of the settlement instigating a further grievance between Māori and Crown.
- The continuity of senior MFish officials and industry representatives clearly dedicated to the success of the cost recovery regime and who were willing to put aside differences and work towards a common end.

Second, clear principles and cost recovery rules are required from the start of any cost recovery regime. The initial absence of any legislated cost recovery principles came close to destroying the integrity of New Zealand's cost recovery regime. Although some tension remains about cost recovery rules as currently legislated, their existence at least provides a foundation for ongoing constructive dialogue between the MFish and the commercial industry.

Third, the attribution of costs depends on the classification of services being in the public good or private good. The application of the beneficiaries-pays and risk-creator pays (a version of the polluter pays) approaches for the recovery of commercial management costs are increasingly difficult to apply as fisheries management agencies are faced with an increasing diverse and complex set of social, cultural and environmental concerns. To deal with these issues agencies hire more staff and develop more complex consultative processes, research programmes and management systems. There is a natural tendency to look to the commercial sector to contribute to the costs of these services under the risk creator pays principle. The beneficiaries pays principle is often harder to apply because the beneficiaries are either not identifiable as individuals or because it is politically unacceptable to recover costs from a particular group of people such as recreational fishers.

Fourth, accountabilities must be clearly defined and accepted by all parties. MFish was at best placed in a situation of potential conflict between its financial accountabilities under the Public Finance Act and the Fisheries Act and at worst used the Public Finance Act to deliberately avoid cost-recovery accountabilities under the Fisheries Act because of the costs and complexity involved. At the same time the commercial industry needed to accept that MFish was not accountable to it as the levy payer for the delivery of fisheries services no matter how good or bad that delivery was. MFish is accountable to the Minister of Fisheries. MFish must, however, provide an financial accounting of cost recovery to industry at a sufficiently detailed level so that it is transparent as to what services the industry is contributing to and whether the attribution of costs is consistent with cost recovery rules.

Fifth, designing and administering a cost recovery system based on cost attribution is complex and resource intensive. Engaging stakeholders in the process has high transaction costs for both participants and the management agency. Nevertheless not to engage stakeholders reduces the likelihood of acceptance of the attribution system and will do little to bring about efficiencies in the delivery of fisheries services since it tends to be the levy payers who have the greatest incentives to see efficiencies occur. The success of joint industry-Government working groups in resolving conflicts over the cost recovery regime further supports the need for fundamental engagement of stakeholders in the design and implementation of a cost recovery system.

Sixth, the use of cost recovery to drive efficiencies may be undermined by inertia within the fisheries management system. This arises from three sources:

- Active resistance to change from within an organization. Staff of any agency are unlikely to embrace sweeping changes especially if it threatens job security or causes the need for retraining or the acquisition of new competencies.

- The physical capability of the system to be changed. Modern management systems are interdependent functionally and hierarchically. Change to one management system has direct and indirect consequences for other parts of the system increasing the natural inertia of the system.
- The capabilities of the people within the system to change even when such change is accepted and desired. In highly competitive labour markets staff with appropriate skills may be scarce and/or expensive to hire. Furthermore, sweeping reforms require a change in mindset and in the competencies of existing employees that cannot occur in the short-term.

Combined these three factors limit the capacity of an agency to change management practices, and even when accepted it can mean change is evolutionary rather than revolutionary. Evolution rather than revolution characterizes the practice of cost recovery in New Zealand, even if its drivers have been and remain revolutionary.

Seventh, delegation, devolution and the general trend towards increasing complexity of fisheries management mean that the total cost of fisheries management is likely to continue to increase rather than decrease. Even as the public costs of commercial fisheries management have been stabilized and efficiencies attained, the private costs of fisheries management have increased. These costs arise from:

- Fisheries services devolved to the industry such as registry services.
- The direct purchase of fisheries services where the industry has formally or informally taken on greater responsibility for ensuring good fisheries management outcomes.
- The increased time and expertise needed to participate in MFish consultative processes as the decision stakes become higher and the range of issues addressed seemingly grows exponentially.

The future path of commercial fisheries management funding in New Zealand is unclear. The issue of attribution of management costs is now one of detail rather than fundamental debate. Efficiency gains in fisheries service delivery have occurred in many areas but the potential for more than incremental improvement is constrained by the need for public agencies to meet multiple objectives and respond to an ever increasing variety of issues and challenges. The cost recovery debate is shifting from the magnitude of the management cost to an ideological focus on the relative role of the Government and industry in the management of commercial fisheries.

The commercial industry and MFish consider the future lies in the development of fisheries plans (MFish, 2004a). Fisheries plans offer a way of making fisheries management more responsive to the needs of particular fisheries and the aspirations of the people who use them. By increasing stakeholder involvement, fisheries plans are expected to increase the level of innovation brought to fisheries management decisions. In situations where the Minister of Fisheries approves a fisheries plan, any associated MFish strategy will be updated to take into account the fisheries plan and avoid duplication or incompatibility of government services with services delivered by stakeholders.

Commercial stakeholder organizations would become increasingly responsible for developing fisheries plans that:

- Set management objectives and performance measures.
- Specify rules for management and governance.
- Define necessary services including: research, administration and management, and monitoring and compliance.
- Establishing funding arrangements.

The diversity of New Zealand's fisheries and marine areas means that fisheries plans will vary widely. Plans will evolve over time, and may begin with a limited set of objectives and management proposals then expand in scope and ambition as stakeholders gain experience. At their most ambitious, after developing a fisheries plan commercial stakeholder organizations could become responsible for:

- Managing decision-making processes.
- Purchasing research services.
- Administering access.

- Monitoring fishing activity.
- Providing information/education services.
- Enforcing non-criminal rules.
- Collecting levies to fund management activities.

The exercise of these functions would be subject to MFish developed standards and specifications.

The benefits of fisheries plans for the delivery of fisheries services include:

- Gains in economic efficiency due to lower transaction costs associated with stakeholder organization directly running and funding their own fisheries management services.
- Enhancement of commercial fishers stewardship ethic because they are directly involved in the purchase and execution of fisheries services rather than being indirectly involved through centrally run consultative processes.

Proposed as part of the independent review of the Fisheries Act in 1988 and provided for in amendments to the Fisheries Act in 1999, progress on fisheries plans has been impeded by a number of factors:

- Opposition by environmental non-governmental organizations and scientific interests who:
 - Believe fisheries service delivery is a core responsibility of government since fisheries are a public resource.
 - Claim that industry has a strong incentive to distort the results of research or compliance service outcomes or pressure contracted service providers for short-term gain.
- A perception by some segments of the fishing industry that fisheries plans meant devolution of management responsibility rather than the more simple delegation of service purchasing functions. This led them to oppose being accountable to the Ministry for the delivery of required fisheries services.
- An overestimation of the capacity of many commercial stakeholder organizations to fund and manage fisheries services orders of magnitude more complex than their existing service delivery responsibilities.
- An under-resourcing of the Ministry of Fisheries to develop necessary standards and specification, establish an effective monitoring and auditing regime, and manage the risks to government associated with stakeholder purchase of fisheries services.
- Insufficient collaboration between the fishing industry and MFish over the development of fisheries plan and the associated delivery of directly purchased fisheries plans.
- Changing attitudes of Government Ministers on the nature and extent of the devolution and delegation of commercial fisheries management services.

New Zealand is often looked to for lessons regarding fisheries management, especially those involving the use of market mechanisms to encourage the efficient use of fisheries resources. The history of New Zealand's cost recovery regime certainly contains many lessons about the construction of a principled cost recovery regime and the transparent and accountable attribution of costs to the commercial industry.

In the absence of a counterfactual it is difficult to measure efficiency gains attributable to the cost recovery regime. The decline in commercial cost recovery levies in real terms without any reduction in the quality of service provision suggests that considerable efficiency gains have been made, especially when viewed against increases in Government expenditure generally during the period reviewed. Significant increases in MFish expenditure, though attenuated in recent years, are likely attributable to the increasing complexity of fisheries management across commercial, recreational and customary fishing sectors generally.

Any jurisdiction considering implementing a comprehensive cost recovery regime should anticipate initial high transaction costs and perhaps a short-term reduction in efficiency. There is a need to implement new procedures and processes to ensure transparency and accountability. These will inevitably need revision and review in light of actual performance. Stakeholders will naturally demand a greater say in the delivery of services once they become responsible for their funding. At times it will be difficult to separate out

behaviours intended solely to reduce industry costs in the short-term from those genuinely intended to improve the performance of management systems. Management agencies must be committed not just to the recovery of costs of fisheries management but to maximising the value derived from the sustainable management of a nation's fisheries resources through a suite of policy instruments, of which cost recovery is one.

ACKNOWLEDGEMENTS

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APPENDIX I: MFISH OUTPUT CLASSES AND OUTPUTS, 2005/06

Output class/output	Explanation
Fisheries policy advice	Outputs that ensure development and review of policy and legal frameworks for the sustainable and efficient utilization of fisheries.
New Zealand fisheries policy advice provided	Advice on policy development and to promote new frameworks aimed at: <ul style="list-style-type: none"> • Protecting the health of the aquatic environment. • Enabling New Zealanders to get the best value from the sustainable and efficient use of fisheries. • Ensuring the Crown delivers on its obligations to Māori with respect to fisheries.
International fisheries policy advice provided	Contribute to the development of bilateral, regional and multilateral frameworks for managing international fisheries, with the aim of: <ul style="list-style-type: none"> • Protecting the health of the aquatic environment. • Enabling New Zealanders to get the best value from the sustainable and efficient use of fisheries. • Strengthening Governance arrangements for high seas fisheries.
Ministerial services provided	Drafting of reports and advice to Ministers and to Select and Cabinet Committees, replies to Ministerial correspondence and responses to Parliamentary questions.
Fisheries information	Research and other service outputs relating to gathering and analysing data about New Zealand's fisheries to support decisions about sustainable utilization, and the provision of information on the biodiversity of New Zealand's marine environment.
Utilization and sustainability of New Zealand's fisheries resources measured	As an input into current and future fisheries management decisions, fisheries research needs are identified, projects undertaken and results reported to provide increased information on: <ul style="list-style-type: none"> • Estimates of biomass and sustainable yields for fish stocks. • Effects of fishing on the aquatic environment, including biodiversity and bycatch species. • Relevant social, cultural and economic factors that may be included in the management decision process. • Non-commercial harvest levels.
Biodiversity of New Zealand's marine environment estimated	Supporting the New Zealand Biodiversity Strategy by identifying research needs, undertaking research and reporting research results in the following areas: <ul style="list-style-type: none"> • Biodiversity information within the New Zealand EEZ • Biodiversity of the Ross Sea, Antarctica
Observer services provided	Observers deployed and data collected
Fisheries management	This output class provides for: <ul style="list-style-type: none"> • Outputs that assist in developing guidelines, regulations and processes that make the fisheries policy framework operational. • Services associated with monitoring the effectiveness of delivery of contracted and devolved registry services to ensure consistency and compliance with contracted or devolved standards. • Management and dissemination of information received from registry agencies for use by the Ministry in managing other output classes. • A number of Ministry statutory decision processes.

New Zealand fisheries utilization and sustainability reported	Establishment of standards and the development of fisheries management advice contributing to the sustainability of aquatic ecosystems and efficient utilization of fisheries.
Deed of settlement implemented	Delivery of many of the services needed to fulfil the Ministry's Treaty and Fisheries Deed of Settlement obligations.
Cost recovery process managed	Determining and consulting on the fisheries management costs that are recovered from the commercial fishing industry.
Statutory decision processes administered	Evaluation of applications from stakeholders to harvest aquatic life or to farm aquatic life outside normal rules.
Registry services managed	Delivery and monitoring of contracted and devolved registry services to ensure consistency and compliance with standards and specifications.
Fisheries enforcement	This output class covers the outputs that promote compliance with fisheries laws.
Commercial fishing rules enforced	Compliance capacity provided to take action in commercial fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Customary fishing rules enforced	Compliance capacity provided to take action in customary fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Recreational fishing rules enforced	Compliance capacity is provided to take action in recreational fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
New Zealand's international fishing rules enforced	Compliance capacity is provided to take action in New Zealand's international fisheries to encourage compliance and deter offending. These actions include monitoring, detection and provision of recommendations to prosecute.
Poaching and black market activities deterred	Compliance capacity is provided to take action to apprehend poaching and black market offenders. These actions include monitoring, detection and provision of recommendations to prosecute.
Prosecutions managed	Fishery-related prosecutions managed. This includes case preparation and management of forfeit property.
Aquaculture settlement	Implementation of the aquaculture settlement in terms of the Aquaculture Reform Act 2004.
Source: MFish (2004)	

APPENDIX II: FISHERIES (COST RECOVERY) RULES 2001**FISHERIES (COST RECOVERY) RULES 2001**

SR 2001/229

Silvia Cartwright, Governor-General
Order in Council

At Wellington this 10th day of September 2001

Present:

Her Excellency the Governor-General in Council

Pursuant to section 263 of the Fisheries Act 1996, Her Excellency the Governor-General, on the recommendation of the Minister of Fisheries under that section, and acting on the advice and with the consent of the Executive Council, makes the following rules.

Contents

1	Title
2	Commencement
3	Interpretation
4	Status of rules
5	Proportion of costs to be recovered from industry
6	Who must pay levies, and basis for levy
7	Allocation of costs between stocks for certain industry-wide services
8	Allocation of costs between stocks for observer coverage services
9	Allocation of costs for stock assessment research
10	Allocation of costs for aquaculture services
11	Alterations in levies during fishing year
12	Port prices
13	Revocation

Schedule

Apportionment of costs of fisheries and conservation services

Rules

- 1 Title—
These rules are the Fisheries (Cost Recovery) Rules 2001.
- 2 Commencement—
These rules come into force on the day after the date of their notification in the *Gazette*.
- 3 Interpretation—
(1) In these rules, unless the context otherwise requires,—

Act means the Fisheries Act 1996

costs includes both direct and indirect costs

fisheries resources stock assessment research, in relation to any stock, species, or class of fish or fish resource, means research projects that aim to produce information on the stock structure, productivity, distribution, ecology, biomass, or sustainable yields of that stock, species, class, or resource

ICE means individual catch entitlement

inshore finfish—

- (a) includes elephant fish, groper, red cod, rig, school shark, and snapper:
- (b) does not include freshwater eels or blue cod

MHR means the monthly harvest return required by the Fisheries (Reporting) Regulations 2001

monitoring harvest levels means services to monitor the quantity and quality of data received from the reporting of fishing activity under the Act

pelagic fisheries resources includes albacore, jack mackerel, kahawai, skipjack tuna, southern bluefin tuna, kingfish (yellowtail), and other game fish species

permit holder means any person who holds a fishing permit issued under section 91 of the Act

port price means the surveyed average price paid by licensed fish receivers to independent fishers for fish landed to those licensed fish receivers, as set or updated under rule 12

QMS means quota management system

research relating to the protected species population means research required or carried out in the interests of the effective management of any species that is—

- (a) protected under the Wildlife Act 1953 or the Marine Mammals Protection Act 1978; and
- (b) taken as non-targeted species by commercial fishers

shellfish fisheries resources does not include cockles, paua, pipis, rock lobster, or tuatua

TAC means total allowable catch

TACC means total allowable commercial catch.

(2) In these rules, references to **stocks** includes, where appropriate, references to fishing activities undertaken for the purpose of harvesting those stocks and to the persons carrying out those activities.

4 Status Of Rules—

These rules are to be followed so far as reasonably practicable in setting any levies under the Act, but failure to accurately predict, estimate, account for, or otherwise quantify any matter referred to in these rules does not invalidate any levies set in accordance with their general tenor.

5 Proportion Of Costs To Be Recovered From Industry—

The proportion of costs to be recovered from the commercial fishing industry for the fisheries or conservation services specified in the first column of the Schedule is the proportion set out in the second column of that schedule.

6 Who Must Pay Levies, And Basis For Levy—

(1) The persons who must pay levies in respect of the fisheries and conservation services specified in the Schedule are, as appropriate,—

- (a) quota owners, on the basis of the quota weight equivalent in relation to their quota share:
- (b) ICE holders, on the basis of the amount of ICE held:
- (c) permit holders, on the basis of the amount of actual catch of non-QMS stock reported on the holders' MHRs:
- (d) fish farmers, on the basis of—
 - (i) the area of the relevant fish farm in hectares, in the case of costs for research services:
 - (ii) the number of licences, permits, or other authorisations held, in the case of costs for enforcement or other services.

(2) The levy payable for any fishing year on quota weight equivalent in relation to quota share, ICE held, or actual catch of non-QMS stock reported on a permit holder's MHR is to be calculated for each stock in accordance with the following formula:

$$\frac{g}{h}$$

where—

g is the total amount of costs to be recovered from the stock for the fishing year

h is the total TACC, ICE, or estimated catch likely to be extracted from the stock in the fishing year, as appropriate.

(3) Levies imposed on the persons specified in subclause (1)(a) to (c) may be expressed as a levy amount per tonne, per kilogram, or per quota share.

7 Allocation Of Costs Between Stocks For Certain Industry-Wide Services—

(1) This rule applies to the following services:

- (a) the services specified in item 1 of the Schedule (which relates to monitoring and offence detection):
- (b) the services specified in items 2 and 3 of the Schedule (which relate to protected species research):
- (c) the services specified in item 4 of the Schedule (which relates to mitigation, etc, of effects of commercial fishing on the aquatic environment or biological diversity):
- (d) the services specified in item 9 of the Schedule (which relates to the monitoring of harvest levels):
- (e) the services specified in item 10 of the Schedule (which relates to administration and registry services).

(2) The percentage of the costs to be recovered from each stock in respect of the services listed in subclause (1) is to be determined in accordance with the following formula:

$$\frac{a}{b}$$

where—

a is the value of the particular stock, derived by multiplying the total TACC, ICE, or estimated catch for the stock by the port price for that stock

b is the total value of all stocks, derived by—

- (a) multiplying the total TACC, ICE, or estimated catch for each stock by its relevant port price; and
- (b) adding all the results.

(3) If, in the case of the services specified in items 2, 3, and 4 of the Schedule, the chief executive identifies particular stocks as risk exacerbators in all or any areas to which the services relate, then—

- (a) the costs of those services in these areas are not to be recovered from other stocks; and
- (b) the costs to be recovered in those areas from the identified stocks are to be determined in accordance with the formula in subclause (2) as if item b related only to the total value of those stocks identified as exacerbators.

8 Allocation Of Costs Between Stocks For Observer Coverage Services—

In respect of the observer coverage services specified in item 8 of the Schedule, the percentage of costs to be recovered from each stock is to be determined in accordance with the following formula:

$$\frac{c}{d}$$

where—

c is the number of observer seadays in the relevant fishing year or financial year or other relevant period attributable to the particular stock

d is the total number of observer seadays during that year or period.

9 Allocation Of Costs For Stock Assessment Research—

- (1) In respect of the stock assessment research services specified in items 5, 6, and 7 of the Schedule,—
- (a) the costs of services attributable to a single stock are to be recovered from that stock:
- (b) where the services relate to more than 1 stock, the costs are to be recovered from each stock to which the services relate in accordance with,—
- (i) the formula in subclause (2), if the chief executive has determined a percentage allocation for the research effort in respect of the particular stock; or
- (ii) the formula in subclause (3), if the chief executive has not determined such a percentage allocation for the stock.
- (2) If, in respect of services that relate to more than 1 stock, the chief executive has determined a percentage allocation for the research effort in respect of a particular stock, the costs to be recovered from that stock are to be determined in accordance with the following formula:

$$c \times d \times h$$

where—

c is the total cost of the services (before deduction of any Crown contribution)

d is the percentage allocation determined by the chief executive as reflecting the research effort in respect of the particular stock

h is the percentage of costs to be recovered from the particular stock, as indicated in the second column of item 5 or the second column of item 6 of the Schedule (whichever is relevant).

- (3) If, in respect of services that relate to more than 1 stock, the chief executive has not determined a percentage allocation for the research effort in respect of a particular stock, the costs to be recovered from that stock are to be determined in accordance with the following formula:

$$(c - e) \times f/g \times h$$

where—

c is the total cost of the services (before deduction of any Crown contribution)

e is sum of any research costs allocated under subclause (2) to other stocks for the services concerned

f is the value of the particular stock, derived by multiplying the total TAC, ICE, or estimated catch for the stock by the port price for that stock

g is the total value of all the stocks to which the services relate (other than stocks for which an allocation has been made under subclause (2)), derived by—

(a) multiplying the total TAC, ICE, or estimated catch for each stock (other than stocks for which an allocation has been made under subclause (2)) by its relevant port price; and

(b) adding all the results

h is the percentage of costs to be recovered from the particular stock, as indicated in the second column of item 5 or the second column of item 6 of the Schedule (whichever is relevant).

10 Allocation Of Costs For Aquaculture Services—

In respect of the aquaculture services specified in item 11 in the Schedule, costs are to be recovered on the basis of—

(a) the area of each fish farm, in the case of the costs of research services:

(b) the number of licences, permits, or other authorisations held, in the case of the costs of enforcement or other services.

11 Alterations In Levies During Fishing Year—

If it is proposed to alter any levy during a fishing year, the altered levy may be set at a figure that, when averaged with the existing levy, results in an appropriate overall levy amount for the whole fishing year.

12 Port Prices—

Before 1 October in each year, the chief executive must survey the port prices for each stock and fix a port price that, in the view of the chief executive, is the average port price for that stock.

13 Revocation—

The Fisheries (Crown Contribution) Order 1999 (SR 1999/381) is revoked.

Schedule

Apportionment of Costs of Fisheries and Conservation Services

Services	Percentage of costs to be borne by industry	Allocation between stocks
1 Monitoring and offence detection of commercial fishing activities	100%	As in rule 7(2)
2 Research relating to protected species populations where risk to those populations by human intervention has been estimated	a/b , expressed as a percentage, where — a is the risk to the populations posed by commercial fishing in New Zealand fisheries waters. b is the total risk of human interventions on the populations	As in rule 7(2) or (3)
3 Research relating to protected species populations where risk to those populations by human intervention has not been estimated	50%	As in rule 7(2) or (3)
4 Services (including research) provided to avoid, remedy, or mitigate that portion of the risk to, or adverse effect on, the aquatic environment or biological diversity of the aquatic environment caused by commercial fishing	100%	As in rule 7(2) or (3)
5 Stock assessment research for stock for which a TAC and a TACC have been set	a/b , expressed as a percentage, where — a is the TACC for the stock b is the TAC for the stock	As in rule 9(1)(a)
6 Stock assessment research for stock for which a TACC or a TAC has not been set	The following percentage, as appropriate, for the stock being researched: (a) blue cod—40%: (b) freshwater eels—50%: (c) cockles, pipis, or tuatua— 25%: (d) paua or rock lobster—75%: (e) shellfish other than cockles, pipis, tuatua, paua, or rock lobster—90%: (f) inshore finfish other than freshwater eels or blue cod—75%: (g) pelagic fisheries other than kahawai and kingfish—95%: (ga) kahawai—70%: (gb) kingfish—50%: (h) seaweed—25%:	As in rule 9(1)

	(i) all other stocks not specified in paragraphs (a) to (h)—100%	
7 Stock assessment research across more than one stock	For each stock, the relevant percentage for that stock specified in this column in item 5 or item 6 (which percentage is to be applied to the stock's share of the costs determined in rule 9(2))	As in rule 9(2)
8 Observer coverage to support stock assessment process and conservation services	100%	As in rule 8
9 Monitoring harvest levels	100%	As in rule 7(2)
10 Quota and commercial fishing administration and registry services, including access and introducing new species into QMS	100%	As in rule 7(2)
11 Aquaculture services	100%	As in rule 10

Marie Shroff,
Clerk of the Executive Council.

The rules also indicate the basis on which levies are to be allocated to particular fishstocks or levy payers.

Date of notification in *Gazette*: 13 September 2001.

Date laid before the House: 13 September 2001.

FINANCING FISHERIES MANAGEMENT: THE GHANAIAN SITUATION

George Hutchful¹

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ACRONYMS

APW	Ali Poli Watsa
CBFMC	Community-Based Fisheries Management Committees
CBLMC	Community-Based Fisheries Management Committees
DFMC	District Fisheries Management Committee
DGN	drift gillnet
DLMC	District Lake Management Committee
DoF	Directorate of Fisheries
EEZ	exclusive economic zone
EMC	Economic Management Committee
EPA	Environmental Protection Agency
FABS	Food and Agriculture Budgetary Support
FAO	Food and Agriculture Organization of the United Nations
FC	Fisheries Commission
FSD	Forestry Services Department
FSCBP	Fisheries Sub-sector Capacity Building Project
GCLME	Gulf of Guinea Large Marine Ecosystem
GDP	gross domestic product
GNCFC	Ghana National Canoes Fishermen Council
GNICF	National Inland Canoe Fishermen Council

GOG	Government of Ghana
GPRS	Growth and Poverty Reduction Strategy
GPS	global positioning system
GRT	gross registered tonnage
ICCAT	International Commission for the Conservation of Atlantic Tunas
IDA	International Development Association
IFMD	Inland Fisheries Management Division
IGF	internal generated funds
JICA	Japan International Cooperation Agency
KNUST	Kwame Nkrumah University of Science and Technology
MCS	monitoring, control and surveillance
MDA's	Ministries Departments and Agencies
MFRD	Marine Fisheries Research Division
MFMD	Marine Fisheries Management Division
MLGLDE	Ministry Local Government and Rural Development and Environment
MOFA	Ministry of Food & Agriculture
MOFEP	Ministry of Finance and Economic Planning
MOFI	Ministry of Fisheries
MSY	maximum sustainable yield
MTEF	Medium Term Expenditure Framework
NAFAG	National Fishers Association of Ghana
NGOs	Non-governmental Organizations
NICFC	National Inland Canoe Fishermen Council
NMA	National Maritime Authority
NORAD	Norwegian Agency for Development Cooperation
SAR	Staff Appraisal Report
SFLP	Sustainable Fisheries Livelihoods Programme
UCC	University of Cape Coast
UG	University of Ghana
UN	United Nations
UNCLOS	United Nations Convention of the Law of the Sea
VMS	Vessel Monitoring System
VRA	Volta River Authority
WB	World Bank
WRI	Water Research Institute

EXECUTIVE SUMMARY

This paper is the technical input of case studies from Ghana, into the Food and Agricultural Organization's initiative to provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management. It identifies the lead fisheries management agency and related institutions in Ghana; provides an overview of financing fisheries management in the country.

Currently the institutions responsible for fisheries management are: Ministry of Fisheries, Fisheries Commission (FC), Directorate of Fisheries as a technical secretariat to the FC, Community-Based Fisheries Management Committees. These structures collaborate with a wide variety of service providers including the Universities, other academic research institutions, Agencies, private consultants, local fisheries associations, other relevant Government Ministries, Departments especially those responsible for managing and regulating the nation's marine and inland water resources.

The Government of Ghana (GOG) is the most reliable and permanent source of funds for fisheries management. It provides funds from the national treasury, and allows the Fisheries management establishment to generate and use funds from regulation enforcement as well as user fees for certain categories of services and fishing in the nation's water bodies. Allocation of funds to the fisheries management goes through an elaborate process of consideration involving key institutions of the nation's governance including the presidency, parliament and the Ministry of Finance and Economic Planning.

Beyond Government sources, external sources comprising the nation's development partners constitute a very important source for financing fisheries management with the World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP), the IPIC project and the CIDA/DFID-funded Food and Agriculture Budgetary Support (FABS) as good examples.

Up to 2005, fishery sector management had been tacked under the Ministry of Agriculture. Decoupling fisheries management from the Ministry of Agriculture and the creation of the Ministry of Fisheries has enhanced the visibility of the sector, facilitated increased resource allocation from Government sources and resource mobilization from external sources, resulting in higher levels of fisheries management expenditures.

Funds from licensing of vessels and local resource mobilization by local fishing communities and District Assemblies as demonstrated by the IPIC project constitute examples of low cost sources of funding for fisheries management.

Overall, internally generated funding mechanisms such as licensing of vessels and use of participatory mechanisms in fisheries management, seem to be the way forward in low-cost fisheries management. In this respect, the reconstitution of the Fisheries Commission as stipulated in Act 625, and strengthening and expanding the coverage of co-management structures are recommended.

1. INTRODUCTION

Sustainable and effective fisheries management is a priority globally. In most countries, cost implications are very high and present a challenge to most practitioners. Fisheries management objectives must not only be met but also in a cost-effective manner especially in developing countries, where chronic funding shortages are the norm rather than the exception and very limited funds have to be shared between competing needs for a variety of activities such as research, policy making, operational management, enforcement and prosecution.

To facilitate informed choices between funding options by interested agencies, the Food and Agriculture Organization of the United Nations (FAO) has initiated a global effort to: examine funding issues; identify and document low cost approaches to meeting the most important fisheries management priorities; and provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management. In pursuit of this agenda, FAO has commissioned technical papers from selected countries including Ghana, to provide case studies that will input into the global analysis, report and tool formulation.

This paper presents the Ghanaian case study on financing fisheries management. It identifies the lead fisheries management agency and related institutions in Ghana; it provides an overview and critique of the various aspects of financing fisheries management in the country with focus on marine and the Volta Lake Fisheries; and, it draws special attention to World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP) – an intervention that reorganized and strengthened the institutional capacity for more effective fisheries management and established the Improvement of Policies and Institutions (IPIC) project – an example of a cost effective and self financing fisheries management scheme.

The paper is organized into four main parts. The first chapter introduces the purposes of the report. The second chapter presents an overview of key components and management agencies of the Ghanaian fisheries.

The third chapter presents the sources of funding, analysis of the financial performance and fisheries management service providers. The fourth part summaries the key issues and presents recommendations on the strategy for cost effective fisheries management.

1.1 GOAL

The goal of this technical paper is to facilitate the adoption of cost effective approaches to sustainable and effective fisheries management, globally.

1.2 PURPOSE

The purpose of this technical paper is to enable FAO to provide practical information, knowledge and tools that will constitute a global blue print for cost effective fisheries management choices by relevant agencies, globally.

1.3 OBJECTIVES

The immediate objectives of this paper are to:

- Contribute to the global effort at adopting cost effective approaches to sustainable and effective fisheries management; and
- Identify, illustrate and analyse current practices in funding/financing fisheries management by the key fisheries management agency and related institutions in Ghana and indicate relevant lessons learnt, in terms of cost-effectiveness.

More specifically, the paper seeks to:

- Document and explain the main characteristics of the Ghanaian fisheries;
- Identify the key fisheries management agency and related institutions in Ghana and describe its mandate, authority, and institutional structure;
- Provide an overview, and critique of various aspects of financing fisheries management in Ghana;

- Analyse and comment on changes in magnitude and composition of expenditures for fisheries management, reasons for such changes, relationship between sources of funds used and the efficiency with which they are used; and
- Describe actions that have improved the overall capability to meet fisheries management objectives including efficiency gains, and/or options to do so.

2. CHARACTERISTICS OF THE FISHERIES

The fisheries sector is important because the livelihoods of about 10 percent of Ghana's population are dependent on the fisheries resource. The sector is key to poverty reduction in the fishing communities as incomes of about 500 000 fishers and 1.5 million others in ancillary jobs are dependent on it. The fishing industry contributes 5 percent of the agricultural gross domestic product (GDP) and 3 percent of the national GDP (MOFA, 2004). Fish is the cheapest and most reliable source of animal protein for the average Ghanaian. It is also an important non-traditional export commodity with annual earnings of some US\$100 million (Mensah *et al.*, 2003)

The fishing industry comprises aquaculture, marine and inland (Volta Lake) fisheries. Marine fisheries are predominant and account for about 85 percent of the annual fish production while the production from the Volta Lake principally accounts for the rest.

The country has a coastline of about 550 km and a narrow continental shelf (15-75m depth) with a total area of 24 300 km² or 11 percent of the country's territorial waters i.e. 218 000 km². The trawlable area extends to depths of 70 metres and covers 18 000 km². An untrawlable hard or rocky bottom exists beyond the 70 metre depth to the edge of the shelf.

The marine fisheries include the large pelagic tuna in the offshore waters inside the exclusive economic zone (EEZ) and beyond, and small pelagic and demersal fish species in the continental shelf area. Sardinella, anchovy and chub mackerel are the most important small pelagic fish species. The most important demersal fish species are of the families Sparidae, Pomadasidae, Mullidae, Scianidae, Lutjanidae, Serranidae, Pomadasidae and cephalopods.

2.1 TYPOLOGY OF MARINE FISHING FLEET

The marine fisheries are exploited mainly for commercial purposes by three categories of fleet. The fishing fleet are classified into: the artisanal, made up of indigenous canoes; the semi industrial wooden vessels; and the steel hulled industrial fleet. The industrial fleet is further categorized into distant water trawlers, shrimpers and tuna vessels.

A description of the crafts, trends in the development of the categories of craft and their implications for management are discussed below. The changes in fleet size of the various categories of vessels in the marine sub-sector from 1999–2006 are presented in Table 1 below.

Table 1: Number of Marine fishing vessels by types 1999–2006

Year	Canoe	Inshore	Industrial	
			Distant water trawlers and shrimpers	Tuna
1999	8 610*	239	37	33
2000	8 610	236	37	34
2001	9 981*	244	39	33
2002	9 981	230	39	33
2003	9 981	233	61	28
2004	11 219*	253	58	27
2005	11 219	240	62	27
2006	11 219	240	61	29
Comment on the fleet size over the period.	Increase	Stable	Increase	Stable

* Number established by census

Source: Directorate of Fisheries

Corresponding marine catch landings in tons by vessel types, location and fishing gear and value of catches for 1999–2006 are also shown in Tables 2 and 3 below. The level of biomass for the different fishery, i.e. pelagics, demersal and tuna species are presented in Table 4.

Table 2: Catch/landings of pelagic and demersal fish species 1999–2006 (metric tonnes)

Depth Contour	Canoe	Inshore	Distant Water	Tuna	Total (metric tonnes)
	0-50m (Costal / Inshore)	30-50m (Inshore)	50-75m (Inshore + Offshore)	75m offshore	
	Harvesting method APW, Beach seine, Set	Purse seine / trawl	Trawl	Pole & line	
1999	164 829	5 149	15 355	83 552	268 885
2000	275 965	8 688	16 679	53 255	354 587
2001	236 355	7 606	19 954	88 806	352 721
2002	200 769	7 785	15 408	66 046	290 008
2003	238 796	11 319	14 144	65 153	329 412
2004	267 910	6 331	15 422	62 742	352 405
2005	218 872	7 591	14 101	82 226	322 790
2006	231 681	9 877	18 807	63 252	323 617

APW: Ali/poli/watsa

Source: Directorate of Fisheries

Table 3: Value of fish landings 1999–2006 (Cedis x000)

Year	Canoe	Inshore	Distant Water	Tuna	Total
1999	597 957 982	18 680 614	62 652 598	243 937 924	923 409 118
2000	1 180 419 644	37 077 020	83 092 672	180 001 900	1 480 591 236
2001	999 782 750	54 217 179	121 758 227	400 315 679	1 576 073 835
2002	1 430 7779 945	56 048 760	116 775 646	531 671 105	2 135 275 456
2003	3 443 802 157	275 580 481	373 763 710	568 374 480	4 661 520 828
2004	3 616 782 030	87 160 605	404 058 480	941 128 950	5 049 130 065
2005	3 338 890 133	117 777 953	435 905 585	1 393 728 158	5 286 301 829
2006	3 938 570 608	173 144 250	651 824 045	1 170 170 140	5 933 709 043

Source: - Directorate of Fisheries

Table 4: Biomass of pelagic and demersal fish species 1999–2006

BIOMASS (MT)				
Year	Pelagics I	Pelagics II	Valuable demersals	Tuna
1999	40 000	50 000	10 743	100 000 - 220 000
2000	56 500	61 000	26 032	120 000 - 240 000
2001	-	-	-	-
2002	73 000	52 000	16 876	190 000 - 220 000
2003	-	-	-	-
2004	68 000	37 000	17 219	190 000 - 220 000
2005	54 000	46 000	19 420	180 000 - 220 000
2006	57 000	37 000	18 010	120 000 - 200 000

Source: Directorate of Fisheries

2.1.1 Artisanal/canoe fishery (coastal)

The artisanal canoe fleet consist of 11 219 traditional wooden dugout canoes, about half of them motorized. The size of the fleet is normally established every other year through a canoe census. Despite the obvious fact that the fishery resources are optimally exploited except in the rocky shelf area, the number of canoes keeps on increasing. This is because there are no restrictions on the entry of new fishers into this sub-sector. The canoe fishers operate from nearly 300 landing sites in 200 fishing villages along the coastline six days a week throughout the year. The fleet employs a wide range of fishing gear which includes purse seines (“poli/watsa”), beach seines, drift gill nets (DGNs), and surface set nets including “ali”. The fishers also use

various forms of bottom set-nets, hook and line (“lagas”). The lagas and DGN fleet which operate beyond the 50 meter depth zone are well equipped with ice, food, and fishing aids like compasses, fish finders and Global Positioning Systems (GPS).

The artisanal subsector produces about 70–80 percent of the total annual volume of marine fish catch. This catch is made up of mainly small pelagic fish species – and to a lesser extent some valuable demersal fish species.

The increase in the fleet size over the period 1999–2006 and its attendant increase in number of fisherman have had a negative social implication as to levels of livelihoods while sustaining a fluctuating resource. Hence, a management regime has to be adopted and applied to protect the use of the resource(s) through the enforcement of bylaws governing the artisanal fisheries sub-sector.

The co-management approach through the Community-Based Fisheries Management Committees (CBFMC’s), introduced during the implementation of the Fisheries Subsector Capacity Building Project (FSCBP) 1996-2002, created an awareness and empowered the fishers to take collective action to stop some destructive fishing methods in the artisanal fishery. This has to be strengthened to well manage the fisheries resources. This could be achieved with the support of the Local Government Authorities, i.e. District Assemblies, by imposing deterrent fines on recalcitrant fishers who infringe on fisheries regulations in the artisanal sector. Funds generated from such fines and licence fees could then be channelled to improve fisheries management.

2.1.2 Semi-industrial fleet (inshore)

These are locally built wooden vessels measuring 9–12 metres in length, number about two hundred and forty (240) and are fitted with 30–90 horsepower (hp) diesel engines. The operators use mainly light bottom trawls fitted without mechanical aids to exploit valuable demersal species like sole, shrimps, cassava fish, cuttlefish, burrito etc. throughout the year. They fish with purse seines during the upwelling seasons. They operate mainly in the inshore waters between 30–50 metres depth where they compete with the canoe fleet.

The semi-industrial fleet produces about 2 percent of the total marine catch. This is made up of the valuable demersal species caught in trawls and the small pelagics caught in purse seines during the upwelling seasons. Trends in numbers of operational fishing crafts in this subsector of the fishing industry seem to be stable. Landings however, since 2004 have fluctuated around a mean of 7 000 tonnes. Of late (2007), inshore fishing seems to be in distress as revenues accrued do not match expenses incurred in the operation of the vessels. The cost of sustaining the inshore fishery needs an integrated approach to alternative livelihoods and diversification of fishing gear which, in turn, calls for the introduction of more environmentally friendly methods of harvesting fish such as the use of trammel nets long line by the Management Agency (DoF).

2.1.3 Industrial fleet (offshore)

This is made up of sixty one (61) vessels with 30–200 hp diesel engines. These are large steel-hulled foreign-built distant water trawlers. Many of these vessels were displaced from their original fishing grounds in Angola, Namibia, Senegal and Mauritania because of the implementation of the United Nations Convention on the Law of the Sea (UNCLOS). Only Ghanaian nationals are allowed into this fishery.

Although these vessels frequently stray into shallow waters, they now are supposed to operate in Ghanaian waters between 50–75 metres deep. They account for about 6 percent of the total volume of marine catch, and the catch includes high value cephalopods that are frozen at sea for export.

The demersal stocks were over fished before the implementation of the Fisheries Subsector Capacity Building Project (FSCBP). However their biomass temporarily improved (Table 4) during the project when the trawlers were effectively removed from shallow waters of depth less than 30 metres. Naval patrols dedicated to patrolling fisheries have been discontinued because of lack of adequate operational funds after the project.

The apparent increase in fleet size and the decreases in landings from the industrial fisheries over the period (Tables 1 and 2) tends to imply overexploitation of fish stocks, especially demersal fish species such as cuttlefish and seabream. Management strategies to minimize the tendency to exploit resources beyond their optimal yields can be attained through the enforcement of fisheries laws and regulations.

Table 5: Catch per unit effort for categories of fleet

Year	Category of fleet			
	Artisanal	Inshore	Distant Water	Tuna
1999	0.124	0.298	78.785	236.611
2000	0.108	0.494	139.233	258.511
2001	0.142	0.408	180.222	379.513
2002	0.239	0.295	156.174	212.073
2003	0.294	0.501	123.856	256.508
2004	0.226	0.362	78.708	297.355
2005	0.186	0.280	112.559	357.500
2006	0.189	0.247	145.148	252.000

* Effort for all vessels but number of days at sea for industrial distant water and tuna fleet

Source: - Directorate of Fisheries

Monitoring and surveillance of vessels through the vessel monitoring system (VMS) currently operational in Ghana is expensive but nevertheless an effective means of regulating the fisheries. Observer programmes on board industrial vessels for compliance monitoring have been introduced should be intensified to improve and sustain fishery management systems.

In 1999 pair trawlers were introduced into the country to operate on trial basis. They landed sea bream, cassava and burrito. Their operations have been suspended as at the middle of August 2007 as a result of their destructive operational nature. A fleet of 29 vessels uses either purse seine or the pole and line with live bait (anchovy) land tunas. The current exploitation level of Bigeye tuna is higher than the maximum sustainable yield (MSY). Yellowfin is maximally exploited while skip jack tuna is exploited below the MSY.

2.2 Inland fisheries

The inland sources of fishing include 90 lagoons with a total area of 40 000 hectares (ha); rivers; about 2 000 dug-outs, small and medium reservoirs and lakes covering about one million hectares – of which the Volta Lake is the predominant one covering about 900 000 ha or 348 192 km². Volta Lake has a shore line of 5 200 km, 400 km from South to North and mean depth of 19 meters. It accounts for 90 percent of the annual inland fisheries production.

There are about 1 232 fishing villages along the shore line of the lake with a total of about 24 025 planked canoes operated by a total of about 71 861 fishers (Brammah – Volta lake Canoe Survey 1998–1991). There are about 27 fishing gears being operated on the Volta Lake. The key ones are gill nets, cast nets, traps, “winch” net, (Purse seine) beach seine, hook and line and short length bamboo pipes. Prohibited nets and methods are “winch” nets, beach seine, “atidza”, short length bamboo pipes and the use of obnoxious chemicals.

The target fish are tilapia, *Chrysichthys* and *Synodontis* which constitute about 80 percent of Volta Lake fish landings. The average yield of the Volta Lake has decreased from 46.8 kg/ha in 1976 to 32.6 kg/ha in 1998. Catch per unit effort has declined at a rate of 0.26 kg/boat/day. At present the number of canoes actively fishing is 17 274, a number which exceeds the 11 731 boats estimated to produce fish at maximum sustainable yield (Brammah – Volta Lake Fisheries Management Plan).

Table 6: Summary of characteristics of the fisheries - 2006

Harvester	Aquaculture	Artisanal Canoes		Semi-Industrial	Industrial	Tuna
		Inland	Marine	MFV	MFV	
Number	2000	24 000	11 219	240	61	29
Target species	Tilapia, catfish	Tilapia, catfish	Small pelagics, demersals	Small pelagics, demersals	Demersals	Large pelagics
Annual landings (tonnes)	1 000	40 000	231 681	9 877	18 807	63 252
Value of landings x000 000 Cedis	NA	NA	3 938 570	173 144	651 824	1 170 170
Location	Inland	Volta Lake	Coastal	Inshore	Offshore	Offshore
Harvesting method	Drag netting	Set netting	Purse seining	Purse seining / trawling	Trawling / shrimping	Pole and line/ purse seining

3. FISHERIES MANAGEMENT AGENCIES, THEIR MANDATE AND AUTHORITY

The fisheries sector is made up of the administration and the fishing industry. The regulation of the fishing industry is by the government currently through the Ministry of Fisheries, Fisheries Commission and its technical divisions; however global trends in fisheries management have influenced the adoption of the co-management approach since 1997.

Currently the institutions responsible for fisheries management are:

- Ministry of Fisheries,
- Fisheries Commission (FC),
- Directorate of Fisheries as a technical secretariat to the FC, and
- Community-Based Fisheries Management Committees.

The figure below shows the Organizational structure for fisheries management.

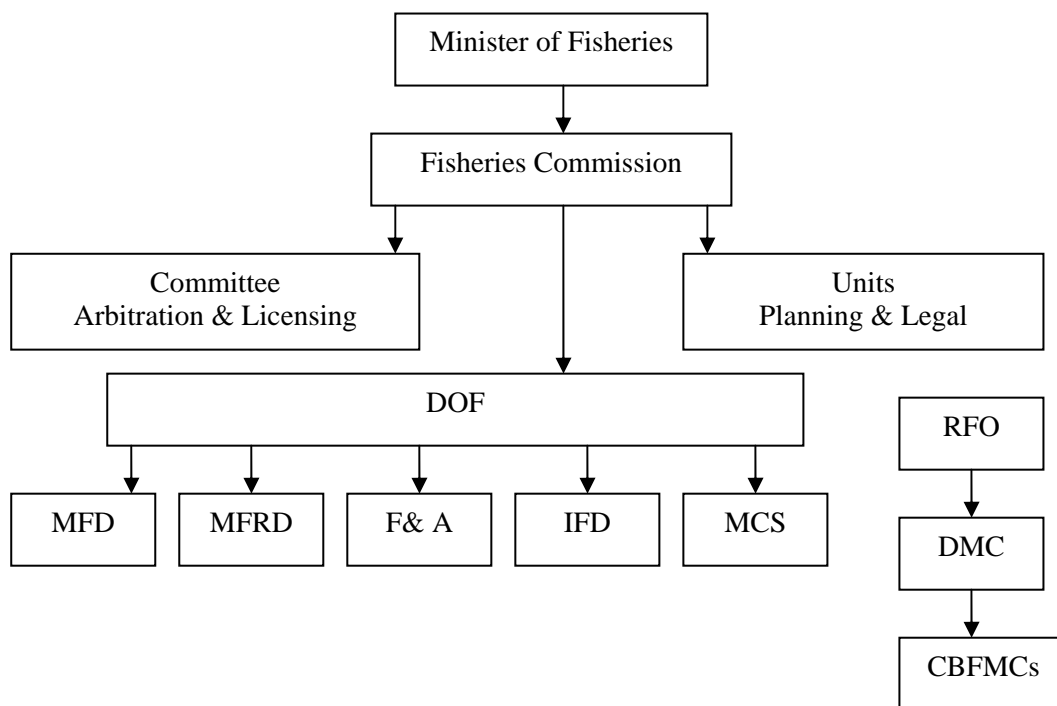


Figure: Organizational structure for fisheries management

3.1 Ministry of Fisheries

The Ministry of Fisheries is the over arching agency that gives policy direction for the growth and development of the sector. It is headed politically by a Cabinet Minister supported by the Chief Director as the administrative head.

3.2 Fisheries Commission

In 1993, by Act 457, a Fisheries Commission (FC) was established as an advisory body to the then Minister responsible for fisheries under MOFA. Act 625 of 2002 established a new Fisheries Commission which is more independent than its predecessor. The new FC incorporated the DOF as the technical secretariat for the management and development of Ghana Fisheries.

The objectives of the FC are:

- To regulate and manage the utilization of Fisheries resources

- To coordinate policies in relation to the management and utilization of these resources
- To ensure development of the fishing industry and sustainable exploitation of the fisheries resource and provide for connected matters.

Specific functions, among others, include:

- Preparation and annual review of fisheries development and management plans
- Conservation of fish stocks
- Monitoring Control and Surveillance (MCS) of the fisheries water
- Research and stock assessment of resources
- Ensure fish quality standards
- Cooperate with other relevant agencies in fisheries management.

As indicated earlier, the authority of the FC resides in Act 625 of 2002 which established the FC. The Act consolidates (with amendments) the Law on Fisheries to provide for more proactive fisheries management.

3.3 Directorate of Fisheries

The Department of Fisheries (DOF) was the sole agency for Fisheries administration from 1946–1993. It was established in 1946 as the key institution responsible for managing the fisheries resources of the country by provisions of Ordinance No. 20 Chapter 165 of 1945 of the laws of the Gold Coast now Ghana of 1945 (Chapter 165).

It functioned variously as a Unit, Division and Department under the Ministry of Food & Agriculture (MOFA) reflecting the progressive changes in its structure and function to cope with the development needs of the sector.

It is now the technical Directorate of the Fisheries Commission under the Ministry of Fisheries establishing and executing the government regulated fisheries management regime. The regime consists of scientific research feeding into the preparation of management plans for operational management and enforcement of the provisions of the plans and measures. The divisions in the DoF responsible for the management regime and their activities are presented below.

3.3.1 Marine fisheries research division

The function of the research unit is to collect, document scientific marine fisheries data and information for fisheries planning and management. Key activities are:

- Collect, collate, and analyse fish catch and biological data on samples of economic important marine fish;
- Conduct gear and canoe frame surveys;
- Monitor environmental parameters; and
- Stock assessment surveys².

3.3.2 Marine/inland fisheries management divisions

The functions of the two management divisions are to formulate and implement fisheries management plans. The key activities of the divisions are:

- Prepare and Review fisheries policy and management plans;
- Educate/disseminate and implement fisheries regulations;
- Facilitate formation, reorganization and training of Community and District Fisheries Management Committees;
- Facilitate development and gazetting of CBFMC bylaws; and

² MFRD's inability to conduct its own survey is due to unavailability of research vessel MV KAKADIAMA.

- Training of fishers in alternative livelihoods strategies.

3.3.3 Monitoring, control and surveillance division

The function of the division is compliance monitoring and enforcement of Fisheries Law and regulations.

The key activities of the divisions are:

- Landing site/quayside/port inspection;
- Volta lake patrols;
- Observer mission for industrial Vessels at sea; and
- Monitor operation of industrial Vessels on the VMS.

3.4 Fisheries management service providers

Table 7 shows the principal agencies and stakeholders in the fisheries sector and their areas of focus.

Table 7: Principal agencies and stakeholders in the fisheries sector

INSTITUTION	SPECIFIC FOCUS
Ministry of Fisheries	Formulation of policy
Directorate of Fisheries	Research preparation of management plan and enforcement of laws and regulations
Food and Agriculture Organization	Technical assistance and assistance in human resource management
Ministry of Food and Agriculture	
Kwame Nkrumah University of Science and Technology	Research and training on resource management
University of Ghana	Research and training on fisheries resource management
University of Cape Coast	Research and training on fisheries resource management
National Fisheries Association of Ghana	Umbrella body of all the fisheries organization Advocacy and education on resource management
National Inland Canoe Fishermen Council	Advocacy and fisheries resource management on the Volta Lake
Ghana National Canoe Fishermen Council	Advocacy and fisheries resource management in the marine sector
Ministry Local Government and Rural Development and Environment	Decentralization and District Assemblies, passage of bylaws
Environmental Protection Agency	Protection of water and natural resources generally
Volta River Authority	Sustainable use of the Volta Lake and its resources
Ghana Navy	Patrol to enforce fisheries laws and regulations
National Maritime Authority	Inspection and certification of vessels
Attorney General's Department	Gazetting of laws and regulations and prosecution on infractions
National Development Planning Commission	Preparation of strategic plans focusing on poverty reduction
Ghana Harbors and Ports Authority	Coordination and management of ports and harbours
Ministry of Finance and Economic Planning	Provision of budgetary fund for implementation of programmes and projects
Ministry of Tourism and Diasporan Relations	Development of beaches for touristic attraction
Development Partners	Provision of Financial Assistance
Water Research Institute (WRI)	Collection and dissemination of data for resource management

4. FINANCING FISHERIES MANAGEMENT IN GHANA

This section provides an overview and critique of various aspects of financing fisheries management in Ghana. It discusses sources of funding, allocation of funds to fisheries management activities, fisheries expenditures, and financial information and indicators.

The main sources of funding for fisheries management are the Government of Ghana and Non-Governmental sources referred to as development partners.

4.1 Funding from Government of Ghana sources

The Government of Ghana (GOG) is the most reliable and permanent source of funds for fisheries management. There are two main Government of Ghana sources of funding for managing the nation's fisheries. These are funds from the national treasury referred to as the consolidated fund, and Internally Generated Funds (IGF).

4.1.1 Allocation of consolidated funds

Allocation of consolidated funds is based on national policy priorities. The current national development policies are expounded in the Growth and Poverty Reduction Strategy (GPRS) II 2006–2009 which aims at a per capita income of US\$1 000 by 2015. In general, budgetary inputs of the Ministry of Fisheries are expected to contribute to the growth and development of the fisheries sector, as well as the long term sustainability of the fisheries resource.

A three year rolling Medium Term Expenditure Framework (MTEF) approach to budget preparation was introduced in 1999. It was adopted to execute policies, projects, and programmes of Ministries, Department and Agencies (MDAs). Each plan and budget indicates a logical framework comprising the following components: objectives, outputs, activities, verifiable indicators of achievement and Costs (inputs).

A national Economic Management Committee (EMC) meets yearly on or around May (at the beginning of the budget cycle) to review and update the macro-economic framework; develop proposals on 3 year ceiling for MDAs and submit proposals for cabinet for approval.

After cabinet approval, the Ministry of Finance and Economic Planning (MOFEP) instructs MDAs on the modalities for budget preparation along with approved ceilings.

In preparing its budget, the budget committee of the Fisheries Ministry reviews its current policy consistent with the GPRS II and prepares a strategic plan. The strategic plan sets out its policy priorities, operational plans for the first year of MTEF and indicative budgets for the second and third years. The strategic plan has three types of activities in consonance with the MTEF. These activities are administration (for which overhead costs for the operation of the office are allocated, including personnel service (for which funds are allocated for delivering goods and services to beneficiary users) and investment (for which funds are allocated for the construction and procurement of non-perishables).

The Ministry's fisheries management functions are comprised of: scientific research conducted by the marine fisheries research division; policy development and operational management executed by the marine/inland fisheries management divisions; and enforcement executed by the monitoring, control and surveillance division. Budgetary allocations to these fisheries management functions are allocated under the service activity of the strategic plan.

The finalized budget is presented to the EMC for onward submission through the MOFEP and, ultimately and after scrutiny, for approval by cabinet. Through the Minister for Finance, the President presents same to parliament for Appropriation Bill to be passed in November for implementation in January in the ensuing year. The Minister of Fisheries moves a motion in parliament as a last step for approval of the budget for eventual release of the funds for the activities.

The allocation from consolidated funds to the Ministry of Fisheries is presented in Table 8 below. On the average, the MOFI received approximately 0.05 percent of available funds from the GOG from 1999 to 2007. The leap in budgetary allocation from 2005 was result of the creation of the new Ministry of Fisheries after being decoupled from the Ministry of Food of Agriculture. Fifty percent (50 percent) of the allocated funds are actually released of activities (Table 9).

Table 8: Budgetary allocation to MOFA and MOFI from national funds (1999–2007)

Year	National (¢)*	Agriculture (¢)	Percent (%)	Fisheries (¢)	Percent (%)
1999	2 717 635 000 000	43 593 000 000	1.6	NA	NA
2000	3 295 404 000 000	62 232 000 000	1.9	1 880 804 673	0.05
2001	4 576 839 000 000	62 996 000 000	2.0	961 246 203	0.02
2002	4 533 601 000 000	102 688 000 000	3.0	816 378 411	0.01
2003	7 798 600 200 000	136 683 600 000	2.0	1 815 558 283	0.02
2004	10 513 179 900 000	142 707 000 000	2.0	1 843 586 814	0.02

Year	National (¢)*	Agriculture (¢)	Percent (%)	Fisheries (¢)	Percent (%)
2005	12 693 800 000 000	209 747 000 000	2.0	12 509 000 000	0.10
2006	17 912 094 900 000	256 910 000 000	2.0	15 840 000 000	0.08
2007	19 925 929 000 000	338 253 000 000	2.0	15 969 000 000	0.08

*Current Cedi equivalent to US\$1 is ¢9,300 or GH¢ 93

Source: Government of Ghana Annual Budget Estimates

Table 9: Releases of funds

Year	Total approved budget	Releases	Ratio
2005	12 509 000 000	5 262 596 956	0.42
2006	15 840 000 000	8 075 421 950	0.51

Formal evaluation of expenditures and process for budget adjustment

Annual work plans and budget are formally submitted to Parliament for approval through the Parliamentary Select Committee on Food and Agriculture. The committee afterwards reviews the previous expenditures and approves the ensuing year's budget. Slight upward adjustments above the ceiling approved by MOFEP can be made if strong justification is made for it.

Use of independent advisors/participants

Extensive consultation of stakeholders is undertaken in the preparation of programmes and projects and in determining general cost e.g. Revision of Fisheries Law design of FSCBP and modus operandi for formation and empowerment of CBFMCs.

Stakeholders are consulted to determine costs in activities in which their services are required, e.g. CBFMCs. Close consultation on budget lines takes place when DOF engages in collaborative work with other institutions, e.g. WRI and UG, in fish life history studies and water quality studies on the Volta Lake.

4.1.2 Internally generated funds (IGF)

Internally Generated Funds (IGF) are funds that the Ministry of Fisheries generates from its service and regulatory functions. Before 2005, the IGF was paid into the consolidated funds, but is now considered as part of the Ministry's budget and has become an important source of operational funds.

The sources of IGF from services are: fees from the Ministry's boat service workshops; production and sale of fingerlings; and fish harvesting services. Sources of funds from regulatory functions are: fees from licensing of fishing vessels; levies on fish imports and exports; fees from access agreements; and fines from operators of fishing vessels contravening fisheries laws and regulations.

Of the aforementioned sources of IGF, Vessel licensing fees have proved by far the most important source of internally generated funds, contributing up upwards of 90 percent of internally generated funds. Vessel licensing fees became recognized as a potentially important source of revenue during the Fisheries Sub-Sector capacity Building project (1995–2000) based on the realization that fishers were taking so much from the national fishery resource base and putting in very little. Ever since, vessel licensing fees have increased progressively. Fees for industrial and semi-industrial vessels were raised from 0.05 percent mean value of catch in 1995, to 0.6 percent in 1996 and to 1 percent in 1997. Subsequently, fees were raised to US\$2 per GRT in 1999 and then to US\$5 per GRT in 2002.

Since 2003, vessel licensing fees have been tied to size of the vessel and the types of species of fish landed. Thus, trawlers up to 300 GRT pay US\$30 per GRT/annum, whilst, those in excess of 300 GRT pay US\$55 for every GRT in excess of the recommended 300 GRT. On the average each trawler pays about US\$9 000 per annum. More specifically:

- Shrimpers up to 200 GRT pay US\$40 per GRT/annum. Those in excess of 200 GRT pay US\$70 for every GRT in excess of the recommended 200 GRT. On the average each Shrimpers pays US\$8 000 p.a.;

- Tuna pole and line vessels up to 500 GRT pay US\$25 per GRT/annum. Those in excess of 500 GRT pay US\$47 for Every GRT in excess of the recommended 500 GRT. On the average, each tuna pole and line vessel pays S\$12 000 p.a.; and
- Tuna purse seiners, up to 1000 GRT pay US\$30 per GRT/annum. Those in excess of 1000 GRT pay US\$55 for every GRT in excess of the recommended 1000 GRT. On the average each tuna purse seiner pays US\$30 000 p.a.

Table 10: Fishing licence fees collected on yearly bases (Cedis)

Year	Industrial Vessels	Inshore Vessels	Total	Total Value (US\$)
1997	206 560 000	–	206 560 000	91 804.44
1998	176 721 000	–	176 721 000	75 845.92
1999	729 138 000	–	729 138 000	208 325.14
2000	623 851 000	–	623 851 000	119 305.99
2001	546 511 000	20 552 000	567 063 000	78 431.95
2002	2 469 210 000	81 611 000	2 550 821 000	300 096.59
2003	7 001 109 000	110 699 000	7 111 808 000	812 778.06
2004	8 064 279 246	173 596 000	8 237 875 246	915 319.47
2005	8 710 492 310	101 933 000	8 812 425 310	979 158.37
2006	8 275 818 705	32 832 000	8 308 650 705	903 114.21
*2007	Gh¢ 492 680.45	Gh¢ 11 849.10	Gh¢ 504 529.55	

* 30th June 2007

From 1997 to 2006, license fees have increased from 206, 560 000 to 8 308 650 705 Cedis. License fees collected on yearly basis have exceeded US\$800 000 since 2004.

Collection of licensing fees from canoes has not been carried out because of unwillingness of canoe operators to pay the fee. The management agency is till educating them on the need financially cost of fisheries management.

Revenues generated from internally generated funds are being used to service payment of a GB£3m Vessel Monitoring System (VMS) that was procured and installed in 2005 to track operations of industrial fishing vessels at sea.

4.1.3 Access agreements

The Ministry of Food and Agriculture formalized Access Agreements in 2003, and foreign fishing vessels now pay a fee to acquire fishing rights in Ghanaian waters for a defined period of time. Companies must pay an application fee of US\$500 and processing fee of US\$010 000 - in addition to the appropriate license fee.

4.1.4 The Fisheries Development Fund

For the future, it is expected that the IGF will be converted into Fisheries Development Fund as provide for in the Fisheries Act 625 of 2002. The Fisheries Development Fund shall be applied as follows:

- Towards the promotion and development of fisheries in the country;
- To meet the liabilities of the Commission in respect of the monitoring, control and surveillance of the fishery waters;
- To provide assistance to small scale fishery co-operative enterprises;
- To promote research and studies of the fishing industry; and
- Toward such other purposes as the Commission in consultation with the Minister may determine.

Sources of money for the Fund will consist of:

- Fees for licenses, permits and other authorization for fishing issued under the Act;
- Damages and costs granted by the courts to the State in respect of any action under this Act or Regulations made under the Act;

- Sums of money received for compounded offences;
- Proceeds of sale of forfeited items collected, imposed or received by or under the Act;
- Such amount of money that Parliament may approve for payment into the Fund; and
- Loans and grants.

The Fisheries Commission is to formulate policies to generate money for the Fund and determine, in consultation with the Minister, the allocations to be made from the Fund. However, since the Fisheries Commission as provided for in the Fisheries Act has not been reconstituted, the above conditions are yet to implemented.

4.2 Non governmental funds/development partners in fisheries management

Another source of financing fisheries management has been the support from development partners. Between February 1996 and December 2002, the World Bank funded project of US\$10.5m provided extra budgetary funds for fisheries sub-sector capacity building to manage the sub-sector in terms of turning the tide against dwindling fish stocks in Ghana's marine and Volta Lake waters.

Other funding sources are the FAO/Nansen programme, the International Commission for the Conservation of Atlantic Tuna (ICCAT), Food and Agriculture Budgetary Support Programme and the Sustainable Fisheries Livelihoods Programme (SFLP) Pilot Project 1. The SFLP project provided an experience of low cost and effective financing system for fisheries co-management.

Government priorities as outlined in the 1999-2000 Medium Term Agricultural Development Strategy (MTADS) identified the fisheries-sub sector as one of the most important sources of economic growth; however, it noted that the sector was subject to fisheries resource overexploitation exacerbated by inadequate public sector capacity for formulating and enforcing appropriate policies and plans to well manage the resources.

4.2.1 World Bank funded Fisheries Sub-sector Capacity Building Project

The World Bank funded Fisheries Sub-sector Capacity Building Project (FSCBP) was designed to establish the long-term sustainability of the fisheries resources and thereby maximize its contribution to the economy. The project sought to strengthen the capacity of the Department of Fisheries (DoF) for managing the sub-sector. It focused on formulation and implementation of policies and management plans; monitoring, control, surveillance and enforcement; and promotion of the development of inland fisheries and aquaculture.

The project also supported the establishment of a co-management system by funding the formation of Community-Based Fisheries Management Committees at the local level. The Community Based Fisheries Management Committee (CBFMCs) are committees formed in a fishing community based on existing traditional leadership authority and common government structures, legally empowered by local law and comprising all stakeholders, to oversee the management and development of the fishing industry. It is to ensure the active participation of the local people in decision making and implementation. When gazetted into law the CBFMCs are empowered to generate and sources for funds for their activities.

The total project cost (as appraised by the World Bank) was US\$10.5m, and the World Bank/International Development Association (IDA) contribution was US\$9.0m. The contributions was used to procure: goods, including vehicles and equipment (US\$1.270m); works comprising mainly of civil works (US\$2.000m); services made up mainly of consultancies (US\$0.945m); training (US\$1.760m); vessel rehabilitation (US\$0.665m); operational expenses (US\$1.880m); and some funds were unallocated (US\$0.480m).

Annual plans and budgets were subjected to critical hearing and approval by the steering committee of the project which was comprised of representatives of the Fisheries Commission and the World Bank. The GOG contribution was US\$1.5m, allocated as local counterpart funding, to provide budgetary support to the Department of Fisheries in agreed percentages of the IDA funding. This funding was allocated to finance naval patrols.³

The four main project components of the project and corresponding funding levels were:

³ The Directorate of Fisheries had signed a contract with the Ghana navy for targeted 60 ship day patrols a year or 300 ship days for the project period.

- Strengthening the department of fisheries (US\$5.0m);
- Marine fisheries management (US\$2.2m);
- Inland fisheries management (US\$1.5m); and
- Monitoring, control and surveillance (US\$1.8m).

The outputs resulting from the execution of these components included a strengthened DoF (through reorganization and staff training); stock assessments; the preparation and implementation of management plans for marine and lake fisheries; strengthened extension in aquaculture; and the establishment of MSC systems for marine and Inland Fisheries. In addition to these outputs, it was also expected that the policy, legal and regulatory framework in the sub-sector would have been reformed to improve management, enhance private sector investment and promote sustainable catches of fish.

Component 1: Strengthen the Department of Fisheries

With an investment of US\$5.0m, the Department of Fisheries (DOF) was strengthened through its reorganization to emphasize fisheries resource management functions. Specific outcomes related to this investment are that:

- All the divisions (Marine Fisheries Research, Marine Fisheries Management, Inland Fisheries Management, Monitoring, Control and Surveillance and Administration and Operation) were created with clearly defined measurable roles, and are performing their corporate functions satisfactorily.
- DOF has developed the capacity to conduct stock assessment, prepare and implement fisheries management plans. The revised Fisheries Law has been passed by Ghana's parliament and a strategy to enforce the law is being implemented.
- Remarkable increases in the revenue from license fees have been recorded from 69.0 million Cedis in 1996 to 1,190 million Cedis by June 2002, following the revision of license fees during project implementation to reflect the type of catch.
- Fishers in coastal villages have reported that training given by the DOF in safety at sea (among a range of other topics) helped to save the lives of some members in the community during dangerous incidences at sea.

Component 2: Marine fisheries management

With an investment of US\$2.2m, the project was able to:

- Mobilize 133 artisanal fishing communities along the coast to form Community-Based Fisheries Management Committees (CBFMCs) as participatory preventive enforcement mechanisms that will enable fishers to comply with the Fisheries Law at the community level.
- Enable the 133 CBFMCs to prepare their local constitutions and by-laws, which have been passed and adopted by their District Assemblies (DAs), thus establishing a legal basis for the CBFMCs, to facilitate the complete elimination of illegal methods of fishing like dynamite use in marine fisheries, through organized surveillance, inspection of fishing nets for compliance with approved mesh sizes, local tribunals, and imposition of fines.
- Conduct two canoe frame surveys, which revealed 16 percent increase in number from 8,610 canoes in 1997 to 9,981 canoes in 2001, indicating increased pressure on fishing resources in the face of declining fish stocks.

Component 3: Inland fisheries management

With an investment of US\$1.5m, the project was able to:

- Conduct a canoe frame and gear (for the first time since 1975) between 1998 and 1999, for Volta Lake and thereby generate the necessary data and maps for managing the resources of the Volta Lake fisheries;
- Conduct a stock assessment of the Volta Lake consisting of biological studies and catch assessment; survey; and

- Prepare a Volta Lake Fisheries Management Plan which included proposals for six projects.

Component 4: Monitoring, control and surveillance

With an investment US\$1.8m, the Project enabled the newly established MCSD to organize:

- A joint patrol programme with the Ghana Navy (completing 65 out of 300 programmed trips) and began to regularly enforce the fishing regulations in the marine sector and Volta Lake systems but these patrols did not prove sustainable as costs became increasingly unbearable; US\$325 000 was spent on 65 out of the targeted 300 ship day patrols for the entire project period.
- The total amount of fines imposed on the owners of the arrested vessels amounted to US\$68 540 which was only about 23 percent of what it cost to conduct the patrols; however, the purpose of removing the industrial vessels from shallow waters was achieved.
- An observer programme for compliance and scientific monitoring of commercial fishing vessels, including regular port inspection and periodic beach combing.
- As already indicated fisheries dedicated Naval patrols succeeded in removing Industrial trawlers from shallow waters. Year 2000 was a good year as biomass of the valuable demersal fish species was estimated to be relatively higher than catch as seen from the biomass and catch tables. This phenomenon reversed in 2006 when the patrols seized because of lack of funds.
- Enforcement in the Volta Lake areas proved difficult due to the limited number of staff and resources in the face of an extremely large and difficult geographical terrain that must be covered.

4.2.2 The FAO/NANSEN programme for research

US\$380 000 was the operational cost of the FAO/NANSEN programme to conduct two marine fish stock assessment surveys in 1999 and 2000 during the Fisheries Project, and the cost was borne by the Norwegian Agency for Development Cooperation (NORAD). Since an outside agency conducted the survey on its own timetable, the timing was not the best for Ghana.⁴

As it is, one of the two surveys was conducted in the lean season and therefore did not help monitor fully the pelagic species biomass levels. The survey did provide, however, a very good indication of demersal stock abundance and indicated that 2000 was a good year for valuable demersals: there biomass of valuable demersals was estimated at 26 032 mt., a figure that exceeded the estimated landings of 16 679 mt demersal fish species.

In 1999 and 2000, MOFI relied on data gathered from eight costal stations for temperature and water salinity readings and assessments of demersal and pelagics fishery resources carried out with the help of donor agencies - including the two FAO-sponsored "Dr. Fridjof Nansen Survey Programmes" (NORAD, Institute of Marine Research, and FAO - and the Gulf of Guinea Large Marine Ecosystem Programme. In addition, a survey of fisheries resources on the continental shelf of Ghana was carried out over a two and half year period with the Japan International Cooperation Agency (JICA), the agency which implements the Government of Japan's technical cooperation programmes.

4.2.3 International Commission for the Conservation of Atlantic Tuna (ICCAT)

The Marine Fisheries Research Division (MFRD) also collaborates on the Tuna Resources Study funded by the International Commission for the Conservation of Atlantic Tunas (ICCAT).

ICCAT conducts stock assessment survey to know the biomass and migratory patterns of tuna. It collaborates with commercial fishermen to study their catch for length/frequency distribution and maturity of various fish. The commission then allocates quotas for extraction. They, in turn, levy the tuna industry based on production and canning capacity.

⁴ Because of environmental conditions, there must be at least 2 surveys in a year: one for major upwelling season, and another for the minor upwelling seasons that are linked to Sardinella production.

4.2.4 Food and Agriculture Budgetary Support from the Canadian International Development Agency (CIDA) and Department for International Development of the UK (DFID)

The Food and Agricultural Budgetary Support (FABS) Project became effective in March, 2004, with total committed funds of CDN\$85 million over five years (2004–2009). It was designed by the Canadian International Development Agency (CIDA) to provide budgetary support to the Government of Ghana to promote sustainable rural development in Ghana through agriculture. Its purpose was to support the implementation of the Food and Agricultural Sector Development Policy (FASDEP) through a sector wide mechanism.

DFID joined the budgetary support programme in 2006 with an amount of £4.4 million to be disbursed over a three year period. It has been mutually agreed between CIDA and DFID that they will jointly use the approaches and processes laid down under the FABS for disbursements and reporting.

Data provided in Table 11 shows progressive increases in the FABS allocation to the Ministry of Fisheries. Significantly, the FABS contribution experienced a great leap in 2005 from one to ten billion Cedis and then to twelve billion in 2006. This leap also coincided with the creation of the Ministry of Fisheries in 2005.

Table 11: Allocation of FABS to the Ministry

Year	FABS Allocation
2004	1 000 000 000.00
2005	10 000 000 000.00
2006	12 000 000 000.00
2007	--
Total	23 000 000 000.00

4.2.5 Sustainable Fisheries Livelihoods Programme (SFLP) Pilot Project 1: Improvement of policies and institutions for comanagement of the Volta Lake

The Project on Improvement of Policies and Institutions for Co-management of the Volta Lake (IPIC) is the first pilot project of the Sustainable Fisheries Livelihoods Programme (SFLP). The SFLP represents a partnership between the FAO, the Department for International Development (DFID) of the Government of Great Britain and Northern Ireland and 25 countries in West Africa. The SFLP sought to reduce poverty in the artisanal fishing communities of West Africa by bringing about improvements in the livelihoods of these communities.

Ghana implemented SFLP pilot project 1 on the Volta Lake with the theme, 'Improvement of Policies and Institutions for Co-management in Inland Waters'. The other participating countries were Burkina Faso, Mali and Cote D'Ivoire.

The pilot project commenced in Ghana in June 2003 and ended in July 2006. It was implemented in three Volta Lake Districts of Ghana – in Asuogyaman, Kpando and Jasikan, with the project office located at Akosombo in the Asuogyaman District – over a three- year period.

The goal of the IPIC project was to reduce poverty and improve livelihoods through sustainable participatory management of water bodies and aquatic resources. The Project Purpose was to improve fisheries livelihoods by the establishment of co-management mechanisms and the integration of fishing communities into local development processes.

The total cost of the Pilot Project 1 was US\$3 150 209, with Ghana receiving an amount of US\$493 801 comprising the following expenditure items: administration US\$109 000; investment US\$64 000; recurrent expenses US\$46 280; project outputs US\$199 647; and unallocated funds US\$74 310. The project components translated into the following costed outputs as shown below in Table 12.

Table 12: Project output and budget estimates

OUTPUTS	BUDGET ESTIMATES US\$
A participatory co-management plan and functional institutional	38 660

OUTPUTS	BUDGET ESTIMATES US\$
framework for the Volta Lake in place.	
Policy and legislative framework for participatory co-management improved.	19 413
Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes.	39 310
Capacity of stakeholders at all levels to contribute to co-management and local development increased.	37 102
Sources of finance to sustain participatory co-management systems and community development programmes identified.	4 912
Information networks, communications and monitoring systems established to support resource management and the improvement and diversification of livelihoods.	55 250
The environment and the resources of water bodies protected and enhanced.	5 000
Total	199 647

Project Output and activities undertaken and impact

Output 1: A participatory co-management plan and functional institutional framework for the Volta Lake in place.

The project prepared the Volta Lake Fisheries Management Plan final document signed and subsequently submitted by the Minister of State for Fisheries to the Attorney General's (AG's) Department for gazetting.

Three awareness creation workshops were organized on the Volta Lake Fisheries Management Plan for all the stakeholders along the Volta Lake, and a national workshop was held in the capital city, Accra.

The impacts of the workshops were twofold. First, a framework for management of the fisheries in all the Regions adjoining the lake was made available for budgeting purposes and for drawing up annual workplans for all institutions interested in the Volta Lake (especially for the Directorate of Fisheries Department and the District Assemblies). Second, an advocacy group comprising various research institutions and NGOs was formed to lobby the government on fisheries issues.

The Project engaged the services of a Social Mobilisation Consultant to prepare a strategy document for formation of lake management entities for the Volta Lake. This document, together with the Volta Lake Fisheries Management Plan, provided the much needed guidelines for the composition, functions and responsibilities of the various fisheries management committees for the sustainable management of the lake's resources.

The Volta Lake Management Committee bylaws were passed by the assemblies. This made DLMC a sub-structure of the district assembly that could be budgeted for. The impact of doing so was to obtain funds for its activities so that it could be sustained long after the project. In the Kpando District the assembly agreed to make the Member of Parliament a member of the core group. The impact of legal recognition of the management entities is that they are now recognized as legal bodies acceptable to banks and other financial institutions

The impact of the operations of the lake management committees was felt in the communities in which they existed as the fisheries resources improved through reductions in the use of illegal fishing gear. Participatory monitoring reports showed tilapias caught from the lake were mature (refer to Annex 1). In addition, the activities of the committees helped to improve safety on the lake.

Output 2. Policy and legislative framework for participatory co-management improved.

A draft Inland Fisheries Policy document was prepared by the project and circulated at the national and international levels including the FAO Regional office for Africa and the Regional Coordinator in Burkina Faso. The impact of the inland fisheries policy document was that it was used for the preparation of the Volta

Lake Fisheries Management Plan and Development Plans for the districts in the operational areas of the project.

The project assisted the communities in the formulation, adoption and gazetting of lake management bylaws. To improve on the quality of the output and to unify draft community bylaws to produce district laws, a legal expert was identified and recruited for 2 months.

The legal expert produced 3 bylaws for each district, namely:

- bylaws for the Volta Lake Management Committee;
- bylaws for the Volta Lake Environmental Protection; and
- bylaws for the Volta Lake Fisheries Resources.

The impact of the formulation processes was that the Directorate of Fisheries agreed to adopt it for improvement of bylaws in the marine and the other inland water bodies.

Output 3. Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes.

The project had to deliver social benefits to the participating communities and supported alternative livelihoods programme in the communities. A list of 15 enterprises emerged from consultations at the community and institutional levels by a consultant engaged by the project. The enterprises were: kente weaving, snail farming; mushroom production; bee keeping; leather bag production; sheep and goats rearing; grass cutter production; piggery; rainfed okro farming; and fish farming.

There was over 100 percent increase in employment opportunities in the fishing communities in which the livelihoods diversification was introduced e.g. kente weaving, snail farming etc Again considerable reduction in fishing pressure on the lake was recorded since other fishermen were being drafted into other income generation activities

Output 4. Capacity of stakeholders at all levels to contribute to co-management and local development enhanced

Capacity building workshops were organized to:

- Strengthen the capacity of the lake management entities in areas of cross-sectoral approaches, lobbying, negotiations, advocacy and management planning and facilitation;
- Improve organizational skills of community, zonal and district lake management entities to facilitate co-management; and
- Strengthen capacity of lake management entities on negotiating and arbitration skills.

Output 5. Sources of finance to sustain participatory co-management systems and Community development programmes identified

To build structures for sustainability, the project assisted the District Lake Management Committees to prepare a list of sources of revenue for fisheries management. These sources included:

1. Annual fishermen registration/membership fee;
2. Annual registration fee for fish vendors;
3. Annual registration fee for net sellers;
4. Annual fishing canoe registration fee;
5. Annual registration fee for boat builders;
6. Annual registration fee for outboard motor mechanics;
7. Annual registration fee for salt sellers;
8. Annual registration fee for transport boats;
9. Annual registration fee for road transport vehicles in fish transportation;
10. Annual registration fee for push truck owners in transportation of fish;

11. Annual registration fee for premix sellers;
12. Fish landing fee in kind or a set value per boat landing fresh fish at a fishing site;
13. Fish landing fee (processed or fresh) at a marketing centre;
14. Landing fee for transport boats at a fish marketing centre;
15. Fish exportation fee (movement of fish outside a community or a market);
16. Fish movement fee for road transport vehicles conveying fish;
17. Proceeds from sale of fish, fishing gear and boats confiscated from illegal fishing;
18. Fees for renting/use of fisheries facilities (choker ovens and trays provided in community processing facilities); and
19. Fines as stated in bylaws of CBLMCs approved by the District Assembly.

An agreed-upon ratio to allocate revenues between the lake management committees (district and community) and the assemblies was:

- 50 percent to the District Assembly;
- 10 percent to the DLMC;
- 10 percent to the CBLMC; and
- 30 percent to the community.

The impact was that the revenue base of district assembly was expanded by 15 percent and that revenue would now be set aside for fisheries management. Bylaws were passed by the 3 assemblies to formally give legal backing to the revenue generation proposals. Again, the opportunity was given to all levels of the lake management entities to retain part of the revenue collected for local development to be decided by the fishing communities themselves. Negligible funds were hitherto directed to development programmes in the fishing communities.

The Asuogyaman District Assembly agreed to establish a Fisheries Development Fund to be capitalized by 2 percent of the Poverty Alleviation Fund. A resolution was passed to further increase the Fisheries Development Fund by allocating 2 percent of the District Assembly Common Fund. This comparatively is a huge amount due to the fisheries sector in the district.

Output 6. Information networks and communication and monitoring system established to support resource management and the improvement and diversification of livelihoods.

The Project conducted a series of workshops and established participatory monitoring and evaluation systems in the Asuogyaman, Kpandu and Jasikan districts. The result of the workshops was the identification of indicators of change in livelihoods due to project implementation.

During the end of the second year, the project managed to install the monitoring and evaluation systems developed for the three districts by training all the stakeholders selected and supplying them with some of the basic logistics.

Output 7. The Environment and the resources of water bodies protected and enhanced.

To enhance the environment along the water bodies, the project – in collaboration with Forestry Services Department (FSD) – trained and established nurseries and woodlots in fifteen communities of the participating districts. A total of 53 acres was covered by the beneficiary communities. The project procured and distributed nursery materials including seeds (acacia and teak) to all the fifteen communities participating in the programme. Ownership of the land for the tree planting programme was controversial and impeded the rate of adoption, particularly by settler communities.

The impact of tree planting programme was that it whipped up community participation initiatives in the fishing communities led by the CBLMCs. Employment opportunities increased through establishment of woodlots for sale as fuel wood.

The project promoted energy efficient ovens which are known to reduce the amount of fuel wood used and which eventually will reduce the rate of environment degradation by 60 percent. A total of 250 fish

processors benefited from the programme to provide communal fish processing facilities, mud stoves and chorkor ovens for the individual fish processors.

5. FISHERIES MANAGEMENT EXPENDITURES

In this section of the paper, changes in the quantum and composition of fisheries expenditures are explained.

5.1 Factors influencing fisheries management expenditure

The factors determining expenditure levels to management dedicated to marine and Volta Lake fisheries can be classified as levels of (i) administrative factors, (ii) policy related factors, and (iii) external factors.

Administrative factors that affect fisheries management expenditure are the numbers of available personnel, the recruitment of personnel/consultants, the availability of vessel and equipment, and the running and maintenance of vessels and equipment.

Policy-related factors include priorities of Government and Ministry; the contribution of outputs to growth and development; the contribution of fisheries to poverty alleviation and wealth creation; the state of fisheries resources; the socioeconomic impact on the economy and social life of community; and the need for urgent responses to emerging issues.

External factors include support and commitments to international protocols and availability of funds from donor/partner sources such as the World Bank, ICCAT and the FAO. Table 13 shows changes in fisheries expenditures with respect to GOG's consolidated funds.

Table 13: Fisheries expenditures with respect to GOG's Consolidated Funds

Year	GOG expenditure for management	Value of fisheries	Efficiency of GOG funding
2000	1 880 804 678	1 480 591 236	0.79
2001	961 246 203	1 576 073 835	1.64
2002	816 178 411	2 135 275 456	2.62
2003	1 815 558 283	4 661 520 828	2.57
2004	1 843 586 814	5 049 130 065	2.74
2005	5 882 000 000	5 286 301 829	0.90
2006	8 965 000 000	5 933 709 043	0.66
2007	6 196 000 000		
Average			1.70

The data suggests lower levels of expenditure from 2000 to 2004 and progressive increases since 2005. Policy-related factors largely account for changes in the quantum of expenditure on fisheries management after 2004. In particular, GOG's decision to give more prominence to the fisheries sector by carving it out of the Ministry of Agriculture and constituting it as a separate Ministry has resulted in better articulation of fishery policies and issues, with resultant increases in budgetary allocation and expenditures. Data in Table 10 shows that, over the years, allocations to the fishery sector have never gone beyond 0.05 percent of the national budget. In 2005, the year of establishment of the Fisheries Ministry, this percentage rose dramatically to 0.1 percent and has ever since, it remained at 0.8 percent, affirming increased resource inflow to and expenditures by the sector resulting from the creation of the Ministry.

Creation of the Ministry has also resulted increased expenditures attributable to administrative factors. More staff has been employed to service the Ministry and the Directorate of Fisheries. During this short period of the creation of the Ministry, relative huge expenditures have been made in the procurement of a fishing vessel at a cost of three million pounds (£3.0m) being paid for at one million pounds a year.

Not only has the creation of the Ministry resulted in more aggressive resource mobilization of resources from GOG sources, it has also resulted in more resource inflows from external Donor/Partner sources, contributing to significant leaps in national fishery management expenditure levels. Data in Table 14 illustrate the trend of rising resource inflows from GOG, FABS and, therefore, the total volume of funds available to be expended.

Table 14 Total GOG and donors expenditure, 2004-2007

Year	GOG Allocation	FABS Allocation	IPIC Project	Total
2004	1 843 586 814	1 000 000 000	1 481 402 999	4 324 989.813
2005	5 882 000 000	10 000 000 000	1 481 402 999	17 363 402 999
2006	8 965 000 000	12 000 000 000	1 481 402 999	22 446 402 999
2007	6 196 000 000			6 196 000 000
Total	22 886 586 814	23 000 000 000	4 444 208 997	50 330 795 811

5.2 Components of fisheries management expenditures

Fisheries management expenditures are conveniently separated into fisheries operations, research and enforcement. Table 15 illustrates the 3 main fisheries expenditure categories from the consolidated fund.

Table 15: Fisheries expenditure categories

Year	Research	%	Operational management	%	Enforcement	%	Total
2005	512 022 461	55	184 493 927	20	240 462 183	25	936 978 571
2006	440 195 418	30	163 151 418	11	898 549 649	59	1 501 896 485
2007	587 840 096	51	341 318 821	30	221 537 004	19	1 150 695 921
Average		45		20		34	

The allocations to research, policy development/operational management and enforcement are 45 percent, 20 percent and 25 percent, respectively. This means that more of the available funds are allocated to research followed by enforcement with the least to the policy development and operational management. This makes data and information gathering for fisheries management planning and decision making as the most important key activity followed by enforcement and then policy development and operational management.

In terms of composition, the available data shows that the highest percentages of fisheries expenditures have been in the in the area of fisheries research. There is a wealth of data from fisheries research for planning and, as indicated by the declining trends in Catch per Unit Effort (CPUE), there is a need for more investment in operational management and in the enforcement areas.

5.3 IMPACT OF FISHERIES MANAGEMENT EXPENDITURE

In the experience of the IPIC project, an amount of US\$493,801 was expended over a three year period, as per the various components of the project presented in Table 16. In addition to the project funds the management committees managed to expand the revenue base of district assembly by 15 percent, and revenue will now be set aside for fisheries management.

Again, the opportunity was given to all levels of the lake management entities to retain part of the revenue collected for local development to be decided by the fishing communities themselves. This low cost fisheries management scheme must be replicated in other lake districts and the marine environment.

Table 16 IPIC Project Expenditure on Outputs

OUTPUTS	Expenditure (US\$)	Expenditure (¢)
A participatory co-management plan and functional institutional framework for the Volta Lake in place	38 660	355 672 000
Policy and legislative framework for participatory co-management improved	19 413	178 599 600
Social and economic benefits to fisheries communities improved both from the sector and from increased participation in wider local development processes	39 310	361 652 000
Capacity of stakeholders at all levels to contribute to co-management and local development increased	37 102	341 338 400
Sources of finance to sustain participatory co-management systems and	4 912	45 190 400

OUTPUTS	Expenditure (US\$)	Expenditure (¢)
community development programmes identified		
Information networks communications and monitoring systems established to support resource management and the improvement and diversification of livelihoods	55 250	508 300 000
The environment and the resources of water bodies protected and enhanced	5 000	46 000 000
Administration	109 000	1 002 800 000
Investment	64 000	588 800 000
Recurrent	46 280	425 776 000
Unallocated	74 310	683 652 000
Total	4931 801	4 537 780 400

5.4 Tracking system

An analysis of financial information and presentation of financial indicators shows that a three tier tracking system approach is used to track expenditures in the sector:

- The monitoring and evaluation unit monitors expenditures, according to the objectives and types of activities as service costs, can be seen to contribute to development and management.
- The Internal Audit Unit of the Accountant General's Department carries out financial vetting of expenditure proposals before funds are released.
- The External Audit Unit of the Audit Service also ensures that expenditures are made according to laid down financial regulations and intended purposes.

6. SUSTAINABILITY, COST RECOVERY AND LOW COST APPROACHES TO FISHERIES MANAGEMENT

Fisheries management objectives are not being met in Ghana due inadequacy of funds. The MOFI usually receives about 50 percent of budget estimates. In addition less than 75 percent of the allocated resources are released to implement its activities. This situation compels the Directorate to re-prioritize its activities, and in most cases less importance is attached to fisheries management.

In the case of enforcement, DOF engaged the services of the Ghana Navy for Naval Patrol under the Fisheries Sub-Sector Capacity Building Project. It was funded by the GOG counterpart fund as the World Bank does not fund military operations. It was agreed under the Contract to conduct three hundred ship day patrols. However, it cost US\$5 000 per day for the naval patrol. This was found to be too prohibitive to be contained within the scarce resources from the GOG. From 1996 to 2002, the Ghana Navy was able to conduct 65 ship day patrols. The patrols were found to not be cost effective though the industrial vessels were kept off the 30 meter depth zone for a limited period. The naval patrols were to be complemented with aerial patrols by the Ghana Air Force, but these did not take place because the cost was too prohibitive. Currently, there is no agreement over naval patrols.

US\$185 125 was spent on a frame survey of the Volta Lake. Since this was the first within 25 years, it involved capital, training and operational costs. During the project period, US\$18 300 was spent on 2 marine canoe frame surveys. This helped update the data on artisanal canoe fisheries in terms of canoe numbers, fishing villages and landing sites, total number of fishermen, the number and types of gear, etc. There is the need for participatory data collection systems to build on the gains of the formal data systems to capture impacts of projects etc.

6.1 SUGGESTIONS FOR LOW-COST APPROACHES TO FISHERIES MANAGEMENT

The Ghana navy is mandated to patrol Ghana's territorial waters against external aggression and poaching by foreign vessels and to clear shallow waters of depth less than 30 metres of industrial vessels. It is suggested that the Navy includes fisheries monitoring in their normal patrols at sea.

Port inspections/quayside inspections are carried out on vessels at port before they sail to sea - a management activity that requires little funds. However, it is subject to abuse as in the past some vessel operators did manipulate the system and carry out their illegal activities with impunity. Nonetheless, if strengthened, it could be a low cost approach to enforcement.

In collaboration with the District Assemblies and the management entities, the SFLP/Pilot Project in Ghana developed revenue generation system. This tried and tested revenue system must be adopted by the communities, as they will be able to generate their revenue for operations and also initiate community development projects to sustain the running of the office of the communities.

Strengthening of the Management entities (Community based Lake Management Committee / zonal based Lake Management Committee) and the District Lake Management that was established during the IPIC Project with backing from the Local Authority will ensure development of institutions for low cost management.

The issue of poverty and vulnerability to poverty has compelled fishermen to use illegal fishing methods with utter disregard to fishing regulations and bylaws. The best option available to mitigate the social cost of enforcement of the fisheries bylaws and regulations is the provision of alternative livelihoods.

7. CONCLUSION AND RECOMMENDATIONS

This part of the report summarizes the key issues and presents recommendations for cost effective fisheries management.

7.1 CONCLUSION

Experiences with various sources of finance revealed that the government is the main and permanent source of funding fisheries management. Funds obtained for the regulatory functions of the Ministry of Fisheries are expected to be paid into the Fisheries Development Fund as required under the Fisheries Act 625. The Act also contains provisions for the formulation of policies to generate funds and to determine the allocations to be made from the Fund by the Fisheries Commission; however, this cannot yet occur because the FC is yet to be reconstituted.

Up to 2005, the fishery sector management was under the Ministry of Agriculture. Visibility and effective articulation of fishery management policies and issues and resource mobilization were therefore highly constrained. Creation of the Ministry of Fisheries has resulted in more aggressive resource allocation and mobilization resulting in higher levels of fisheries management expenditures.

There is a very impressive system of collection of licensing fees from the industrial and semi industrial fleet which currently generates an annual total of about US\$900 000. It is important to set up guidelines for the utilization of funds according to the priorities for fisheries management. With constant pressures to increase internally generated funds, there is also the need for studies to evaluate the impact of the fees on the resources.

The management regime of licensing and restricting access does not cover the artisanal fisheries sector. The open access nature of the artisanal sub-sector has resulted in increases in both the fleet size and the number of fishermen. This, coupled with the declining resources, has resulted in low incomes and vulnerability.

Funds from development partners, in terms of both the quantum and the targeting of programmes, have been important to enable the Ministry of Fisheries carry out some fisheries management functions such scientific data gathering, preparation of management plans and establishment of fisheries MCS unit. Data gathered from these studies were used to develop a Volta Lake Fisheries Management Plan and a Marine Fisheries Management plan. The plans were reviewed by the then FC, but they are yet to be implemented because of a lack of funds. There is the need to consolidate the gains made by investing in implementing the management plans and managing the results of the process.

7.2 RECOMMENDATIONS

The following recommendations are suggested contribute to the attainment of effective fisheries management with low cost approaches in Ghana:

- The Fisheries Commission as provided for in Act 625 should be reconstituted and operationalized.
- A participatory management regime - in terms of registration and licensing of canoes - has to be implemented.
- Co-management system must be strengthened. The experiences of the IPIC co-management project have shown how collaboration can be built between users of the resources, stakeholders and fisheries managers to generate funds at the local level to strengthen the co-management system.

- In light of the declining natural resource base and the increasing population of fisheries stakeholders, a key strategy to ensuring that the management of the fisheries resources is successful is the generation of alternative, appropriate and sustainable livelihoods opportunities that can attract people and investment out of the fishery and that can encourage those who remain in the fishery to diversify their existing livelihoods strategies.
- The Directorate of Fisheries must procure a small multi purpose patrol/research vessel to combine research with patrols (especially within the 30 meter depth zone) to remove the industrial vessel from the shallow waters which are the habitat and spawning grounds of most fish.

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ANNEX 1: MONTHLY MODAL SIZE OF *OREOCHROMIS NILOTICUS* CAUGHT JULY 2004- SEPT 2005

Mid-length (cm)	Modal length (cm) caught																			
	2004							2005												
	J	J	A	S	O	N	D	J	F	M	A	M	J	J	A	S	O	N	D	
10				X			X													
11		X																		
12																				
13																				
14								X	X											
15															X					
16						X														
17																				
18					X															
19																				
20											X									
21			X																	
22															X					
23													X							
24												X								
25																				
26										X										

Length at maturity



ANNEX 2: CEDI EQUIVALENT TO US\$

CEDI EQUIVALENT TO US\$ BY 31ST DECEMBER	
1997	2 250
1998	2 330
1999	3 500
2000	5 229
2001	7 230
2002	8 500
2003	8 750
2004	9 000
2005	9 000
2006	9 200
2007	9 300

FINANCING FISHERIES MANAGEMENT: THE INDIAN SITUATION

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1. COUNTRY PROFILE

India is one of the oldest civilizations in the world with a kaleidoscopic variety and rich cultural heritage. It is positioned between latitudes 8° 4' and 37° 6' north and longitudes 68° 7' and 97° 25' east with a geographical area of 3 87 263 sq km (about 2.4 percent of the earth's surface area). The country is bounded by the Himalayas in the north, the Indian Ocean in the south, the Bay of Bengal on the east and the Arabian Sea on the west. India is also the second most populous country, with a population of about 1 28 million (about 17 percent of the global population) as per the 2001 National Population Census.

After independence in August 1947, the country adopted a socialistic style of development through centralized planning. The National Five-Year Plans were formulated and implemented to harmonize the use of resources for parallel development of capital-intensive heavy industries, with labour intensive small-scale industries and the rural and agricultural sectors.

Within three decades of independence, the country recorded achievements in technology and also attained self-sufficiency in food production through the 'green revolution'. However, the lukewarm growth of the economy during this period and the worsening balance of payment situation led the government to undertake a series of reforms. Beginning in mid-eighties, these reforms were mainly directed to minimize the state interference in business and liberalize the economy. These efforts culminated in the New Economic Policy of 1991 and portray a clear shift from pro-planning to pro-market growth model based on the principles of liberalization, privatization and globalization of the economy.

India now stands as the third largest economy in the world in terms of purchasing power parity² (PPP) and the the second fastest growing major economy in the world, with a GDP growth rate of 9.4 percent for the fiscal year 2006–2007³. However, in spite of marked developments in the industrial and tertiary sectors, agriculture sector continues to remain as the major determinant of the health of the economy. It contributes about 20 percent of the Gross Domestic Product (GDP) and employs about 60 percent of the labour force in the country. Industries contribute about 26 percent of the GDP and employ about 12 percent of the labour force and the tertiary sector contributes the rest (about 54 percent) and employs about 28 percent of the labour force.

1.1 Characteristics of the fishery

1.1.1 Scope of fisheries management in India

Fisheries management, in the present context, implies a governmental system of management rules based on defined objectives and a mix of management means to implement the rules, which is put in place by a system of monitoring, control and surveillance (MCS). Modern fisheries management is most often based on biological arguments where the idea is to protect the biological resources in order to make a sustainable exploitation possible. As per the 'ecosystem approach', fisheries management is defined as management actions aimed at conserving the structure and functions of marine ecosystems, in addition to conserving the fishery resources.

In the Indian perspective, the scope of fisheries management can be traced through the Five-Year Plans. On perusal of the Plans, it is seen that until the Seventh Five-Year Plan (1985–1990), the Government was mainly concerned with increasing fish production and promoting capitalization of the fishing fleet. Fisheries management per se was not elucidated in the earlier Plans. It was only during the Eighth Five-Year Plan (1992–1997) that fisheries management figured in the scope of Plan budget, which was then carried on to the subsequent Plans also. The following excerpts from the Comprehensive Marine Fishing Policy, 2004 of the Government of India provide some glimpse into fisheries management, as conceived by the Government of India:

“The marine fishing policy announced by the Government of India in the past focussed only on the developmental needs of the deep-sea sector, leaving aside similar issues pertaining to the coastal sector to the respective marine states/ Union Territories (UTs). Even though substantial assistance

² World Development Indicator database, World Bank (Revised on September 2007)

³ Economy of India, http://en.wikipedia.org/w/index.php?title=Economy_of_India&oldid=176996061 (last visited Dec. 11, 2007).

was channelled through the Central and Centrally Sponsored Schemes to the States/UTs for the development of coastal fisheries, non-existence of an integrated policy for this sector was found to hamper fulfilment of the national objectives.”

1.1.2 Commercial fisheries

The fisheries sector occupies a very important place in the socio-economic development of India. Soon after independence in 1947, the Government started focussing on the fisheries sector for two reasons: (1) to promote fisheries production in order to ensure food safety (subsequently foreign exchange earning were also added); and (2) capacity building in fisheries through subsidisation of various assets.

As a result, starting from a purely traditional activity in the fifties, both aquaculture and fisheries have now transformed to commercial enterprises. The sector has been recognized as a powerful income and employment generator as it stimulates the growth of a number of subsidiary industries and is a source of cheap and nutritious food.

The fisheries sector contributed Indian Rupees (INR) 347 580 million⁴ to the GDP (at current prices) during 2005–2006, which is 1.07 per cent of the total GDP and 5.84 percent of the GDP from agriculture, forestry and fishing (Table 1 and Figure 1). During 1970 to 2006, the share of the sector in total GDP increased from 0.62 percent to 1.07 percent, recording a cumulative annual growth rate (CAGR) of 1.86 percent. The fisheries sector has also been one of the major contributors of foreign exchange earnings through export of marine products.

Table 1: Contribution of fisheries sector to the GDP in India

Year	Total GDP (million INR)	GDP from agriculture, forestry & fishing	GDP from fisheries	GDP from fisheries % of	
				Total GDP	GDP agriculture & allied Sectors
1970-71	397 080	168 210	2 450	0.62	1.46
1971-72	422 480	171 050	2 630	0.62	1.54
1972-73	464 730	187 720	3 050	0.66	1.62
1973-74	569 540	248 360	3 930	0.69	1.58
1974-75	670 390	270 570	4 540	0.68	1.68
1975-76	712 010	266 510	5 670	0.80	2.13
1976-77	765 360	271 050	6 010	0.79	2.22
1977-78	873 510	322 380	6 180	0.71	1.92
1978-79	938 800	328 150	9 380	0.79	2.25
1979-80	1 024 420	335 860	7 680	0.75	2.29
1980-81	1 224 270	422 660	9 210	0.75	2.17
1981-82	1 432 160	477 360	10 080	0.70	2.11
1982-83	1 593 950	505 270	11 740	0.74	1.02
1983-84	1 867 230	613 180	14 480	0.78	2.36
1984-85	2 085 330	651 810	17 160	0.82	2.63
1985-86	2 337 990	699 640	19 740	0.84	2.82
1986-87	2 600 300	744 050	22 500	0.87	3.02
1987-88	2 948 510	835 150	26 860	0.91	3.22
1988-89	3 527 030	1 041 030	31 420	0.89	3.02
1989-90	4 086 610	1 154 470	37 810	0.93	3.28
1990-91	4 756 040	1 351 620	47 560	0.96	3.37
1991-92	5 515 520	1 623 170	53 000	0.96	3.27
1992-93	6 279 130	1 845 360	66 490	1.06	3.60
1993-94	7813450	2419670	86790	1.11	3.59
1994-95	9170580	2787730	106020	1.16	3.80
1995-96	10 732 710	3 031 020	118 660	1.11	3.91
1996-97	12 435 470	3 626 060	140 830	1.13	3.88
1997-98	13 901 480	3 870 080	172 690	1.24	4.46
1998-99	15 981 270	4 424 940	181 560	1.14	4.10

⁴US\$1 = 39 INR (approximately.)

Year	Total GDP (million INR)	GDP from agriculture, forestry & fishing	GDP from fisheries	GDP from fisheries % of	
				Total GDP	GDP agriculture & allied Sectors
1999-00	17 618 380	4 619 640	200 170	1.14	4.33
2000-01	19 029 980	4 684 800	225 350	1.18	4.81
2001-02	20 814 740	5 105 680	248 430	1.19	4.87
2002-03	22 548 880	5 078 630	270 930	1.20	5.33
2003-04	25 197 850	5 752 830	270 260	1.07	4.70
2004-05	28 559 330	5 366 290	287 750	1.01	5.36
2005-06	32 509 320	5 950 580	347 580	1.07	5.84

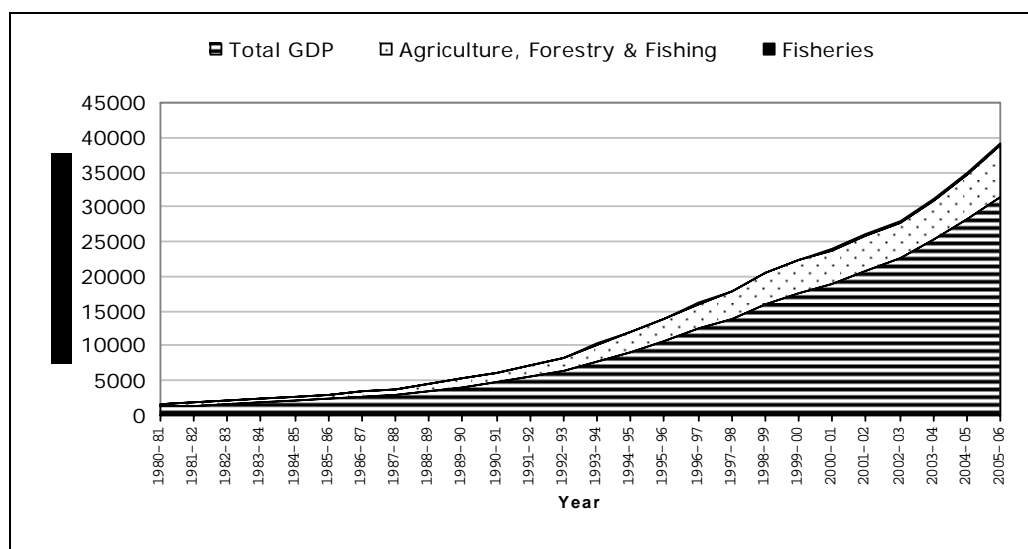


Figure 1: Contribution of fisheries sector to the GDP in India (1980–2006)

1.1.3 Recreational fisheries

In India, recreational fishing was initiated during the colonial rule as a pastime activity for the British. As a result, trout species (brown and rainbow) were introduced in the upland waters of the country, mainly in the Himalayan states. Presently, state governments such as Jammu and Kashmir, Uttar Pradesh, Sikkim and Arunachal Pradesh are promoting sport fishing to boost tourism.

Besides trout species, indigenous species such as *Tor putitora* and *T. tor* are also excellent sport species and their promotion for tourism is being carried out in the states of Haryana, Maharashtra, Assam and Karnataka. In the northern states of Jammu and Kashmir and Himachal Pradesh, both brown and rainbow trout are available in plenty. In the northeastern states such as Assam and Arunachal Pradesh, the rivers Brahmaputra, Jia Bhoroli, Kapili, Manas and Bhalukpong, Yingkiong, Bodak and Siom have the potential to develop recreational fishing. The river Cauveri in Karnataka is another popular sport fishing river, mainly for *T. khudree*, a species native to the southern peninsula.

1.1.4 The fishers in India

Fishing is a traditional economic activity in India practiced for generations by the fisher communities. The fishers can be broadly classified as (1) inland fishers, (2) marine fishers and (3) fish farmers. Among the three, commercial-scale fish farming is a recent development and is also spread outside the domain of traditional fishers communities. As per the Livestock Census, 2003, 14.49 million people were engaged in various fisheries related activities in India. About 75 percent of the fishers are engaged in various inland fisheries activities and about 25 percent in marine fisheries activities. At the national level, about 6.44 percent of fishers are full-time and about 7.40 percent engage in part-time fishing.

As per the National Marine Fisheries Census (NMFC), 2005, the marine fisheries sector provides employment to about 0.9 million in active fishing and about 0.7 million fishers in various other fishing

operations (Table 2 & Figure 2). The number of people involved in marine fisheries related activities include nearly 0.2 million in fish marketing, 0.1 million in repairs of fisheries requisites, around 0.2 million in fish processing and 0.1 million in other ancillary activities. In all, an estimated 3.51 million people depend on marine fisheries for their livelihoods in India.

Table 2: National Marine Fisheries Census, 2005

State and Union territories	Active fishers	Number of fishers involved in fishing allied activities						Total	Total fisher population
		Marketing	Making/repair of net	Curing/processing	Peeling	labour	Others		
West Bengal	70 750	5 237	15 326	4 705	478	26 151	5 844	57 741	269 565
Orissa	121 282	31 691	40 252	27 849	3 167	37 781	11794	152 534	450 391
Andhra Pradesh	138 614	34 337	23 926	28 319	2 996	55 372	7 942	152 892	509 991
Tamilnadu	206 908	36 126	19 051	6 250	2 107	25 657	15 318	104 509	790 408
Pondicherry	10 341	6 393	630	364	5	714	1 989	10 095	43 028
Kerala	140 222	17 976	9 560	3 881	8 057	17 242	14 358	71 074	602 234
Karnataka	37 632	14 327	7 876	3 342	581	14 043	5 530	45 699	170 914
Goa	2 515	1 688	479	0	0	515	700	3 382	10 668
Maharashtra	72 074	43 822	9 086	9 209	1 439	11 565	6 659	81 780	319 397
Gujarat	83 322	14 885	13 452	3 212	4 310	31 366	7 857	75 082	323 215
Daman & Diu	5 868	880	80	11	3	256	373	1 603	29 305
TOTAL	889 528	207 362	139 718	87 142	23 143	220 662	78 364	756 391	351 9116

Compared with the previous NMFC undertaken in 1980, it is seen that marine fisher population has nearly doubled from 1.87 million in 1980 to 3.51 million in 2005. Among the maritime states, West Bengal has the highest concentration of fishers per kilometre of coastline (1,706) followed by Kerala (1,012) and Orissa (938).

Among those engaged in active marine fishing, the majority (81 percent) are in full-time fishing, 13 percent on part-time basis and the rest in occasional fishing (Figure 3). Fishing as a full time profession is relatively popular in the west coast states/UTs (Gujarat, Goa, Daman & Diu, Maharashtra, Karnataka, Lakshadweep and Kerala) where 84 percent of active fishers are engaged in full-time fishing as compared to the east coast (West Bengal, Orissa, Andhra Pradesh, Puducherry, Andaman and Nicobar Islands and Tamil Nadu), where 79 percent fishers engage in full-time fishing. This is also supported by the fact that fishing operations are more capital-intensive in the west coast states than in the east coast states.

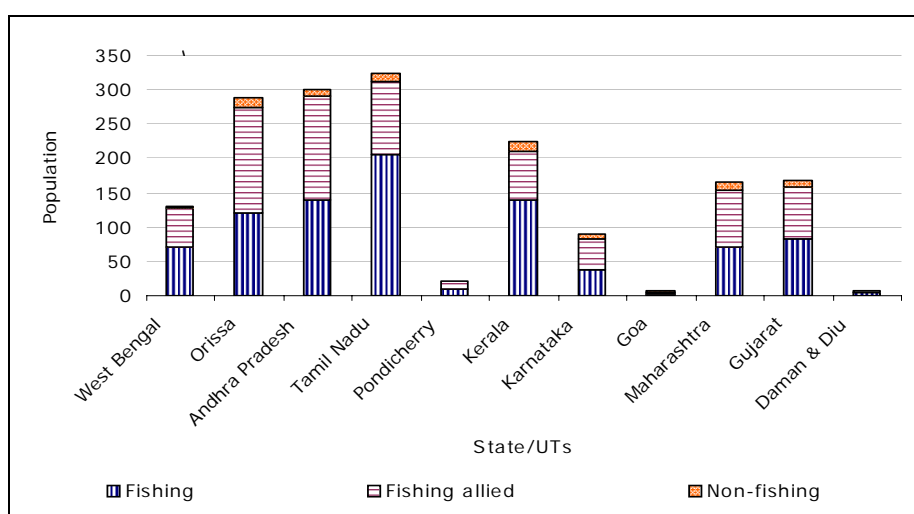


Figure 2: State and activity-wise marine fisher population

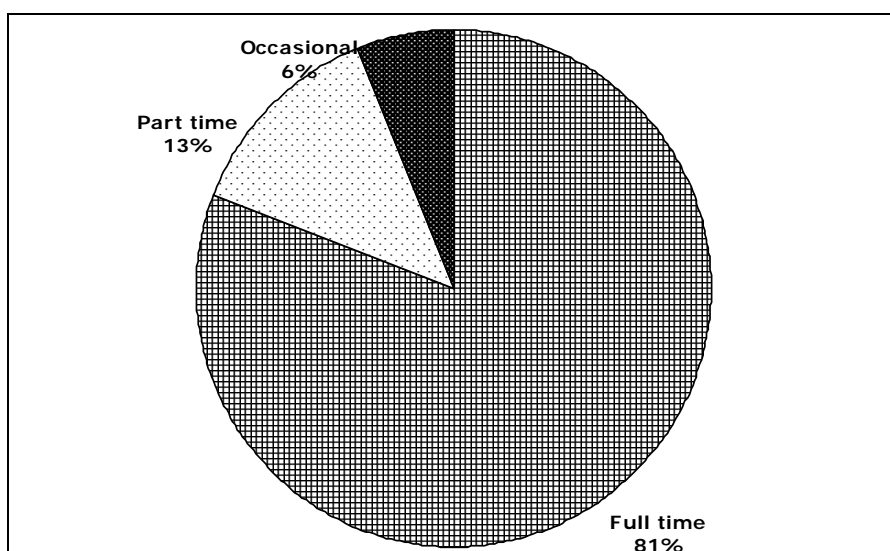


Figure 3: Engagement profile of active marine fishers in India

1.1.5 Trends in fish production and catch composition

Fish production in the country has been showing an increasing trend and reached a record level of 6.57 million tonnes in 2005–06. The marine fisheries sector contributed 2.82 million tonnes and the inland sector (including aquaculture) contributed 3.75 million tonnes in 2005–06 (Table 3). The progress in the inland fisheries sector during the 1990s has been commendable (6.55 percent per annum), whereas the growth in marine fish production during the same period has been slow (2.19 percent per annum).

Table 3: Trends in fish production (1950-2006)⁵

Year	Fish production ('000 tonnes)			Average annual growth rate (percent)		
	Marine	Inland	Total	Marine	Inland	Total
1950-51	534	218	752	--	--	--
1955-56	596	243	839	2.32	2.29	2.31
1960-61	880	280	1 160	9.53	3.05	7.65
1965-66	824	507	1 331	-1.27	16.21	2.95
1970-71	1 086	670	1 756	6.36	6.43	6.39
1973-74	1 210	748	1 958	3.81	3.88	3.83
1978-79	1 490	816	2 306	4.63	1.82	3.53
1979-80	1 492	848	2 340	0.13	3.92	1.47
1980-81	1 555	887	2 442	4.22	4.6	4.36
1981-82	1 445	999	2 444	-7.07	12.63	0.08
1982-83	1 427	940	2 367	-1.25	-5.91	-3.15
1983-84	1 519	987	2 506	6.45	5	5.87
1984-85	1 698	1 103	2 801	11.78	11.75	11.77
1985-86	1 716	1 160	2 876	1.06	5.17	2.68
1986-87	1 713	1 229	2 942	-0.17	5.95	2.29
1987-88	1 658	1 301	2 959	-3.21	5.86	0.58
1988-89	1 817	1 335	3 152	9.59	2.61	6.52
1989-90	2 275	1 402	3 677	25.21	5.02	16.66
1990-91	2 300	1 536	3 836	1.1	9.56	4.32
1991-92	2 447	1 710	4 157	6.39	11.33	8.37

⁵ Note: The growth rates presented for the period prior to 1979 are the average annual compound growth rates.

Year	Fish production ('000 tonnes)			Average annual growth rate (percent)		
	Marine	Inland	Total	Marine	Inland	Total
1992-93	2 576	1 789	4 365	5.27	4.62	5
1993-94	2 649	1 995	4 644	2.83	11.51	6.39
1994-95	2 692	2 097	4 789	1.62	5.11	3.12
1995-96	2 707	2 242	4 949	0.56	6.91	3.34
1996-97	2 967	2 381	5 348	9.6	6.2	8.06
1997-98	2 950	2 438	5 388	-0.57	2.39	0.75
1998-99	2 696	2 602	5 298	-8.61	6.73	-1.67
1999-00	2 852	2 823	5 675	5.79	8.49	7.12
2000-01	2 811	2 845	5 656	-1.44	0.78	-0.33
2001-02	2 830	3 126	5 956	0.68	9.88	5.3
2002-03	2 990	3 210	6 200	5.65	2.69	4.1
2003-04	2 941	3 458	6 399	-1.64	7.73	3.21
2004-05	2 779	3 526	6 305	-5.51	1.97	-1.47
2005-06	2 816	3 756	6 572	1.33	6.52	4.23

Source: Handbook of Fisheries Statistics 2006

The inland fisheries in the country comprises about 800 varieties of species, of which five major groups: Indian major carps, minor carps, exotic carps, murrels and catfishes are commercially more important (Table 4 and Figure 4). The Indian major carps (*Catla catla*, *Labio rohita*, *Cirrhinus mrigala*.) contribute about 58 percent of the total inland fish production followed by exotic carps such as silver (*Hypophthalmichthys molitrix*) and grass carps (*Ctenopharyngodon idella*).

Table 4: Catch composition of inland fisheries (production in tonnes)

Species/Year	2000	2001	2002	2003	2004	2005*
Major carps	1609 630	1781 238	1992 840	2022 721	2314 691	2357 470
Minor carps	133 839	155 773	178 362	188 781	293 228	128 017
Exotic carps	264 943	349 412	283 473	292 244	324 181	401 844
Murrels	139 409	122851	66392	73 011	73 011	58 368
Freshwater catfishes	116 239	78 367	101 488	106 282	106 282	94 909
Other freshwater fishes	300 710	401 018	270 115	279 225	279 225	135 666
Miscellaneous	263 336	195 588	273 256	258 143	258 143	581 031

* Provisional

On the other hand, the marine waters of India harbour around 1 707 species of fish, of which over hundred species are commercially harvested. Time-series catch composition of marine fishery shows considerable variation through the period 1950–2005 (Table 5 and Figure 5).

These changes are: (1) increase in the number of species harvested/ caught, (2) changes in catch composition and (3) a decline in population of some species. Broadly speaking, during the 1950s and 1960s, Indian oil sardines, natantian decapods, mackerels and Bombay duck constituted the majority (more than 1/3rd) of the landings, but since 1970s, share of Bombay duck in catch composition has declined steadily. The share of other dominant species such as clupeids and hair tails also declined considerably during the period 1950-2005. On the other hand a phenomenal rise in landing of prawns, shrimps and other marine crustaceans took place during the same period.

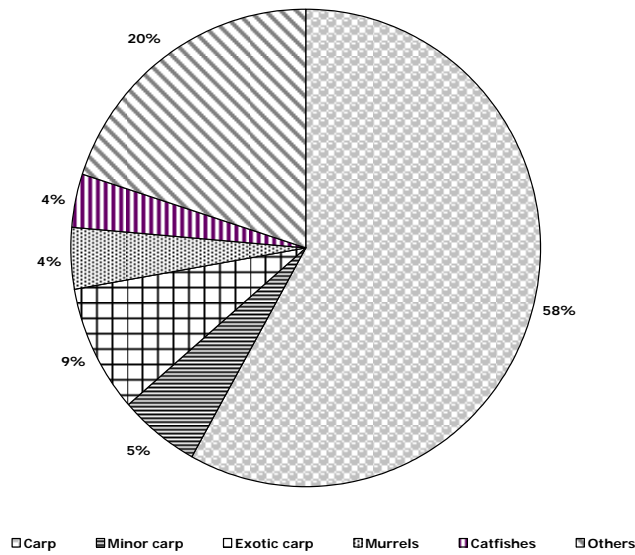


Figure 4: Catch composition of inland fisheries (2003)

Table 5: Composition of marine catch

Species	2000	2001	2002	2003	2004	2005
Miscellaneous aquatic animals	95	0	0	0	0	0
Others	0	0	8,750	8 750	0	0
Demersal species	951 042	903 119	917 935	860 109	904 988	928 136
Pelagic species	760 534	752 014	722 450	736 835	738 135	732 985
Marine fish	559 676	708 296	845 775	881 386	735 770	705 363
Crustaceans	382 372	378 052	436 028	451 705	411 068	412 755
Cephalopods	96 408	53 271	87 344	89 535	69 292	80 240
Molluscs (excluding cephalopods)	1 796	2 597	1 240	2 358	8 844	7 511

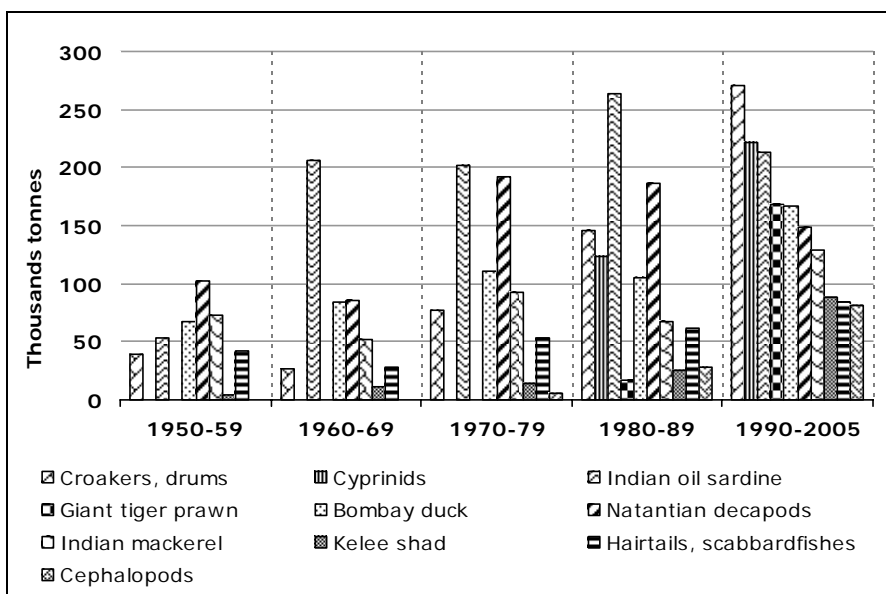


Figure 5: Changes in composition of marine fish landings in India

Group-wise (FAOSTAT), demersal fishes constitute about 16 percent of the total landings, pelagic species constitute about 13 percent and marine species (finfishes, etc) constitute about 25 percent of landings. The other marine varieties (crustaceans, cephalopods and molluscs) constitute about 17 percent of the landings (Figure 6).

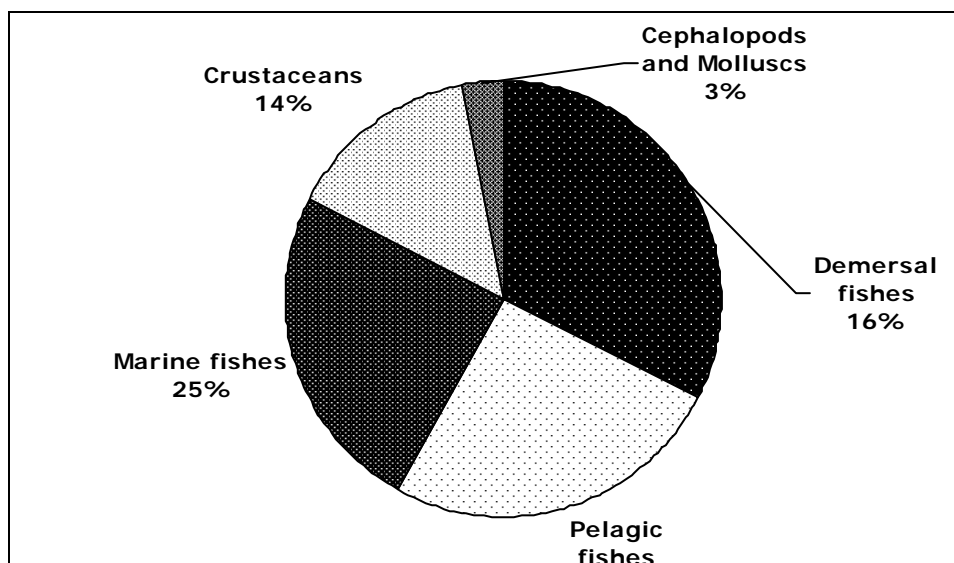


Figure 6: Composition of marine landing in 2005

Overall, during 1950-2005, landing of demersal fishes has recorded a CAGR of 3.07 percent, pelagic species 2.43 percent and marine fishes (since mid-1950s) recorded a CAGR of 9.73 percent.

1.1.6 Location of fisheries

India has vast inland water resources in the form of rivers and canals (0.2 million km), reservoirs (3.1 million ha) and tanks and ponds (2.2 million ha) offering tremendous scope for fish production. The extensive network of Indian rivers (45 000 km) constitutes one of the major inland fisheries resources of the country and serves as a primary habitat for the rich germplasm of carps, catfishes, featherbacks, etc. (Tables 6 and 7).

Table 6: Inland fisheries resources of India

Sl. no.	State/UTs	Rivers & canals (km)	Reservoirs ('000 ha)	Tanks & ponds ('000 ha)	Floodplain lakes & derelict water ('000 ha)	Brackish water ('000 ha)	Total water bodies ('000 ha)
1	Andhra Pradesh	11 514	234	517	-	60	811
2	Arunachal Pradesh	2 000	-	276	42	-	318
3	Assam	4 820	2	23	110	-	135
4	Bihar	3 200	60	95	5	-	160
5	Goa	250	3	3	-	Neg.	6
6	Gujarat	3 865	243	71	12	100	426
7	Haryana	5 000	Neg.	10	10	-	20
8	Himachal Pradesh	3 000	42	1	-	-	43
9	Jammu & Kashmir	27 781	7	17	6	-	30
10	Karnataka	9 000	440	290	-	10	740
11	Kerala	3 092	30	30	243	240	543
12	Madhya Pradesh	17 088	227	60	-	-	287
13	Maharashtra	16 000	279	59	-	10	348
14	Manipur	3 360	1	5	4	-	10
15	Meghalaya	5 600	8	2	Neg	-	10
16	Mizoram	1 395	-	2	-	-	2
17	Nagaland	1 600	17	50	Neg	-	67
18	Orissa	4 500	256	114	180	430	980
19	Punjab	15 270	Neg	7	-	-	7

Sl. no.	State/UTs	Rivers & canals (km)	Reservoirs ('000 ha)	Tanks & ponds ('000 ha)	Floodplain lakes & derelict water ('000 ha)	Brackish water ('000 ha)	Total water bodies ('000 ha)
20	Rajasthan	5 290	120	180	-	-	300
21	Sikkim	900	-	-	3	-	3
22	Tamil Nadu	7 420	570	56	7	60	693
23	Tripura	1 200	5	13	-	-	18
24	Uttar Pradesh	28 500	138	161	133	-	432
25	West Bengal	2 526	17	276	42	210	545
26	A & N Islands	115	1	3	-	120	124
27	Chandigarh	2	-	Neg	Neg	-	0
28	Dadra and Nagar Haveli	54	5	-	-	-	5
29	Daman and Diu	12	-	Neg	-	Neg	0
30	Delhi	150	4	-	-	-	4
31	Lakshadweep	-	-	-	-	-	0
32	Pondicherry	247	-	Neg	1	Neg	1
33	Chhattisgarh	3 573	84	63	-	-	147
34	Uttaranchal	2 686	20	1	0	-	21
35	Jharkhand	4 200	94	29	-	-	123
	Total	195 210	2907	2414	798	1240	7359

Table 7: Profile of the major river systems in India

Sl. No.	River System	Main Rivers	Approximate length (km)	States
Himalayan or Extra - Peninsular Rivers				
1.	Ganga	Ganga Ramganga Gomti Ghaghra Gandak Kosi Yamuna Chambal Tons Son Ken	2 525 569 940 1 080 300 492 1 376 1 080 264 784 360	Uttar Pradesh, Bihar, West Bengal Uttar Pradesh Uttar Pradesh Uttar Pradesh, Bihar Bihar Bihar Punjab, Haryana, Delhi, Uttar Pradesh Madhya Pradesh, Uttar Pradesh, Rajasthan Uttar Pradesh Uttar Pradesh Madhya Pradesh
2.	Brahmaputra	Brahmaputra, Dibang, Siang, Lohit, Manas, Buri, Dihang, Dhansri, Koppili	4 000	Arunachal Pradesh, Assam, Nagaland, Sikkim, Manipur
3.	Indus	Jhelum Chenab Beas Satluj Ravi	400 330 460	Jammu & Kashmir Jammu & Kashmir, Himachal Pradesh Himachal Pradesh, Punjab Himachal Pradesh, Punjab Jammu & Kashmir, Himachal Pradesh, Punjab
Peninsular Rivers				
4.	East Coast	Mahanadi Godavari Krishna Cauvery Bhima	851 1 465 1 401 800 861	Orissa, Madhya Pradesh Maharashtra, Andhra Pradesh Maharashtra, Andhra Pradesh, Karnataka Karnataka, Tamil Nadu Karnataka
5.	West Coast	Narmada Tapti Mahi	1 322 720 583	Maharashtra, Gujarat, Madhya Pradesh

Source: Central Inland Fisheries Research Institute (ICAR), Barrackpore

The country has a long coastline of 8 118 km and an equally large area under estuaries, backwaters and lagoons, etc. The continental shelf area amounts to 5 300 000 sq. kms of which 71 percent area is available in the Arabian Sea (west coast) and the remaining 29 percent in the Bay of Bengal (east coast). After declaration of the Exclusive Economic Zone (EEZ) in 1977, the area available to India is estimated at 2.02 million km², comprising 0.86 million km² on the west coast, 0.56 million km² on the east coast and 0.60 million km² around the Andaman and Nicobar Islands (Figure 7).

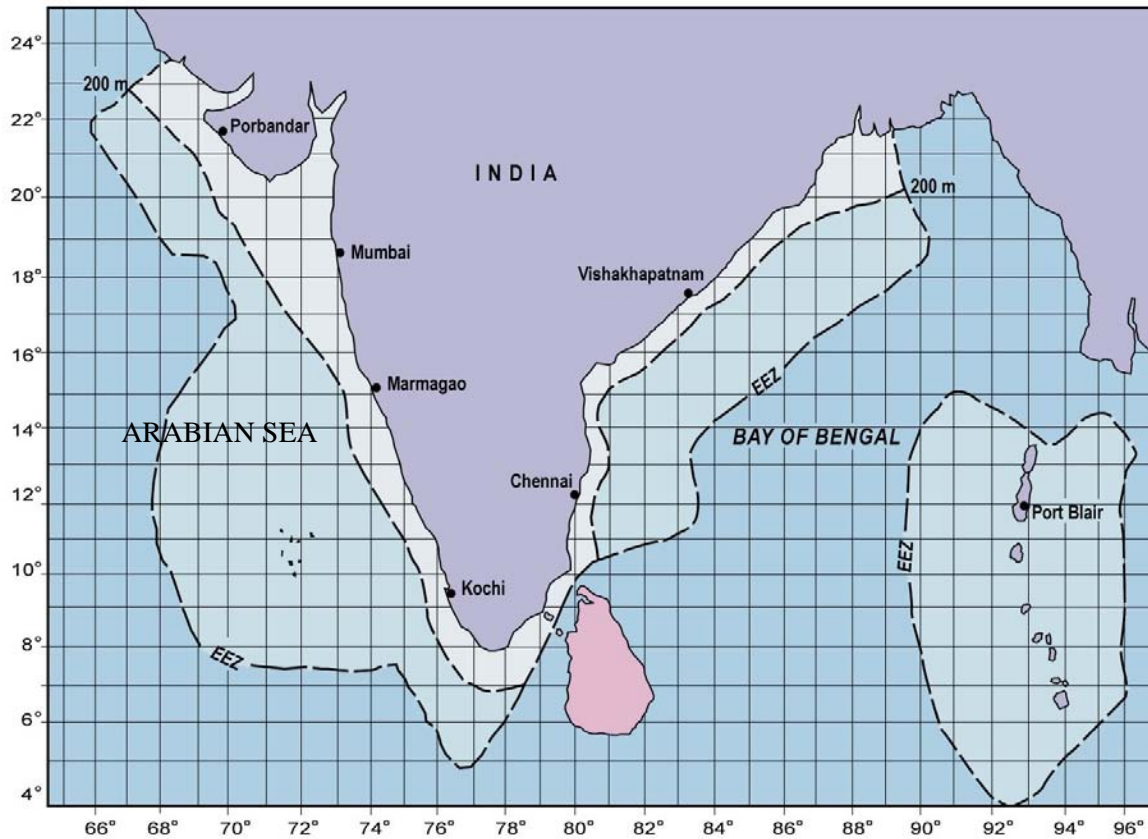


Figure 7: Exclusive economic zone of India

Riverine fisheries

Both the Ganga and the Brahmaputra river systems harbour Indian Major Carps (*C. catla*, *L. rohita*, *C. mrigala*), which are the key species responsible for increased production from ponds and tanks in the last three decades. However, the catch statistics over the years indicate that the biologically and economically desirable fish species, including the Indian Major Carps have started giving way to low-value species, exhibiting an alarming swing in the population structure. The average yield of major carps in the river Ganga has declined from 26.62 to 2.55 kg/ha/year during the last four decades. Studies have shown that environmental aberrations like marked reduction in water volume due to increased sedimentation and water abstraction, accompanied with river course modifications and irrational fishing practices are the key factors responsible for the decline in riverine fish production.

Reservoir fisheries

Optimisation of fish yields from reservoirs in India has received some importance only recently and the fish yield from the resource is still frustratingly low. Presently, they yield an average of about 15 kg/ha/yr in contrast to 88 kg/ha/yr in Russia, 100 kg/ha/yr in Sri Lanka and 600 kg/ha/yr in China. A production of 50-100 kg/ha/yr can easily be realized from large (>5000 ha) and medium (1 000–5 000 ha) reservoirs by adoption of suitable mesh size, balanced fishing effort and sustained stocking support. The small reservoirs (<1 000 ha), having a total area of 1.48 million ha in the country, have the potential to yield 200–300

kg/ha/yr. Even a moderate increase of 100 kg/ha for small and 75 kg/ha for medium and 50 kg/ha for large reservoirs can provide an additional increment of about 0.150 million tonnes of fish annually (Table 8).

Table 8: Present yield and potential of production from different categories of reservoirs in India

Category	Total available area (ha)	Present		Potential	
		Average production (kg/ha)	Fish production (tonnes)	Average production (kg/ha)	Fish production (tonnes)
Small	1 485 557	49.90	74 129	100.00	148 556
Medium	527 541	12.30	6 488	75.00	39 565
Large	1 140 268	11.43	13 033	50.00	57 013
Total	3 153 366	29.70	93 650	77.70	245 134

The reservoir fisheries is largely guided by economic considerations rather than biological principles, the result being a poor understanding of biological and limnological functions governing the production regimes of the reservoirs. Multiplicity of agencies owning and manning the reservoirs has further compounded the problem by adopting irrational norms, with little concern for the enhancement of fisheries.

Coastal fisheries

Coastal fisheries in India remained in a pre developed phase until 1962 (pre-mechanization period; with the annual average production during 1950–1962 being <0.8 million tonnes), a prolonged growth phase until 1988 (intensive mechanization phase; annual production during 1963–1988 being 0.8 to 1.8 million tonnes); followed by the fully exploited coastal areas and the annual production being 1.8 to 2.8 million tonnes/ year). Fishing effort has increased steadily throughout the three phases of development, more so in the fully exploited phase. Marine fishing activity in India is an example of uncontrolled fisheries in the initial phase and inefficiently managed fisheries in the subsequent phases.

Coastal aquaculture

For the past two decades or so, development of brackish water aquaculture has been one of the most outstanding features of the fisheries sector in the country. It has been primarily responsible for almost doubling the shrimp production in recent years, and has also resulted in substantial economic gains in the coastal States of the country.

The potential brackish water area available in the coastal regions of the country for shrimp culture is estimated between 1.2 million to 1.4 million hectares. Presently, an area of about 184 115 ha is under farming with an average production of about 110 000 tonnes of shrimp per year. The average productivity has been estimated at about 1 000 kg per hectare per year. Since the development of this sector, about 0.3 million persons have gained direct employment in shrimp farming and about 0.6–0.7 million persons are employed in the ancillary units and activities. The area under culture has also increased from 135 582 ha in 1996–97 to 184 115 ha in 2005–06.

Cultured shrimps (mainly *Penaeus monodon* or popularly known as black tiger) contribute about 50 per cent of the total shrimp exports. About 91 per cent of the shrimp growers in the country have a holding between 0 to 2 ha, 6 per cent between 2 to 5 ha, and the remaining 3 per cent have an area of 5 ha and above. The infrastructure facilities established over years include hatcheries both in private and public sector, laboratories for testing of pathogens/ diseases and processing units.

Until early nineties shrimp culture was completely dependent on the seed collected from the natural resources. With the increase in farming area and increased stocking rates shrimp hatcheries were established in large numbers in the private sector. Presently, there are 237 shrimp hatcheries along the coastline of the country with a production capacity of 11.0 billion of post-larvae (PL) per annum.

Deep sea fisheries

The Indian EEZ is an open access realm for Indian nationals and only possession rights exist. There are no property rights. Deep-sea fishing is viewed in a state of diminishing fleet strength of vessels above 23 m overall length (OAL). There numbers have come down from about 180 in the early nineties to about 60 now. Lack of research and development efforts on fishing vessels best suited to the Indian conditions has also

impeded the growth of this sector. Mechanized vessels below 20 m OAL necessitate major inputs in their design not only to increase their voyage but also to facilitate bringing back the catch in as good condition as possible. While new hull material such as fibre-reinforced plastic (FRP) is being used by the industry, standards are still lacking, resulting in poor quality vessels.

Potential yield

The potential fish production in India, as per the current estimate, is 8.40 million tonnes per annum. Potential yield from inland fisheries⁶ and marine fisheries are estimated at 4.50 million tonnes per annum and 3.92 million tonnes per annum respectively. At the aggregate level, India is presently exploiting 78 percent of its potential yield comprising 83 percent of potential yield in inland fisheries and 72 percent of potential in marine fisheries.

Presently, the reservoirs in India have the potential of 0.25 million tonne per annum, whereas only 38 percent of its potential is exploited. With proper policy interventions, this sector can develop the fisheries economy to a large extent.

In the coastal fishery, the west coast of India has a potential yield of about 2.36 million tonnes comprising demersal fishery resources of about 1.25 million tonnes and pelagic fishery resources of about 1.11 million tonnes. On the other hand, the east coast of India has a potential yield of about 1.09 million tonnes comprising demersal fishery resources of about 0.66 million tonnes and pelagic fishery resources of about 0.43 million tonnes (Table 9). At the aggregate level, the potential yield for demersal fishes is 1.929 million tonnes, for pelagic fishes 1.742 million tonnes, and for oceanic fishes 0.246 million tonnes.

Table 9: Potential yield from continental shelf of India

Region/ Resource	West coast	East coast	Lakshadweep Islands	Andaman and Nicobar	Total
Demersal	1.251	0.656	-	0.022	1.933
Pelagic	1.106	0.434	0.063	0.139	1.742
Oceanic					0.246
Total	2.357	1.09	0.063	0.161	3.921

1.1.7 Methods of harvesting

The marine fishing fleet comprises about 280 491 fishing craft of which 225 862 are of traditional types (including about 44 578 motorized traditional craft). The mechanized fishing fleet comprises 29 241 trawlers, 983 purse seines, 14 183 gill-netters, 8 862 dol-netters and 1 020 other type of boats (Table 10).

Table 10: Fishing craft operating in the coastal States and Union Territories

Sl. no.	State/Union Territory	Traditional crafts	Motorized traditional crafts	Mechanized boats	Total
1	Andhra Pradesh	53 853	4 164	8 642	66 659
2	Goa	1 094	1 100	1092	3 286
3	Gujarat	9 222	5 391	11 372	25 985
4	Karnataka	19 292	3 452	2 866	25 610
5	Kerala	28 456	17 362	4 206	50 024
6	Maharashtra	10 256	286	8 899	19 441
7	Orissa	10 993	2 640	1 276	15 854
8	Tamil Nadu	33 945	8 592	9 896	52 433
9	West Bengal	4 850	270	3 362	8 482
10	Andaman and Nicobar Islands	1 180	160	230	1 570

⁶ Potential from inland fisheries is a variable concept. Since the total amount of area under reservoirs, pond and other water bodies may vary with time, a definite potential cannot be estimated. The figure given here may be best described as potential yield at this point of time.

Sl. no.	State/Union Territory	Traditional crafts	Motorized traditional crafts	Mechanized boats	Total
11	Daman and Diu	252	350	805	1 407
12	Lakshadweep	594	306	478	1 378
13	Pondicherry	7 297	505	560	8 362
	Total	181 284	44 578	53 684	280 491

Total includes 810 FRP Catamarans and 135 Beach Landing Crafts

As seen by the number of traditional craft and small-mechanized vessels, the major fishing activities are still concentrated in the areas within 0 to 70–80 meter depth zone. As compared to the west coast, concentration of traditional craft (including motorized) is more on the east coast (about 57 percent of the total). In the case of mechanized vessels, the trend is reverse. The scale of mechanization is also reflected in the total fish landings of the two coasts.

At the national level, the mechanized sector contributes about 67 percent of the landing. In 1969 it was a mere 20 percent. Motorized sector contributes about 25 percent and the balance 8 to 10 percent is contributed by the traditional crafts. With the advent of mechanization, use of traditional harvesting gear like bag net, cast net, small meshed gill net has declined and more efficient gear like purse seines have become popular. Table 11 shows the harvesting methods of some commercially important fish species in the country.

Table 11: Harvesting methods for some commercial varieties of fin and shellfish species

Species	Gear
Indian oil sardine	Purse seine, ring seine gillnet
Mackerel	Gillnet, ring net, trawl net, purse seine
Bombay duck	Dol net, trawl net
Carangids	Trawl net, gillnet, hooks and line
Whitebaits	Ring seine, Trawl net
Seer fishes	Gillnet, trawl net, hooks and line
Tunas	Gillnet, hooks and line
Shad	Gillnet
Anchovy	Trawl net, dol net
Ribbon fishes	Trawl net
Pomfrets	Gillnet, trawl net
Sharks	Hooks and line, gillnet, trawl net
Rays	Hooks and line, bottom set gillnet
Threadfin breams	Trawl net
Catfishes	Purse seine, trawl net, gillnet, dol net
Croakers	Trawl net, bottom set gillnet, bag net
Silverbellies	Trawl net
Goatfishes	Trawl net
Threadfins	Trawl net
Rock cods	Hooks and line, bag net, trawl net
Flatfishes	Trawl net
Big-jaw jumper	Trawl net
Penaeid shrimps	Trawl net, dol net, trammel net
Non-penaeid prawns	Trawl net, dol net
Crabs	Trawl net, bottom set gillnet
Lobster	Trawl net, bottom set gillnet, bag net
Cephalopods	Trawl net, hooks and line

1.2 Fisheries Management Frameworks

1.2.1 Mandate and authority

Entry 57 of List 1 of Seventh Schedule of the Constitution of India specifies Fishing and Fisheries beyond Territorial Waters as Union Subject, whereas Entry 21 of List II speaks of Fisheries as a State Subject. Reading both the Entries together, it follows that control and regulation of fishing and fisheries within territorial waters is the exclusive province of the State, whereas beyond the territorial waters, it is the exclusive domain of the Union. The Central Government acts as a facilitator and coordinator responsible for policy formulation, carrying out fishery research and channelling funding support to the states in line with the national priorities and the commitments made to the state/ UT governments. The Ministry of Agriculture (Department of Animal Husbandry, Dairying and Fisheries) within the purview of its allocated business helps the coastal states and UTs in development of fisheries within the territorial waters, besides attending to the requirements of the sector in the EEZ. Therefore, management of fishery exploitation in the EEZ requires close coordination between the Union and the states.

1.2.2 Fisheries legislation

For sustainable development of the marine resources, India amended its constitution in 1976. The Indian Parliament enacted the Territorial Sea, Continental Shelf, Exclusive Economic Zone and other Maritime Zones Acts in 1976, pursuant to which a 200 nautical mile EEZ was established with effect from January 15, 1997. Since then, India has also enacted a number of other laws and regulations, including: the Marine Products Export Development Authority Act, 1972; the Indian Coast Guard Act, 1978; the Maritime Zones of India (Regulation of Fishing by Foreign Vessels) Act, 1981; the related Rules of August, 1982; the Environment Protection Act, 1986; the Coastal Aquaculture Authority Act, 2005, etc. The other central legislations, which have important bearing on the fisheries sector include the Merchant Shipping Act, 1956 and the Wildlife Protection Act, 1973. However, there is still no law to regulate the Indian-owned fishing vessels operating in the EEZ.

The Marine Fishing Regulation Act (MFRA) of the maritime state/ UT governments and the deep sea fishing schemes as provided under the Maritime Zone of India (Regulation of Foreign Fishing Vessels) Act, 1981 of the Government of India provide for prohibition of fishing by mechanized fishing vessels in the areas earmarked for the traditional and small-motorized crafts. For monitoring the fishing activities to be carried out in different assigned fishing zones by respective fleets, patrol boats are provided under a Central Scheme to the Department of Fisheries (DoF) of the maritime states. The resources monitoring surveys conducted by the Fisheries Survey of India (FSI), Mumbai are being linked with the management measures to be evolved and applied for sustainable development of fisheries in the country.

The inland fisheries sector is regulated through the provisions of the Indian Fisheries Act, 1897, which has been repealed by the inland states as their own Act. However, a model bill for regulation of inland fisheries and aquaculture is under consideration of the Central Government.

1.2.3 Institutional structure

As defined by the Indian constitution, both the Union and the state government agencies manage fisheries activities. While at the Central-level, the Department of Animal Husbandry, Dairying and Fisheries in the Ministry of Agriculture is the focal point, in the state/UT governments, it is the DoF. Other Ministries/Departments like the Ministry of Commerce and Industries, Ministry of Earth Sciences, Ministry of Food Processing Industries, Ministry of Environment and Forests play important role in various aspect of management. At the national level, the Ministry of Defence through the Indian Coast Guard is also associated with the management of fisheries in the EEZ.

Role of Central Government

The Fisheries Division in the Department of Animal Husbandry, Dairying and Fisheries, Ministry of Agriculture acts as the focal point for fisheries development and management in the country. It formulates the strategy for the national development plans for the sector and issues policy guidelines for fisheries development and management. It also provides technical and financial assistance for fisheries development and management to various states/UTs. The financial assistance is over and above the budgetary support provided to the states by the Planning Commission.

To promote export of fish and fish products, the Government of India established the Marine Products Export Development Authority (MPEDA) under the Ministry of Commerce and Industry in 1972. While the processing aspect fall under the Ministry of Food Processing, the control of marine biodiversity and marine pollution falls under the jurisdiction of Ministry of Environment and Forests and the Ministry of Earth Sciences. Table 12 give the detailed institutional structure for fisheries management in India.

Table 12: Institutional set up for fisheries management in India

Item	Agency/ Ministry/ Department
Deep Sea fishing (List I) Survey & assessment of fisheries resources Research Training & extension Aquaculture development	Ministry of Agriculture / Department of Animal Husbandry, Dairying and Fisheries/ Indian Council of Agricultural Research Fisheries Survey of India
Monitoring of fishing by foreign vessels (List I) Prevention of marine pollution by ships Protection of endangered species (Wildlife Protection Act, 1972)	Ministry of Defense / Coast Guard
Fish processing Processing units	Ministry of Food Processing Industries/ Ministry of Commerce & Industries Marine Products Export Development Authority (MPEDA) National Fisheries Development Board (NFDB)
Seafood exports (List I) Quality control	Ministry of Commerce & Industry – MPEDA Export Inspection Council
Law of the Sea negotiations (List I)	Ministry of External Affairs
Potential fishing zones Monitoring ocean pollution	Ministry of Earth Sciences
Fishing vessel industry (List I) Major fishing ports (List I) Minor fishing ports (List II)	Ministry of Shipping, Road Transport and Highways/, Ministry of Agriculture, State Governments
Aquaculture in inland and territorial waters (List II) Sustainable development of coastal aquaculture (Coastal Aquaculture Authority Act, 2005) Fisheries in territorial waters (List II)	State Governments / Department of Fisheries/ NFDB/ Coastal Aquaculture Authority
Protection of marine biodiversity (List III) ⁷ Protection of coastal habitats (List III) Focal point for Ramsar, CITES, CMS & CBD Conventions (List III)	Ministry of Environment and Forests (MoEF)
Infrastructure	Ministry of Agriculture /Ministry of Commerce and Industries – MPEDA / NFDB

Role of the State Governments

The DoF in the state/UT governments are responsible for fisheries development and management in their respective jurisdictions. The principal objectives of the DoF are planning and development of infrastructure facilities for landing and berthing of fishing craft, creating suitable marketing facilities, implementation of various fisheries development programmes viz., channelling financial assistance for purchase of fishing implements, implementation of socio-economic programmes and interactions with the Government of India and other agencies for technical and financial assistance.

The National Fisheries Development Board

In view of optimal utilization of the fisheries resources in the country, the Government of India constituted the National Fisheries Development Board (NFDB) in August 2006. Keeping in view the multifarious requirements of the fisheries sector in the country, the Ministry of Agriculture considered the need of a

⁷ Concurrent List

committed body like NFDB with adequate resources to achieve the desired results. The Ministry also felt that an autonomous agency like NFDB would have the facility to practice effective flexibility in implementation of programmes and schemes, which is a necessity for a diverse country like India.

The Board⁸ has started with a corpus of INR21 000 million for implementation of various activities during the period 2007-12. The Board is mandated to spend INR6 200 million towards intensive aquaculture in ponds and tanks, INR4 000 million for reservoir fisheries, INR150 million for coastal aquaculture and INR6 000 million for infrastructure. To streamline domestic marketing, the Board will invest INR2 500 million in the coming years. About INR2 000 million will be invested in activities to promote mariculture, seaweed and sea ranching, deep-sea fishing, etc.

2. ALLOCATION OF FUNDS FOR FISHERIES MANAGEMENT ACTIVITIES

2.1 The basis of allocation of funds to fisheries management

The funds allocated to the fisheries sector in India broadly fall under (1) Non-plan expenditure and (2) Plan expenditure. Non-Plan expenditure mainly includes the salary component of the organizations. On the other hand, fisheries management falls under Plan expenditure. The Plan component includes allocation to various schemes implemented by the Central and the State Governments during the Five-Year Plan periods.

The Plan size in India depends not only on economic, but also on political considerations. The actual allocation of funds to fisheries management primarily depends on how much in funds is allocated to each Five-Year Plan. Procedurally, in the beginning of each Plan, the National Development Council sets the target and priorities of the Plan and formulates guidelines on the importance of various sectors for the Planning Commission of India. Simultaneously, the Ministry of Finance works out the amount of resources that can be allocated to the Plan. Following this, the Planning Commission forms Working Groups to review various sectors. In respect of the fisheries sector, prior to each Plan, the Planning Commission constitutes a “Working Group on Fishery” to assess the development of the sector and to identify areas of focus/ priority to be addressed in the ensuing Plan. For example, the Working Group on Fisheries for the Eleventh Five-Year Plan (2007–2012) was constituted with the following Terms of Reference (ToR)⁹:

1. *“To undertake a critical review of the progress of the on-going Central and Centrally Sponsored Schemes/ programmes in fisheries sector with reference to their objectives and targets during the Tenth Plan and to recommend their continuation/ discontinuation/ modification/ convergence and also fresh initiatives, if any with tentative investments.*
2. *To identify the various problems and constraints in the implementation of the on-going development programmes in the fisheries sector, especially in development of deep-sea fishing/ distant water fishing, fresh water and coastal aquaculture, infrastructural development including fishing harbours, fish seed hatcheries, processing and marketing network, welfare of fishers, etc.*
3. *To suggest measures including policy issues for increasing area and productivity in freshwater/ coastal aquaculture, reservoir fisheries, cold water fisheries including uniform long-term leasing of suitable water bodies, etc.*
4. *To suggest an action plan for production and standardization of adequate quantum of fish seed for freshwater and coastal aquaculture and reservoirs.*
5. *To suggest concrete measures for supplementing marine fish catch by sustainable exploitation of deep sea fishery resources, reduction of by- catch, mariculture, resource replenishment programmes like setting up of artificial reefs, etc.*
6. *To suggest necessary steps for creation of post-harvest infrastructure for fishing harbours, fish landing centers, processing and marketing network, including inland fisheries.*
7. *To suggest measures for development of non-food fisheries for pearl culture, ornamental fisheries, etc. to supplement production and income from fisheries.*

⁸ <http://www.fishingchimes.com/acidwater.htm>

⁹ Quoted from Report of the Working Group on Fishery, Eleventh Five-Year Plan (2007).

8. *To suggest effective fisheries management measures for ban on fishing during monsoon, standardization of mesh sizes in different categories of fishing gear, conservation of aquatic biodiversity, etc. in accordance with the FAO Code of Conduct for Responsible Fisheries adopted, etc.*
9. *To review the on-going fisheries training, extension, HRD and welfare measures for fishers and suggest effective steps for strengthening HRD in fisheries and for improving socio-economic and livelihood issues, socio-economic development, etc.*
10. *To review current availability of extension and information support, institutional credit and suggest measures to augmenting the same.*
11. *Working Group may co-opt any other official/ non-official expert/ representative of any organizations member(s), if required.*
12. *The Working Group may also examine and address any other issue, which may be considered important, but not specifically spelt out in the ToRs and devise its own procedures for conducting its business including meetings.”*

As can be seen from the ToRs of the Working Group, fisheries management in India is mainly concerned with:

- increasing production both in capture and culture fisheries,
- R&D support to increase production in a sustainable manner,
- human resource development,
- improving the operational efficiency of various schemes, and
- capacity building in the fisheries sector.

The Working Group after reviewing each of these aspects prepares a report for the Planning Commission, which is then circulated to the Ministry of Agriculture. Based on the report of the Working Group, the Ministry of Agriculture prepares a Work Plan and budget for review of the Planning Commission. The Planning Commission, balancing between the priorities of various sectors, decides on the budget allocation for various planned aspects of fisheries management. This process is summarized in the Figure 8.

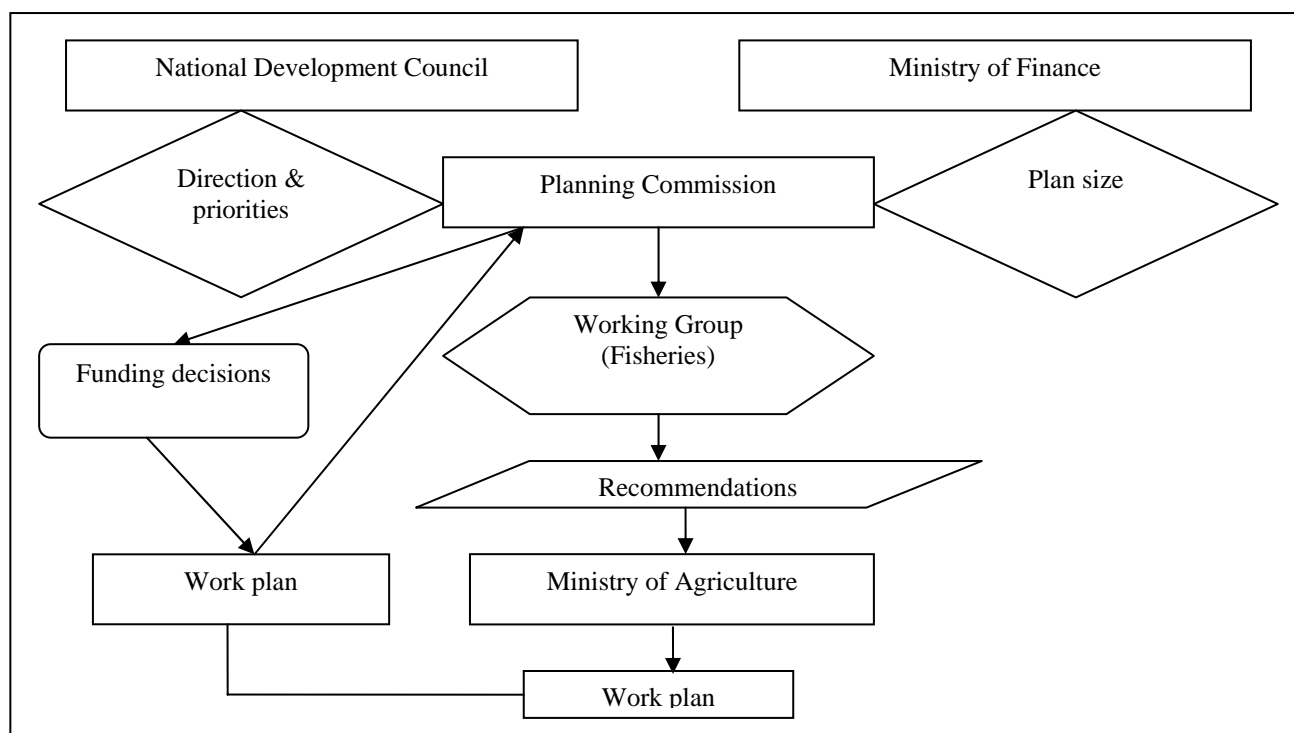


Figure 8: Procedure for allocation of funds to fisheries sector

2.2 Determinant factors in level of expenditure dedicated to fisheries

Expenditure on various aspect of fisheries management comprises two decision situations: (1) allocation of funds to various components of management (e.g. research, capacity building and human resource development, etc) and (2) allocation of funds to the states/UTs.

In each Plan period, based on the report of the Working Group, the Ministry of Agriculture at the Centre and the DoF in the states/UTs sets their own targets and identify the thrust areas to achieve the targets (Table 13). Until the 1960s, the focus of fisheries development was mainly on increasing inland fish production and improving the socio-economic conditions of the fishers. Hence, major share of funds were allocated to meet these objectives. Simultaneously, welfare schemes were also introduced.

Table 13: Developmental thrust during the Five-Year Plan Periods (1951-2007)

Five-year plans	Plan-wise developmental thrust
I	Inland fisheries and collection of spawn and fry from natural sources. Some States passed legislation for bringing neglected water bodies under fish culture.
II	Programmes initiated in the First Plan continued with added thrust on development of marine fisheries.
III	Thrust on increased fish production, mechanization of fishing vessels and programmes on improvement in the socio-economic condition of fishermen. Schemes on development of infrastructure for landing and berthing facilities for fishing vessels were introduced.
IV	Development of export potential, including setting up of an autonomous authority for export promotion. Allocation of separate outlay for fisheries research. Setting up of Special Trawler Development Fund. Setting up of Fish Farmers' Development Agencies to promote inland aquaculture.
V	Development of brackishwater fisheries, survey of marine fisheries resources, development of infrastructure facilities for coastal fishing villages, etc.
VI	Assistance for acquisition of trawlers for deep sea fishing. Development of inland fisheries statistics. Establishment of prawn hatcheries and prawn farming.
VII	Motorization of traditional fishing craft. National Welfare Fund for development of fishermen villages. Conservation of marine resources through closed season. Initiation of new Deep-sea Fishing Policy.
VIII	Strengthening of inland fish marketing, resource enhancement through artificial reefs. Fisheries training and extension. Setting up of large number of minor fishing harbours and fish landing centres. Setting up of Aquaculture Authority for regulation of shrimp farming.
IX	Acquisition of survey vessels for strengthening Fishery Survey of India. Modernization of fishing harbours and fish landing centres.
X	Strengthening of database through the National Marine Census. Manpower building. Establishment of Coastal Aquaculture Authority and the National Fisheries Development Board
XI	Under finalization

Beginning in the 1970s, the focus of fisheries development shifted to export promotion. To boost production, more funds were allocated for mechanization of fishing fleet, development of aquaculture and enhancement of infrastructure and food processing industries (primarily, these are concerned with the marine sector and aquaculture). During this period, the Government promoted the MPEDA to penetrate new export markets through product diversification. As a part of this effort, the Government through the MPEDA and the DoF also introduced new schemes on coastal aquaculture development. Table 14 shows the changes in the level of expenditure in various sub-sectors of the fisheries sector.

Table 14: Share (percent) of various sub-sectors in total plan outlay to fisheries sector

Plan	Inland	Marine	Aquaculture	Other (welfare scheme and man power training)
V	1.06	79.70	7.35	11.89
VI	4.96	78.78	10.36	5.9
VII	6.51	54.54	26.24	12.71
VIII	6.22	61.50	17.02	15.26
IX	6.69	55.71	23.60	14.00
X	Included in aquaculture	57.43	18.24	24.33

2.3 Role played by outside fisheries management agencies in the budget allocation process

“Outside agencies” implies the role played by various international organizations and lobbies, NGOs and trade associations of fishers. In India, primarily three types of outside managerial interventions have taken place in budget allocation for fisheries development: (1) incorporating environmental concerns (international organizations and NGOs), (2) subsidies and other facility to the sector (trade associations), and (3) livelihoods development of fishers (NGOs).

During the constitution of the working groups, all these groups are adequately reflected. In addition, as per the terms of reference (TORs) of the Working Group, the Group can co-opt other members if it deems necessary. In its actual working process, the Working Group co-opts members from trade associations and environment lobbies to develop acceptable strategies for sustainable development. For example, the 27-member strong Working Group for the Eleventh Five-Year Plan comprises 8 members from the industry and supporting institutions, 2 members from fisher organizations and 3 members representing international organizations.

2.4 Evaluation of expenditure and process for budget adjustments

The accounting year in India runs from 01 April to 31 March of each year. At the beginning of the year, based on the work plan, the Ministry of Agriculture forwards a budget estimate (BE) on possible expenditures to carry out activities for that year to the Ministry of Finance. By 31 October of the same year, the Ministry makes the revised estimate (RE) to record the actual expenditure on the activities.

Secondly, if funds remain unspent in a particular year, they go back to the exchequer and such unspent funds have a bearing on the allotments for the corresponding year. In actual field settings, the BE and RE are done for each scheme run by the Ministry of Agriculture and depending on utilization, the allocations change. Table 15 shows such adjustments carried out during the Tenth Five-Year Plan.

Table 15: Changes in actual allocation in schemes over the Plan Period

Sl no.	Schemes	Outlay	Actual allocation	BE	EXP	BE	EXP	BE	EXP	BE
				2002-03	2002-03	2003-04	2003-04	2004-05	2004-05	2005-06
1	Central Institute of Fisheries Nautical & Engineering Training (CIFNET)	388.5	388.5	20.6	22.7	6.1	12.7	20.6	27.5	85.9
2	Central Institute of Coastal Engineering for Fishery (CICEF)	5.5	5.5	3	3	1	2.5	1		0.5
3	Integrated Fisheries Project (IFP)	56.0	56	19.1	5.5	7.1	5	8.3	6	11.4
4	Fishery Survey of India (FSI)	1 300	1 300	407.3	294	415.8	277.5	420.1	396.7	454.8
5	Fisheries & training extension	150	150	10	16.9	10	9.2	15	12.7	15
6	Strengthening of	450	245	10	5	20	13.8	150	49.9	51

Sl no.	Schemes	Outlay	Actual allocation	BE	EXP	BE	EXP	BE	EXP	BE
				2002-03	2002-03	2003-04	2003-04	2004-05	2004-05	2005-06
	database and information networking for the fisheries sector									
7	Development of marine fisheries, infrastructure and post harvest operations	2 500	2 500	150	99.7	125	79.5	460	558.4	575
8	Development of inland fisheries and aquaculture	1 350	1 350	190	111.2	160	100.5	275	211.2	250
9	National Scheme of Welfare of Fishermen	1 200	1 200	190	169.7	200	188.2	250	242.7	250
	Total	7 400	7195	1 000	727.7	945	688.9	1 600	1 505.1	1 693.6

3. EXPENDITURES ON FISHERIES

3.1 Categorization of expenditure

Categorization of expenditure for fisheries management in India's context can be: i) Central Sector Schemes: the schemes under these categories are fully financed and implemented (in some cases) by the Central government, ii) Centrally Sponsored Schemes: the financing for these schemes is shared both by the Central and the state governments, and iii) State Schemes: financed and implemented by the states.

The allocation of funds and expenditure on various schemes shows different thrust areas under each Five-Year Plan. For the purpose of this study, the allocation and expenditure in fisheries sector has been categorized under five major headings: (i) Scientific research, (ii) Policy development and operational management, (iii) Enforcement, (iv) Corporate and administrative support, and (v) Development and capacity building. However, the demarcation under the different headings cannot be clearly drawn, as many schemes comprise multiple characteristics overlapping other category(ies).

3.1.1 Scientific research¹⁰

The current components of fisheries research can be broadly grouped under the following organizations: (a) Indian Council of Agriculture Research (ICAR) system; (b) Ministry of Agriculture; (c) Ministry of Commerce and Industries; (d) Ministry of Food Processing Industries; (e) Ministry of Earth Sciences and (f) Other Bodies such as the Council of Scientific and Industrial Research and the State Agricultural Universities. However, the ICAR is the main organization for conducting fisheries research in the country and the following institutes form part of the ICAR system:

- Central Marine Fisheries Research Institute (CMFRI), Kochi, Kerala.
- Central Inland Fisheries Research Institute (CIFRI), Barrackpore, West Bengal.
- Central Institute of Fisheries Technology (CIFT), Kochi, Kerala.
- Central Institute of Fisheries Education (CIFE), Mumbai, Maharashtra.
- Central Institute of Brackish water Aquaculture (CIBA), Chennai, Tamil Nadu.
- Central Institute of Freshwater Aquaculture (CIFA), Bhubaneswar, Orissa.
- National Bureau of Fish Genetic Resources (NBFGR), Lucknow, Uttar Pradesh.
- National Research Centre on Cold Water Fisheries (NRCCWF), Bhimtal, Uttar Pradesh.

¹⁰ Fisheries and Aquaculture Research Capabilities and Needs in India – World Bank Technical paper 147 (Fisheries Series)

Tables 16 and 17 and Figure 9 show the expenditure on various schemes related to scientific research in fisheries during the different Plan Periods. Apparently, expenditure has always fallen short of outlays in the last Five-Year Plans, with the exception of the Eighth Plan – where expenditure was exceptionally higher than the outlay. During this Plan, new schemes in scientific research were introduced for which allocation of funds was not made at the time of preparing the Plan documents.

Table 16: Overview of outlay for fisheries research (INR million)

Plans	Outlays for DARE ¹¹	Outlay for fisheries	Outlay for fisheries as percent of DARE's outlays (%)
IV	850	22.5	2.65
V	1 535.6	96	6.25
VI	3 400	157.5	4.63
VII	4 480	182.5	4.07
VIII	13 000	650	5.00
IX	21 000	1250	5.95

Table 17: Institute-wise outlay and expenditure on fisheries (INR Million)

Institutes	Plans			
	IX		X	
	Outlays	Expenditure	Outlays	Expenditure
CIFE	292.5	234.5	492.5	460.2
CIFRI	124.2	130.6	225	151.5
CMFRI	170.8	178.7	300	206
CIFT	199.9	121.9	280	215
CIFA	109.5	128.6	210	187
CIBA	131	94.7	200	114
NBFGR	119.5	124.5	210	148
NRCCWF	64.5	59.2	117.7	89.7
Total	1 211.9	1 072.7	2 035.2	1 571.4

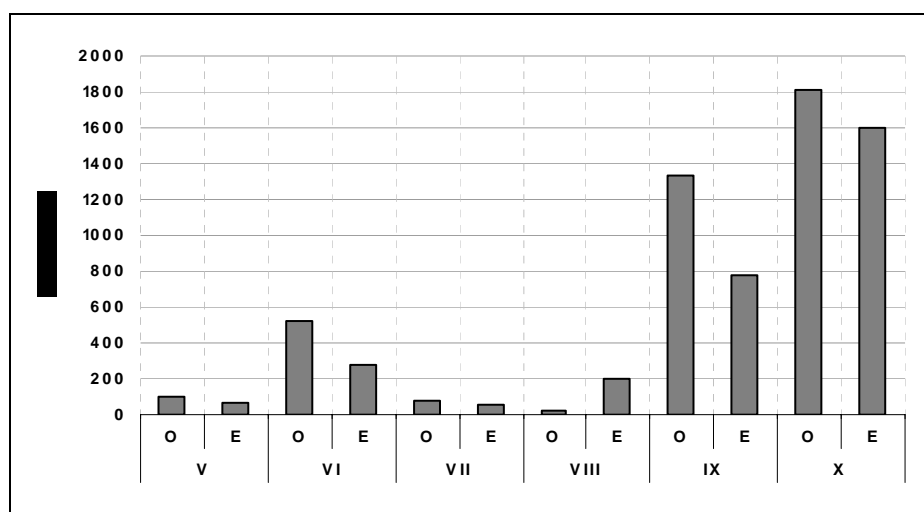


Figure 9: Outlays and expenditure on scientific research during Fifth to Tenth Five-Year Plans

¹¹ Department of Agriculture Research and Education, Ministry of Agriculture.

3.1.2 Policy development and operational management

The use of policy reforms in India has been restricted to rent from the post-harvest sector, i.e. levies on export of marine products; landing and berthing fees collected from mechanized fishing vessels in some of the fishing harbours and fish landing centres (FLCs), and rent through licensing of deep-sea fishing vessels through joint venture, charter and leasing arrangements.

While the levy on export continues, the rent through licensing ceased after the government in 1997 rescinded the 1991 policy on deep-sea fishing. As regards the landing and berthing fee, there is no uniform pattern, and the rent collected from most of the fishing harbours and FLCs is meagre and not commensurate with the expenditure on the maintenance of the facility.

It is seen that policy instruments can be useful management tools to restrain/ optimise fishing effort as well as to provide a source of revenue to the government, which can be ploughed back to the fisheries sector to supplement the meagre share it often receives from Plan allocations. To sustain marine fisheries, the Government of India would have to introduce a set of fiscal reforms in the fisheries sector, which *inter alia* should include a system of limiting access and appropriate fee for the access.

With the exception of the Tenth Five-Year Plan where outlays and expenditure were actually in balance, expenditures mostly fell short of outlays in the other Plans (Figure 10).

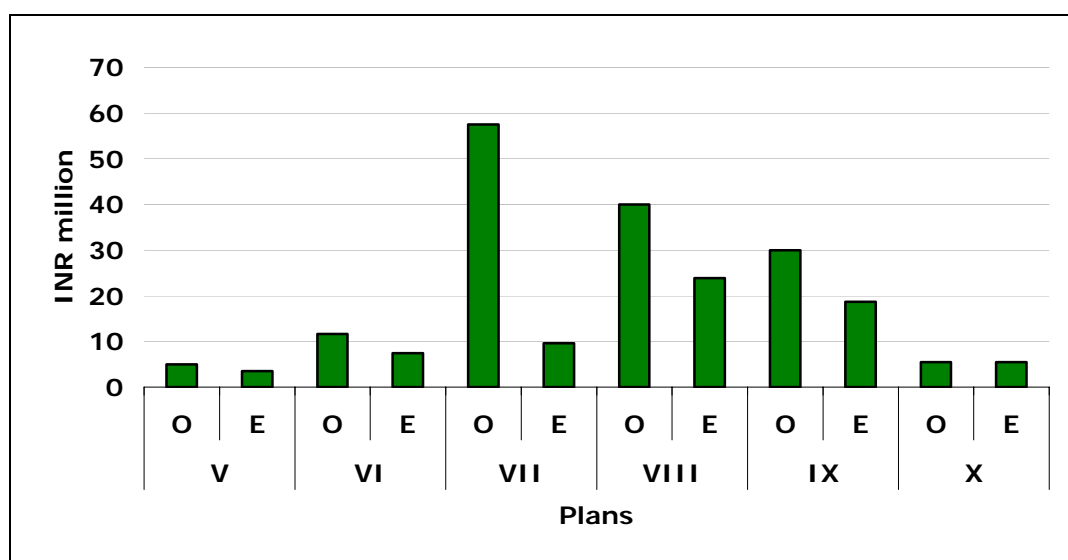


Figure 10: Outlays and expenditure on policy development and operational management during the Fifth to Tenth Five-Year Plans

3.1.3 Enforcement (monitoring, control and surveillance)

The open access nature of marine fisheries also takes us to the issue of monitoring, control and surveillance (MCS). Implementation of MCS in small-scale fisheries or in coastal areas presents a range of unique problems which relate to large numbers of widely dispersed fishers operating within a fishery, mixed gear/species and landing points. The main objective of implementing MCS in the country is to secure responsible and sustainable management of fisheries resources while allowing an ecologically safe and economically profitable exploitation of the resources, not only for today's population but also for posterity. However, the main obstacle in the successful implementation of MCS is lack of coordination among stakeholders.

As can be seen from Table 18, allocation of funds on this aspect of fisheries management was not favoured in the government funding. In the last five Plans, budgetary provisions were made for enforcement related schemes only during the Eighth and Ninth Plans.

Some of the main controls and instruments that could be used in implementing MCS in marine fisheries in India are as follows:

1. Review of existing marine fisheries management programmes and analysis of the fisheries in the coastal waters and the EEZ (this will inter alia include the registration of fishing vessels, number and category of fishing craft and gear, fishing harbours/ fishing landing sites, boat building yards, etc.).
2. Review of the existing fishing vessel licensing and registration procedures and practices, fisheries legislation and of other concerned Ministries/ Departments (e.g. MMD), which have a bearing on the sustainability of the fisheries resources.
3. Assessment of the MCS capacity and identification of institutional development requirements within the Ministry of Agriculture and the Department of Fisheries of the coastal states/UTs and, if necessary, other concerned sister Departments (e.g. MMD).

It is expected that implementation of the MCS system will not only enhance fisheries conservation and management but will also lead to establishment of multiple channels of communication and improved safety for fishing vessels and crew.

Table 18: Outlays and expenditure on enforcement

Category	Plans			
	VIII		IX	
	Outlays	Expenditure	Outlays	Expenditure
Enforcement	350	245.2	20	15.3

3.1.4 Corporate and administrative support (marine fisheries laws and regulations)

Under the enabling provisions of the Indian Fisheries Act, 1897, various states and UTs have introduced their fishery regulations for regulating inland fisheries. For regulation of fisheries in the territorial waters, all the coastal States and the UT of Lakshadweep have enacted their Marine Fishing Regulation Act (MFRA). These Acts are based on a model bill provided by the Union Government in 1979.

The expenditure on corporate and administrative related schemes has shown satisfactory utilization as compared to aspects of fisheries management discussed above (Figure 11).

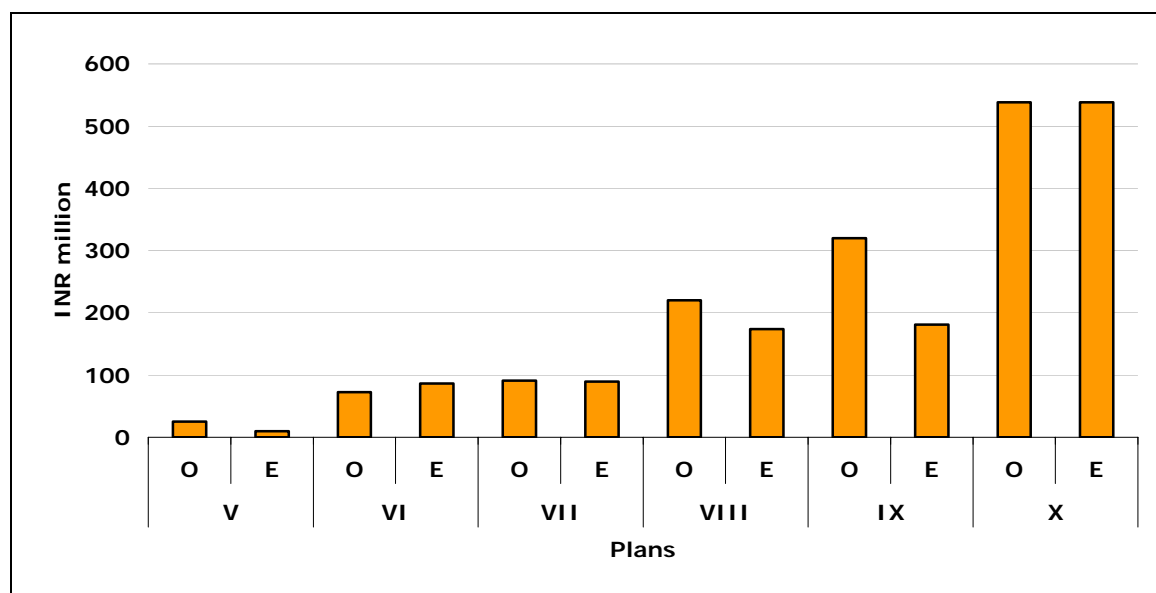


Figure 11: Outlays and expenditure on corporate and administrative support during the Fifth to Tenth Five-Year Plans

3.1.5 Development and capacity building¹²

The importance of access to essential infrastructure facilities such as fishing harbours, FLCs, ice plants and cold storages, boat building yards, net making plants, transportation and communications networks, seed production units, has been recognized as important for stimulating the growth of fisheries sector during the various Plan periods. In 1964, a Centrally Sponsored Scheme was introduced to provide infrastructure facilities for landing and berthing of mechanized fishing vessels, traditional fishing crafts and deep sea fishing vessels. The initial approach was to provide limited landing and berthing facilities such as a jetty, deepening of the entrance channel, provision of a breakwater, market hall, guide lights, etc.

Since the inception of the Centrally Sponsored scheme, six major fishing harbours, 53 minor fishing harbours and 188 FLCs have been identified for implementation. Out of which, 6 major fishing harbours, 41 minor fishing harbours and 162 FLCs have been completed and put to use. The remaining 18 minor fishing harbours and 28 FLCs are at various stages of construction¹³. During the Fifth Plan (1974-1979), the construction of major fishing harbours at Mumbai, Cochin, Chennai, Visakhapatnam and Roychowk was sanctioned. The development of fishing harbours and landing centres has subsequently continued in all the Five-Year Plans, albeit with certain modifications in the implementation of the scheme during the Ninth Five-Year Plan.

Some of the other schemes introduced for development and capacity-building included Techno-Socio-Economic Survey of Fishers, National Welfare Fund of Fishermen, Group Accident Insurance Scheme, Motorization of Traditional Crafts, Introduction of Improved Landing Crafts, Marine Fishing Regulation, Fish Farmer's Development Agency, Incentives for Small Mechanized Fishing Sector, Development of Model Fishermen Villages and Saving-cum-Relief Scheme. Implementation of these schemes has had much impact on the living conditions of fishers. The objective of Development of Fishermen Villages is to provide civic amenities like housing, potable water, recreation facilities, etc. The objective of Saving-cum-Relief for fishermen is to provide financial assistance to the fishermen during the period of ban on fishing (mostly for two months during the period April – August, which also coincides with the south-west monsoon in India). The scheme on the Fisheries Training and Extension was introduced in the Eighth Plan to provide training to fishery personnel so as to assist them in undertaking fisheries extension programme effectively.

The programmes for the welfare of fisher communities were initiated from the Sixth Five-Year Plan. Prior to that, government efforts were concentrated on expansion of production and exploitation of fish resources.

The phenomenal increase in fish production in the first three decades after independence could be attributed to the increase in the number of active fishers, introduction of mechanized vessels, motorization of traditional boats, use of synthetic gear material and extension of harbour facilities and expansion of export trade. From the 1980s onwards, the emphasis was on increases in the efficiency of craft and gear, motorization of traditional boats, exploitation of deep-sea fisheries through introduction of new mechanized boats and the use of foreign experience by allowing foreign vessels to fish in the Indian EEZ. Thus, mechanizations and motorization has been an important part of the planning process in India.

Figure 11 shows the expenditure on the schemes related to development and capacity building. Throughout the Plan periods (Tables 19 and 20), this aspect of fisheries management has received the highest amount of funds from the government sources with a share ranging from 64 to 85 percent in the total Plan expenditure.

Table 19: Outlays and expenditure for fisheries development over Plans

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
I	10.0	03.8			41.3	24.0	51.3	27.8
II	37.3	18.0			85.3	72.6	122.6	90.6
III	67.2	30.3			215.5	202.9	282.7	233.2
IV	280.0	81.1	60.0	51.7	486.8	408.3	826.8	541.1
V	510.5	399.3	170.0	40.7	831.9	711.1	1512.4	1 151.1

¹² This mainly includes funds and expenditure on infrastructure, motorization/mechanization, aquaculture development, fisher welfare, etc.

¹³ Handbook on Fisheries Statistics, 2006, (pg 95).

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
VI	1 371.0	755.4	366.2	288.0	1 974.2	1 826.1	3 711.4	2 869.5
VII	1 565.8	1 169.3	607.5	532.6	3 291.9	3 074.0	5 465.2	4 775.9
VIII	1 390.0	1 610.1	3 000.0	2 680.2	7 663.9	6 894.3	12 053.9	11 184.6
IX	2 400.0	1 243.7	5 600.0	2 731.8	12 697.8	10 162.6	20 697.8	14 138.1
X	1 750.0	1 831.5	5 650.0	4 851.5	13 205.4		20 605.4	

Source: Working Group on Fisheries – Eleventh Five-Year Plan

Table 20 Budget utilization of fisheries sector over various Five-Year Plans

Plan	Utilization (in %)			
	Central Sector	Centrally sponsored	State schemes	Total
I	38.00		58.11	54.19
II	48.26		85.11	73.90
III	45.09		94.15	82.49
IV	28.96	86.17	83.87	65.45
V	78.22	23.94	85.48	76.11
VI	55.10	78.65	92.50	77.32
VII	74.68	87.67	93.38	87.39
VIII	115.83	89.34	89.96	92.79
IX	51.82	48.78	80.03	68.31
X	104.66*	85.87		

Source: Working Group on Fisheries – Eleventh Five-Year Plan

*Anticipated Figures

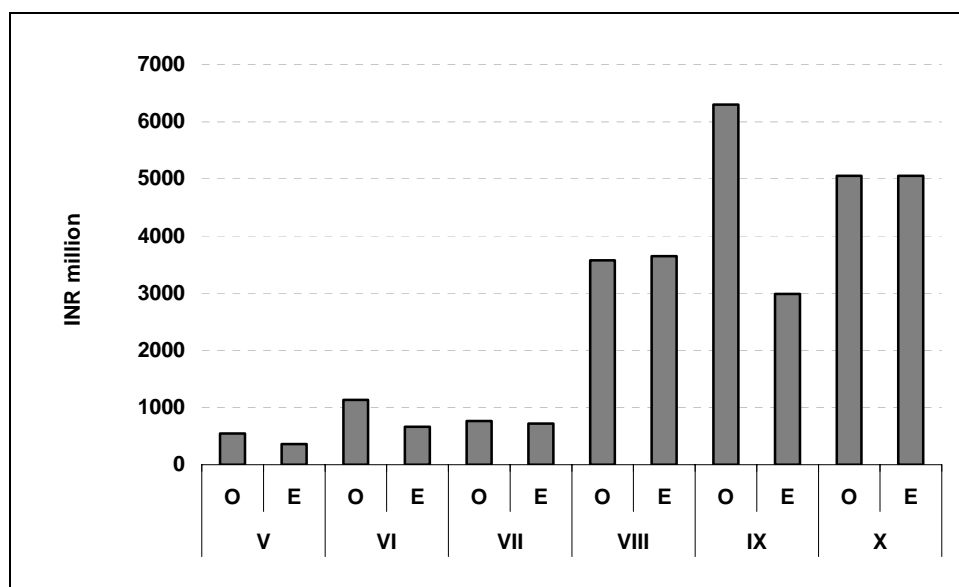


Figure 12: Outlay and expenditure on development and capacity building during the Fifth to the Tenth Five-Year Plan

3.2 Approaches followed to track expenditure

As far as planned expenditure for fisheries schemes is concerned, the Government follows the approach of utilization certificate and expenditure indicators. Broadly, the following are used as the basis for expenditure tracking for planned expenditure on fisheries: (i) financial indicators, (ii) physical indicators and (iii)

utilization certificate. For each scheme, which has been financed through government sources, the implementing agency has to submit a utilization certificate at regular intervals.

Various parameters under each indicator determine the basis for expenditure tracking. For example, the scheme on Fish Farmer Development Agency includes indices like area covered, number of farmers trained, etc. The Auditing of Plan scheme also serves as an instrument for tracking the expenditure. There are two types of audits generally followed for such schemes: (a) financial audit and (b) performance audit. The financial audit also includes a local audit. The Comptroller and Auditor General of India is the prime agency for auditing of all government expenditure.

4. AN ANALYSIS OF FINANCIAL INFORMATION AND INDICATORS

It can be observed almost uniformly that there has been an increased percentage of allocation of outlay for the state schemes (Table 21). It registered a downward trend from 80.51 in the First Five-Year Plan to 53.19 percent in the Sixth Five-Year Plan. Thereafter, it recovered gradually to reach 64.09 percent in the Tenth Five-Year Plan. On average, its share in the total fisheries outlay has been approximately 64.26 percent.

Table 21: Outlays and expenditure for fisheries development over Plans

Plan	Central Sector		Centrally sponsored		State schemes		Total	
	O	E	O	E	O	E	O	E
I	10.0	03.8			41.3	24.0	51.3	27.8
II	37.3	18.0			85.3	72.6	122.6	90.6
III	67.2	30.3			215.5	202.9	282.7	233.2
IV	280.0	81.1	60.0	51.7	486.8	408.3	826.8	541.1
V	510.5	399.3	170.0	40.7	831.9	711.1	1512.4	1 151.1
VI	1 371.0	755.4	366.2	288.0	1 974.2	1 826.1	3711.4	2 869.5
VII	1 565.8	1 169.3	607.5	532.6	3 291.9	3 074.0	5 465.2	4 775.9
VIII	1 390.0	1 610.1	3 000.0	2 680.2	7 663.9	6 894.3	12 053.9	11 184.6
IX	2 400.0	1 243.7	5 600.0	2 731.8	12 697.8	10 162.6	20 697.8	14 138.1
X	1 750.0	1 831.5	5 650.0	4 851.5	13 205.4		20 605.4	

Source: Working Group on Fisheries – Eleventh Five-Year Plan

A close examination of the utilization of the fisheries outlay over the Plan period (Table 22) shows that it fell far short of the allocation. The magnitude of utilization varied between 54.19 percent in the First Plan to 68.34 percent in the Ninth Five-Year Plan. However, from the pattern of outlay and expenditure, it can be seen that there is a process of adjustment over the Plans as rate of utilization improved at a faster rate than increments in outlay (except Fourth and Ninth Plan).

Table 22: Budget utilization of fisheries sector over various Five-Year Plans

Plan	Utilization (%)			
	Central Sector	Centrally sponsored	State schemes	Total
I	38.00		58.11	54.19
II	48.26		85.11	73.90
III	45.09		94.15	82.49
IV	28.96	86.17	83.87	65.45
V	78.22	23.94	85.48	76.11
VI	55.10	78.65	92.50	77.32
VII	74.68	87.67	93.38	87.39
VIII	115.83	89.34	89.96	92.79
IX	51.82	48.78	80.03	68.31
X	104.66*	85.87		

Source: Working Group on Fisheries – Eleventh Five-Year Plan

*Anticipated Figures

The funds for the Central Sector Schemes, as a general trend, were less utilized than the Centrally Sponsored and the state schemes. The outlays of the Central Sector Schemes on an average constituted 24 percent of

total fisheries outlays. Actual utilization of outlays of Central Sector Schemes always fell short of total allocation except in the Eighth Plan when expenditure (INR1 610.10 million) was more than allocation (INR1 390 million). Over the Plan Periods, the growth rate of outlay of Central Sector Schemes was 107.70 percent. The Fourth Five-Year Plan witnessed the lowest utilization (28.96 percent). However, if the average utilization rates of outlays of Central Sector Schemes to Centrally Sponsored schemes are compared, it turns out to be almost same, i.e. 67.48 percent and 69.00 percent respectively¹⁴.

The Centrally Sponsored Scheme came into picture with the Fourth Five-Year Plan. When it was first introduced, about 86.17 percent of the outlay was utilized. Its utilization followed a fluctuating trend in the subsequent Plans, except in the Fifth and Ninth Plans, where the utilization was much less than the other four Plans. In the remaining four Plans, utilization hovered between 78.65 percent in the Sixth Plan and 89.34 percent in the Eighth Plan. On an average, the ratio of the outlays of Centrally Sponsored Schemes to total fisheries outlays was about 13 percent.

5. PRODUCTION

Fish production in the country has been showing an increasing trend. The progress in the inland fisheries sector during the 1990s has been commendable (6.55 percent per annum), whereas the growth in marine fish production during the same period has been slow (2.19 percent per annum) (Tables 23 and 24).

Table 23: Fish Production (compound growth rate, percent)

4Year/ Period	Marine	Inland	Total
1950s	5.12	2.53	4.43
1960s	2.13	9.12	4.23
1970s	3.65	2.85	3.35
1980s	3.99	5.64	4.62
1990s	2.19	6.55	4.12
2000–7	3.26	9.56	6.66
1950s–007	3.70	5.72	4.54

Fisheries in the inland open waters systems have been an important source of livelihood security and nutritious protein for the growing population in the country. The inland fisheries sector has registered an impressive growth rate in the 1990s on account of production from aquaculture and surpassed the marine production for the first time in 2000–2001. Of the total inland fish production, about 75–80 percent comes from aquaculture. In inland fisheries, West Bengal leads the production table, followed by Andhra Pradesh, Uttar Pradesh and Bihar. Indian major carps contribute the bulk of production from the inland fisheries.

The multipurpose nature patter of use in inland waters has relegated capture fisheries to low priority in most of the riparian states and their importance relative to other production systems has not been given due recognition. Consequently, most of the inland open water resources have witnessed habitat degradation with

¹⁴ Comparison is done from the Fourth Five-Year Plan onwards as Centrally Sponsored Schemes were introduced during the Fourth Plan.

Table 24: Fish Production over Plan periods in India (1951-2004)

Plan Period	Fish Production at end of the period (‘000 tonnes)			Growth (percent) over the plan period			Average annual growth
	Marine	Inland	Total	Marine	Inland	Total	
Pre-Plan Period (1951–56)	534	218	752	—	—	—	—
1st Plan (1951–56)	596	243	839	11.61	11.47	11.57	2.31
2nd Plan (1956–61)	880	280	1 160	47.65	15.23	38.26	7.65
3rd Plan (1961–66)	824	507	1 331	-6.36	81.07	14.74	2.95
Annual Plans (1966–69)	904	622	1 526	9.71	22.68	14.65	4.88
4th Plan (1969–74)	1 210	748	1 958	33.85	20.26	28.31	5.66
5th Plan (1974–79)	1 490	816	2 306	23.14	9.09	17.77	3.55
Annual Plan (1979–80)	1 492	848	2 340	0.13	3.92	1.47	1.47
6th Plan (1980–85)	1 698	1 103	2 801	13.81	30.07	19.70	3.94
7th Plan (1985–90)	2 275	1 402	3 677	33.98	27.11	31.27	6.25
Annual Plan (1990–91)	2 300	1 536	3 836	1.10	9.56	4.32	4.32
Annual Plan (1991–92)	2 447	1 710	4 157	6.39	11.33	8.37	8.37
8th Plan (1992–97)	2 967	2 381	5 348	30.42	69.83	45.44	6.49
9th Plan (1997–02)	2 830	3 126	5 956	-4.62	31.29	11.37	2.27
10th Plan (2002–03)	2 990	3 210	6 200	5.65	2.69	4.10	4.10
10th Plan (2003–04)	2 941	3 458	6 399	-1.64	7.73	3.21	3.21

Sources: i. Central Marine Fisheries Research Institute, Kochi for the period up to 1970-71. ii State Governments Union Territory Administrations since 1970-71.

accompanying low fish yields. This is best illustrated by the riverine fishery where the production is below subsistence level with an average yield of 0.3 tonne per km, which is only about 15 percent of their actual potential. This has also contributed to reduced employment opportunities in the rural areas along the riparian tracts in the country.

While inshore waters have been almost exploited to the sustainable levels, the contribution from deep sea and marine fisheries has been insignificant. Gujarat has emerged as the leading producer of marine fish during 2005-2006, followed by Kerala, Maharashtra and Tamil Nadu. Penaeid shrimps, which dominate the export front, are at their optimum exploitation levels, whereas tuna and cephalopods are the two least exploited fisheries owing to limited operational range of the majority of the present fishing fleets and also the lack of suitable technology. Several other species in the continental shelf are exploited only up to 70–80 m depths.

5.1 Exports

Fisheries exports from India have become an important component of agricultural exports, to the extent of 18 percent. Over fifty products are exported to as many destinations all over the world, and India has also been making a mark in ornamental fish exports in recent years.

Between the Eighth and the Ninth Five-Year Plans, the quantity of fish exports increased by 62 percent in quantity and over 117 percent in value (Table 25). It improved the share of exports in total output and enhanced the integration of the sector with the global market. A trend towards export of high value fish and retention of other fish for domestic market is seen in the recent years. Continuous monitoring of overseas markets and compliance of changing standards to remain competitive needs no emphasis. The projected target for exports from the fisheries sector by the end of Eleventh Five-Year Plan is 1.06 million tonnes in quantity and INR1 500 billion in value.

A study conducted by the National Centre for Agriculture Planning, New Delhi, indicated that although fisheries export has performed well and is quite competitive in the global market, the relative competitive advantage has declined in recent years. However, expansion in the world trade is the major determinant of fisheries export from India.

Table 25: Growth in fisheries exports and integration with international markets

Five-Year Plan	Average annual exports		Average annual production		Percent exports of production	
	Quantity ('000 t)	Value (Rs billion)	Quantity ('000 t)	Value (Rs billion)	Quantity	Value
VIII	287	309.4	4 819	1 235.9	5.95	25.03
IX	379	553.6	5 595	2 455.8	6.78	22.54
X	463	671.6	6 301	3 232.7	7.35	20.78

The future of fisheries export would be influenced by the adoption of environment-friendly fishing practices, ecolabelling and consistent compliance with food safety measures (HACCP and SPS standards). Cost of implementation of these measures has shown scale bias that has worked against smaller operators. This requires government policies and support system to be designed to minimize the cost of compliance with international standards to make smaller operators viable and export-competitive. Steps also need to be taken to devise appropriate institutional mechanisms to bring scattered small- producers and processors under a network to enable them to participate in the emerging scenario to reap the benefits of expanding global fish trade.

5.2 Training, extension and transfer of technology

The training and extension services in the fisheries sector are mainly handled by the Fish Farmers' Development Agency (FFDA) and the Brackishwater Fish Farmers' Development Agency (BFDA). Due to changes in the funding pattern of the two schemes in the Ninth Five-Year Plan, some states disbanded the FFDA's/ BFDA's and or merged them with their district-level establishments.

In the states, the DoF has presence at the lowest revenue division to take care of the fisheries development, including training and extension. However, with the closure/ merger of the FFDA's/ BFDA's, the availability of extension services to the fish farmers has been adversely affected in these states.

The research institutes and the State Agriculture Universities have also been offering training and extension work as part of their routine curriculum. The Department of Rural Development promotes fisheries through its Integrated Rural Development Programme.

6. SOURCE OF FUNDING FOR INDIA'S FISHERIES

6.1 Government funding

The sources of Government funding for fisheries sector in India are mainly Central and the state funding. In the following paragraphs glimpses on trends of outlays for fisheries sector during the various Plan Period has been presented.

The Total Plan outlays from the First Plan (1951–56) to the Tenth Plan (2002–07) have grown at 111.85 percent on average. At the beginning of the First Five-Year Plan, the total outlay was INR19 600 million (1951–56), and it rose to INR19 688 150 million in the Tenth Five-Year Plan (2002–07).

After the introduction of the New Economic Policy (1991), the total Plan outlay grew at 105.70 percent on an average. However, the average growth of the Plan outlays before the Eight Five-Year Plan was about 115 percent. This might indicate the effects of liberalisation.

Allocation of funds to a particular sector is an indication of the push given for the development of the sector. The outlay for fisheries sector as percent of outlay for the agricultural sector over the Five-Year Plans has increased from 1.45 percent in the First Five-Year Plan to about 6.52 per cent in the Sixth Five-Year Plan (Table 26). In subsequent Plans, its share hovered around 4 to 5 per cent. It shows the importance given to the fisheries sub-sector within the agriculture sector. Its share in the total Plan outlay during different Plans periods has been hovering between 0.26 and 0.52 per cent¹⁵.

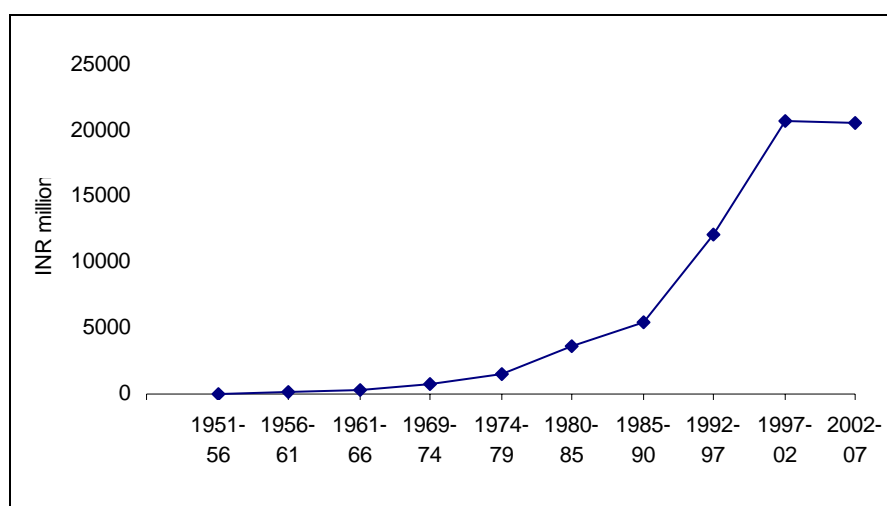
¹⁵ Analysis of Policies, Institutional Environment and Support Services in Fisheries – ICAR-ICLAR Project.

Table 26: Outlay for fisheries sector during Five-Year Plans (INR millions)

Plan	Period	Total outlay	Outlay for agricultural sector	Outlay for fisheries sector	Share of fisheries sector (%) of	
					Total outlay	Agricultural outlay
I	1951–56	19 600	2 940	51.3	0.26	1.74
II	1956–57	46 000	5 290	122.6	0.27	2.32
III	1961–66	75 000	10 680	282.7	0.38	2.65
IV	1969–74	159 020	27 280	826.8	0.52	3.03
V	1974–79	393 320	4 302	151.24	0.38	3.52
VI	1980–85	975 000	66 090	3 711.4	0.38	5.62
VII	1985–90	1 800 000	105 240	5 465.4	0.3	5.19
VIII	1992–97	4 341 000	224 670	12 328.2	0.28	5.49
IX	1997–2002	8 750 000	1 153 900	1 3632	0.16	1.18
X	2003–04	3 988 900	206 680	20 605.4	0.52	9.97

The Plan outlays for agriculture and allied sectors (Agricultural Research and Education, Crop Husbandry, Soil and Water Conservation, Animal Husbandry and Dairying, Fisheries, Forestry, Land Reforms, Management of Natural Disasters, Agricultural Marketing, Food, Storage and Warehousing, Investment in Agricultural Financial Institutions) have also witnessed (to some extent) trends similar to total outlays. The outlay for Agriculture and Allied Sector has, on average, increased by 83.71 percent over the Plans. The share of agriculture outlay to total outlay showed a healthy trend over the first four Plans. Since then (after the Fourth Five-Year Plan), it showed a downward trend until the Tenth Five-Year Plan. However, the linear growth rate of agriculture share to total outlays has shown a negative trend over the duration of the Plans.

In the Five-Year Plans, fisheries sector has always been a part of the agricultural sector, and its allocation was a fraction of the allotment set aside for agriculture. Since the beginning of the First Five-Year Plan, outlays for fisheries have consistently been rising (Figure 13). Average growth of fisheries outlays over the Plan period was 103.27 percent. The Fourth Plan saw the highest growth in fisheries outlays (192.46 percent), whilst in the Tenth Plan the growth was the lowest (-0.45 percent). The phenomenal growth of outlay in the Fourth Plan can be attributed to introduction of new mechanized boats.

**Figure 13: Outlay for fisheries sector over the Plan periods**

One important observation regarding fund allocations during the Plan period is the declining share of agriculture outlay to total outlay. However, during the same period, the share of fisheries outlay in agriculture outlay has shown an overall growing trend (Figure 14 and Table 27). Albeit there are Plan-to-Plan variations, but on an aggregate basis, the data indicates a growing focus on fisheries sector.

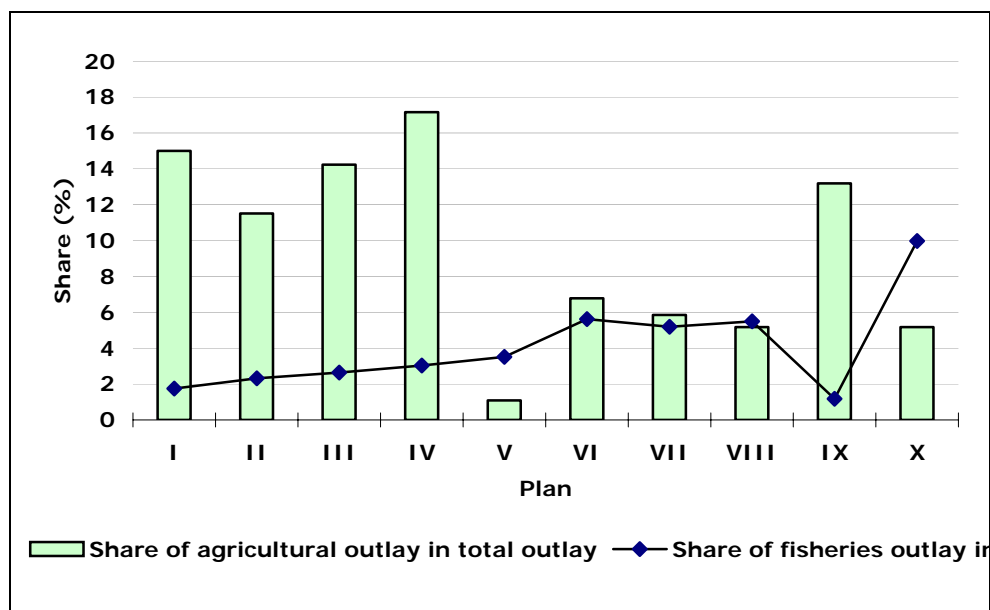


Figure 14: Outlay for fisheries percentage of total outlays and agriculture outlays over the Plan periods

Table 27: Categorized expenditure for fisheries development under various plans (INR Million)

Sl No	Categories	V		Vi		VII		VIII		IX		X	
		O ¹⁶	E ¹⁷	O	E	O	E	O	E	O	E	O	E
1	Scientific research	102.414	64.432	518.5	280.791	78.0	54.741	23.0	201.2	1330.0	780.7	1806	1601
2	Policy development and operational management	4.988	3.522	11.6	7.426	57.5	9.591	40.0	23.9	30.0	18.7	5.5	5.5
3	Enforcement	---	---	---	---	---	---	350.0	245.2	20.0	15.3	---	---
4	Corporate and administrative support	25.011	9.953	72.5	86.566	91.0	89.408	220.0	173.8	320.0	180.8	538.5	538.5
5	Development and capacity building ¹⁹	548.06	362.089	1134.6	668.56	764.5	721.04	3577.0	3646.2	6 300	2 986	5 050	5 050
6	Total	680.5	440	1737	1 043	991	874.8	4 210	4 290	8 000	3982	7 400	7 195

Funding from states to fisheries sector is mainly channelled to welfare funds for fishers. State-wise government outlays and expenditure is given in Table 28. As mentioned above there are two types of schemes which receive funds from state budget viz. Centrally Sponsored Schemes and State Schemes. In the

¹⁶ Outlay

¹⁷ Expenditure

¹⁸ '---' Indicates no allocation of funds.

¹⁹ This includes funds for infrastructure, motorization/ mechanization, aquaculture development, fisher welfare, etc.

Centrally sponsored schemes, states generally have to contribute about 50 percent of the outlay, and the remaining 50 percent is matched by the Central Government).

Table 28 Outlays and Expenditure of States for fisheries during Fifth to Ninth Five-Year Plan (million)

Sl. No.	State/ Union Territory	Fifth Plan		Sixth Plan		Seventh Plan		Eighth Plan		Ninth Plan	
		O	E	O	E	O	E	O	E	O	E
1	Andhra Pradesh	49.40	44.40	140.00	155.46	214.00	237.76	980.60	162.00	518.40	198.60
2	Arunachal Pradesh	3.51	3.69	7.80	12.07	25.00	24.79	56.50	73.50	188.10	95.40
3	Assam	30.90	28.30	60.00	57.03	100.00	171.74	228.50	278.90	997.60	553.40
4	Bihar	27.40	21.30	69.60	63.04	95.00	105.07	260.50	72.50	100.00	67.20
5	Goa	19.65	18.18	40.00	31.74	50.00	44.41	100.00	64.40	79.20	68.60
6	Gujarat	76.00	77.90	200.00	191.49	242.60	210.84	370.00	362.60	1 040.00	636.70
7	Haryana	4.90	5.10	19.50	37.82	75.00	67.93	150.60	127.70	173.80	235.40
8	Himachal Pradesh	3.30	3.20	18.00	15.10	43.00	32.97	80.00	105.80	145.00	137.00
9	Jammu & Kashmir	3.60	3.70	23.00	24.23	45.00	53.42	92.00	115.50	275.00	235.40
10	Karnataka	45.50	43.90	130.30	114.51	200.00	147.05	430.00	809.80	1 105.00	521.50
11	Kerala	116.00	115.00	200.00	207.92	400.00	329.44	1 050.00	1 133.70	1 760.80	1 498.40
12	Madhya Pradesh	33.50	22.80	70.00	59.22	104.80	90.96	170.80	202.80	479.20	299.50
13	Maharashtra	55.80	39.90	120.70	147.15	160.00	178.39	291.40	273.60	418.80	513.80
14	Manipur	10.00	12.60	25.00	27.02	46.50	50.49	80.00	95.60	200.00	92.20
15	Meghalaya	5.10	4.90	9.00	11.01	18.00	20.15	35.00	41.30	140.00	52.10
16	Mizoram	1.99	2.43	6.00	7.63	10.00	17.41	22.50	33.40	45.00	58.60
17	Nagaland	4.50	3.90	7.00	10.89	30.00	35.18	65.00	57.10	200.00	71.50
18	Orissa	27.00	30.70	100.00	94.46	126.00	267.05	1046.40	526.30	541.80	695.50
19	Punjab	11.20	8.00	17.50	21.03	59.80	53.68	178.20	104.80	195.20	104.90
20	Rajasthan	10.20	10.20	22.50	18.51	40.00	27.50	95.50	59.00	77.00	37.60
21	Sikkim	2.50	2.70	10.00	7.14	12.00	8.00	15.00	15.00	20.00	17.80
22	Tamil Nadu	134.20	75.50	240.00	104.24	240.00	146.79	315.00	781.70	998.40	1 117.80
23	Tripura	9.80	10.40	33.30	41.95	60.00	114.99	220.00	188.30	198.80	163.50
24	Uttar Pradesh	7.30	8.20	65.90	95.30	125.00	123.97	215.00	238.00	280.00	302.30
25	West Bengal	95.10	86.30	270.00	201.23	617.50	391.74	791.70	616.40	1 871.30	1 821.40
26	A & N Islands	10.28	4.98	20.00	12.64	40.50	15.10	112.10	138.73	248.40	182.90
27	Chandigarh	0.11	0.11	1.00	0.93	1.74	1.72	2.60	1.69	50.00	1.90
28	Dadra & Nagar Havelli	0.10	0.02	0.50	0.00	0.50	0.31	1.00	0.53	1.10	0.30
29	Daman & Diu						13.66	20.20	20.33	32.20	31.60
30	Delhi	3.50	3.18	6.00	5.73	8.00	4.93	6.00	7.31	12.50	9.20
31	Lakshadweep	12.24	7.90	17.50	15.47	52.00	32.72	93.80	81.73	155.20	109.40
32	Pondicherry	17.30	11.74	24.10	34.13	50.00	53.90	88.00	104.26	150.00	140.30
33	Chattisgarh										45.40
34	Uttaranchal										14.30
35	Jharkhand										31.20
Total		711.13	1 974.20	1 826.10	3 291.94	3 074.03	7 663.90	6 894.30	6 894.28	12 697.80	10 162.60

6.2 Non-government funding for fisheries management activities

Non-government funding for fisheries in India is mainly related to external funding and has been increasing with participation of India in various regional bodies and with increasing assistance from international and inter-governmental organizations such as the constituents of the United Nations (FAO, UNDP, IMO, etc.), World Bank, etc.

Under institutional finance, the National Bank for Agriculture and Rural Development (NABARD), as a refinance agency for commercial banks, co-operative banks and regional rural banks, has been the major facilitator of credit to the fisheries sector. In view of the focus on deep sea fishing through charter, leasing and joint venture starting from the early eighties, and the brackishwater aqua boom in the early 1990s, many financial institutions like the Industrial Finance Corporation of India (IFCI), Industrial Development Bank of India (IDBI), Shipping Credit and Investment Company of India (SCICI), State Finance Corporations (SFCs) and National Co-operative Development Corporation (NCDC) also entered the sector to lend credit.

Credit support from financial institutes is available for almost all the activities of fisheries and for creation of infrastructure. Nevertheless, the critical role of the middlemen, merchants and occasional moneylenders in the chain is still in vogue. The present liberal status of the banking sector does hold a considerable hope for further improvement in the availability of public finance to the fisheries sector.

6.3 Review of cost recovery mechanisms²⁰

Costs related to MCS and conflict management are said to have increased, although no specific data are available. The government generally believes that the financial resources directed at MCS are adequate. Participation by operators in the fisheries to cost sharing for fisheries management is minimal. License fees are levied in the mechanized sector, but fees are low, as are penalties applied for offences. These sources of revenue do not represent a significant contribution to the overall cost the Government incurs for the management of the resource.

Fishermen cooperative societies are exempted from income tax. Arguably, the most important reasons for this exemption are the following:

- Farmers are exempted from income tax, and fishing activities that are considered similar to farming operations are also exempted;
- the costs of collecting taxes in a highly disaggregated sector like the Indian fisheries sector may not justify the revenue that could potentially be collected.

Seafood exporters were exempted from income tax until recently. Exports (all agricultural commodities exported, including seafood) are charged a fee of 0.3 percent of the FOB value of seafood exports (a reduction from the initial rate of 0.5 percent). The collected tax is used for financing the MPEDA, and currently amounts to approximately US\$4 million per annum. Import tariffs on seafood were 60 percent until recently; but these were reduced to 30–35 percent in 2002–03. India imports very little fish, unlike other countries in the region.

At present, the respective coastal state/UT governments only license the mechanized fishing vessels. The system of licensing needs to be extended to motorized and non-motorized craft as well. Licensing will be helpful to maintain an inventory of all categories of fishing vessels. New vessel may be permitted only as a replacement of a vessel of equal size and capacity. The priority of licensing should be shifted from a means of mere revenue earning to a system of regulating the number and type of fishing vessels. Licensing will also enable better implementation of sea safety norms in the small-scale fishing vessels.

6.4 Issues associated with ability to pay mechanism

In theory, ability to pay mechanism is possible in the marine fisheries. However, politics (such as the politics of fisher unions) and imperfection of labour markets are the major obstacles. The majority of the fishermen are small-scale and poor, which further precludes the implementation of such a mechanism.

Further, the non-payment of rent is very common, and there is no mechanism in place to penalize the defaulter. As a result, very little rent accrues from the users of the landing and berthing facilities. Due to political compulsions, it is also becoming difficult for the management bodies to rationalize the fee to enable its re-use for regular maintenance and upkeep of infrastructure facilities such as fishing harbours and the FLCs.

7. FISHERIES MANAGEMENT SERVICE PROVIDERS

7.1 Types and level of services provided by non-government sources

Several international and inter-governmental organizations, including the World Bank, UNDP, DANIDA, NORAD, DFID/ ODA (UK and Japan) provide aid to India for the development of fisheries sector. Under the FAO Bay of Bengal Programme (BOBP), started in 1979, assistance was provided for the development of small-scale fisheries and enhancing the socio-economic conditions of the fishing communities.

The ODA (now DFID) has provided technical aid for the prevention of post-harvest losses in marine fisheries. Recently, FAO launched a scheme for providing technical assistance to implement Hazard

²⁰ <http://www.fao.org:80/docrep/009/a0477e/a0477e0k.htm>

Analysis and Critical Control Points (HACCP) in seafood processing industries. A Shrimp and Fish Culture Project was taken up with the assistance of the World Bank in May 1992 and continued until December 1999.

The role of private players is limited in fisheries management in India. The Tenth Five-Year Plan document emphasizes the importance of private/ public partnership in developing fisheries sector as:

“increasing public/ private investment is needed for strengthening infrastructure for diversifying fisheries and aquaculture activities and for enhancing fish production and productivity. Enhanced public investment is also required in research programmes, strengthening infrastructures for training, post-harvest, marketing, etc. Setting up of minor fishing harbours and creation of common facilities for maintenance and usage of dredgers by the Government should be given priority for improvement of infrastructure facilities in the marine fishery sector”.

India is party to a number of regional bodies, programmes and projects dealing with fisheries management and the protection of coastal habitats, communities and resources. India collects data in formalized data collection schemes, and provides regularly feed back to these regional bodies.

India also participates in programmes, inter-governmental and regional organizations that also deal with the management and conservation of fisheries resources, or the trade of fisheries products. These include:

- Bangladesh-India-Myanmar-Sri Lanka-Thailand Economic Cooperation (BIMSTEC)
- Bay of Bengal - Inter-Governmental Organisation (BOBP-IGO)
- Bay of Bengal Large Marine Ecosystem (BOBLME)²¹
- Commission for the Conservation of Antarctic Marine Living Resources (CCAMLR)
- Indian Ocean Rim Association for Regional Cooperation (IOR-ARC)
- Indian Ocean Tuna Commission
- INFOFISH, and
- The South Asian Association for Regional Cooperation (SAARC).

There is, however, no legal requirement within either state or national fisheries legislation for fisheries management issues that may be adopted by regional fisheries bodies (or other regional body) to be incorporated into national legislation.²²

7.2 Services by fisheries participants

Trade unions and the Self Help Groups (SHGs) mainly comprise the service provider organizations. The other important participants are boat builders, input (feed, seed, etc.) suppliers, traders and moneylenders. The trade unions in capture fisheries mainly comprise the mechanized/ motorized boat owners associations. Such trade unions play a crucial role in local settings in mitigations of conflicts among the artisanal fishers and mechanized boats. They are also quite conscious about de facto demarcation of fishing areas among various fishing centres. Such trade unions have generally evolved into cooperative forms and enter in distribution of fuel for boats, price negotiations, etc.

However, for artisanal fishers there are hardly any such strong trade unions or cooperatives. Formation of SHGs, especially women SHGs are a recent trend in Indian fisheries and are significantly related to the efforts of NGOs. The SHGs are mostly associated with value addition activities in fisheries. In aquaculture, input suppliers play an influential role in determining farming practices and trade. The fish farmer is usually bound to the input suppliers through credit and advances. As extension activities by the governmental agencies are inadequate, the input suppliers/ traders also act as technical advisers to the farmers.

In the Indian context, boat building is an unregulated activity, both in terms of public interventions as well as market mechanisms. In terms of governmental intervention, there are no rules and guidelines or standard specification for boat building yards. Registration is not compulsory and technical expertise is not

²¹ The BOBLME is still under negotiation and yet to start.

²² <http://www.fao.org:80/docrep/009/a0477e/a0477e0k.htm>

scrutinized. In terms of market mechanism, there is no strong association of boat builders that can act as an entry barrier. Virtually anybody with carpentry knowledge can enter the field. Especially in the east coast after the December 2004 tsunami, the number of boat building yards increased many times and produced poor quality fiber-reinforced plastic boats.

One significant determinant of fisheries management is the private moneylender, though his place does not find any place in the management policy. The private moneylender acts as a cushion for fishers and fish farmers during the peak and lean periods. Since institutional credit is still lacking in terms of timely supply and amount, the fishers mostly depend on these private moneylender to manage their financing. Generally speaking, private moneylenders usually act as input suppliers in aquaculture and wholesale buyers in capture fisheries. There are many fishermen's unions, who assist the government agencies to implement various laws and regulations and other activities, and the other small groups like the SHGs and co-operative societies have been growing recently in the fisheries sector.

8. CONCLUSION

The fisheries sector in India is set in a highly diversified social, cultural and geographical environment. The diversity is amply evident in the use of technology, too, making fisheries management a challenging task. Rapid modernization of the sector and emergence of distant-water fishing has led the government to intensify its involvement in fisheries management, which has also led to increasing transaction costs on activities such as conflict resolution, MCS and safety at sea, especially of small-scale fishers.

In terms of achieving management goals, India has been successful in modernising the fishing sector and, to a large extent, especially the aquaculture sector. Fish production has increased manifold, both in inland and marine capture fisheries, and new fishing grounds are now being harvested. Aquaculture has been the main contributor to the increased production in the last one decade. The country has also emerged as an important exporter in international fish trade. Since, increasing production and export earnings were the early goals of the fisheries policy makers, it can be inferred that such policies have been quite successful.

However, there is a big question mark on the sustainability of both capture and culture fisheries in India. Marine capture fisheries are riddled with the issues of open access and over fishing. The fishery managers have also failed to pull out the traditional and small-scale fishers out of the poverty trap, and the threat to livelihoods is gradually increasing in many fishing communities along the coastline. Management is largely top-down, although a participatory approach to management is now being more overtly discussed. The challenge, therefore, lies not only in optimal utilization of the resources but also in adopting co-management approaches which can increase the role of fishers and other stakeholders in the day-to-day management of the fisheries.

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The result is recommendations and guidance as well as coverage of the discussions regarding key components of successful fisheries management regimes, the means to fund and deliver fisheries management services, and the different ways to put these practices into effect.

This document also includes the extensive background documentation prepared for the Expert Consultation about the best practices in sustainable, effective and cost effective fisheries management as well as six case studies expanding on how different countries finance fisheries management.

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