



The status of fisheries in the Republic of Maldives

Item Type	book_section
Authors	Faiz, Mohamed
Publisher	Training Department, Southeast Asian Fisheries Development Center
Download date	08/06/2022 22:23:17
Link to Item	http://hdl.handle.net/1834/40503

THE STATUS OF FISHERIES IN THE REPUBLIC OF MALDIVES

by

Mohamed Faiz
Ministry of Fisheries & Agriculture, Male' Maldives

1. INTRODUCTION

The Republic of Maldives is an island nation in the middle of the Indian Ocean. The country comprises about 1200 small coral islands widely dispersed over an area of 90,000 km². These islands are grouped in to 26 natural atolls but for administrative purposes are divided into 19 atolls. Out of 1200 islands only 202 islands are inhabited and the rest of the islands remain essentially uninhabited, although 76 islands have recently been developed exclusively as tourists resorts. The national census in 1995 estimated the country's population to be around 244,600. (Ministry of Planning Human Resources & Environment)

More than 95% of the total territorial area of the country comprises of sea hence almost all of the country's natural resources are related to the marine environment. Until recent times the main driving force behind the country's economy was the fishing industry. It was the main provider of employment. More than 50% of the working population of the country were in some way or other engaged in the fishing industry. But the introduction of tourism in the early 1970's along with the development of other sectors like shipping has reduced the fishing industry's share in the economy. Nevertheless now fisheries continue to play a dominant role in the economy of the country. In 1996, fisheries accounted for 11.0% of the national GDP. 20.6% of the working population were employed in the fishing industry. It also accounted for 74% of direct foreign exchange earnings and 75% of the country's export commodities (Ministry of Planning Human Resources and Development, 1997)

The tuna fishery dominates the country's fishing industry and was the only fishery that existed in the country for centuries. Apart from a very strong domestic market, tuna as also the main export commodity of the country. Although there are thousands of earthy coral reefs throughout the country, these remained unexploited. But recent years have witnessed a very fast growing reef fishery in the country. This is mainly due to new high valued export markets for reef species from abroad, especially from East Asian countries.

2. TUNA FISHERY

For hundreds of years Maldives has been a tuna-fishing nation, and this is still of prime importance. There is documentary evidence showing that historically Maldives was the biggest tuna-fishing nation in the Indian Ocean. In 1995, tuna and tuna related species accounted for more than 86% of the total fish catch of the country . Five species

of tuna: Skipjack tuna, Yellowfin tuna, Frigate tuna, Little tuna (kawakawa) and Bigeye tuna are the main species caught in Maldives. The method of fishing employed by this fishery is mainly live bait pole and lining, which has ensured the sustainability of the fishery for centuries. Locally built wooden vessels called "Masdhoni" are used in the tuna fishery. These vessels are not very large (length) and all fishing trips are confined to a single day. The masdhonis normally operate within a range of 45 miles, which leaves a huge area of the EEZ unexploited. It should be noted there are a few tuna longlining vessels operating beyond 75 miles. These vessels are mainly foreign vessels operating under license from the government.

Mechanization of the masdhoni fleet was initiated by the government in the mid 1970's and gave a real boost to the country's tuna fishery. Catch rates increased and fishing operations became more efficient (Table 1). By 1982 most of the tuna that caught in the country was landed by mechanized fishing vessels. In 1995 there were 1994 mechanized pole and line fishing vessels operating in the country (Table 2).

Maldives is considered be among the countries which has the highest per capita consumption of fish. It is estimated that an average Maldivian consumes about 76 kg of fish per year, most of which is tuna. Apart from the tuna that is consumed locally, it is also considered to be the major export commodity of the country. In 1995 Maldives exported 3124 metric tons of frozen tunas, 3888 tons of smoked dried tunas, 1909 metric tons of salt dried tunas, 7781 tons of canned tunas and 2101 tons of tunas in the form of fishmeal (EPCS, Ministry of Fisheries & Agriculture).

Because of the direct impact tuna fishery has on the economy and the livelihood of a good part of the population of the country, the government always accords a high priority to ensuring that this fishery is properly managed and utilized. Government regulations ban the use of any form of nets as a gear to catch tuna. Furthermore to safeguard local fishermen, no foreign party is allowed to fish for tunas within the 75 miles Coastal Fishing Zone declared by the government. In recent years the government has also been installing fish aggregating devices (FAD) in different parts of the country. Recent years have seen the government putting much effort in to developing and establishing proper infrastructure to process and market the tunas. The Maldives Industrial Fisheries Company (MIFCO), a company which is partly owned by the government, plays a leading role in this context. At present MIFCO maintains a fleet of 22 collector (ice carrying) vessels and 12 mother (freezer) vessels. MIFCO runs a tuna cannery on an island north of Male'. MIFCO has also commissioned two new old storage facilities both in the south of the country (Anderson, Hafiz & Adam, 1996).

3. REEF FISHERIES

The beginning of the 1980's brought many changes to the Maldivian fishing industry. Although there are numerous healthy reef throughout the country these natural resources remained largely unexploited at a commercial level. Reef fishing in the country was done only to be consumed locally, normally when tuna fishing was bad or the weather was too rough to catch tuna. But the introduction of new high value export markets for certain reef species had a dramatic effect on many reef resources. As

Maldives has open access to fisheries for locals, people started to exploit these reef resources at an alarming rate. This high level of exploitation had a detrimental effect on several reef species, the stock of which are very to overexploitation due to their slow growth, low reproduction rate etc.

3.1 Sea Cucumber fishery

The Maldivian sea cucumber fishery provides a classic example of what happens to a scarcely exploited resource being rapidly used up once its income earning capacity is realized, in this case solely as an export product. The first reported export of sea cucumber or beche-de-mer from Maldives was made in 1985 and increased rapidly, reaching a peak of 745 tons by 1990, within just a five year period (Table 4). After 1990 the export declined just as rapidly as it had grown, inspite of increased effort. Just 66 tons of sea cucumber was exported in 1994. During the initial years of the sea cucumber fishery, income generated from this fishery exceeded that from the tuna fishery in some of the islands of the country (Joseph and Shakeel, 1991). Lot of traditional tuna fishermen changed from tuna fishing to sea cucumber fishery. At the time when this fishery was at its peak this was the most popular fishery in the country. In the beginning of the sea cucumber fishery, it was concentrated in the central atolls of the country but quickly it expanded to cover the whole country.

During the initial stages of the sea cucumber fishery the method used to harvest sea cucumbers was through hand picking during the low tide from the intertidal and from the shallow areas of the lagoon where the depth is around 1 m. But as a result of very high level of exploitation, stocks in these easy accessible areas were depleted and fishermen had to move into deeper areas of the lagoons and on to the reef where the depth is around 15 - 20 meters. The methods used for collection in these deeper waters were by spears and lines with hooks and sinkers attached. SCUBA gears were also utilized to some extent. The processing method used to process sea cucumbers in the Maldives is cooking and sun drying.

In the early stages of the fishery it went unmonitored except for the export statistics which were compiled by the Customs Department. Information on the stock size, abundance and biology was not available; as a result the fishery went unregulated until 1991. In 1991 the government carried out a short study on this fishery (Joseph and Shakeel, 1991). The study reviewed all the relevant issues associated with the sea cucumber fishery including the need for the management of the resource and further development of the fishery. In addition to this questionnaires about the fishery, prepared by the Marine Research Section were sent to all the island development committees in order to get clear re picture about the status of this fishery. In 1993 SCUBA diving to harvest sea cucumbers were banned through out the country. Other management measures under consideration are banning of catch and export of certain species of sea cucumbers for certain period of time, and setting a minimum size limit.

3.2 Grouper fishery

Although there existed a grouper fishery in the Maldives, mainly to cater for the tourist resorts, grouper fishing was not done at any substantial level before 1993. In 1993 new export markets for live and chilled grouper were introduced, mainly from the Far Eastern market. In 1993 17.8 tons of live and chilled grouper were exported and the fishery expanded very rapidly. 1995 just two years after the first exports were made 1025 tons of live and chilled were exported (Table 3).

As in the case of the sea cucumber fishery, in the early stages of the grouper fishery it was concentrated in the central regions of the country but quickly expanded to cover the whole country. The most common gear used for grouper fishing is hand lines and all types of fishing boats: rowing boats, sailing or mechanized trolling boats and mechanized pole and line fishing boats are used in the grouper fishery. The usual fishing areas are island house reefs, ring reefs and patch reefs. All the groupers caught are kept alive in the holds of vessel. Large tuna fishing vessels hold groupers in the same manner as they hold live bait. During fish holding, which lasts from the moment of capture to transferring to cages (about 5 - 10 hours) the mortality constitutes 5 - 20% of the total catch (Shakeel & Ahmed, 1996). All the fish that are caught by the local fisherman are sold to exporters or their agents who stock the fish in cages for exporting alive or chilled. If exploitation of the grouper resource persists at the present high level it is very likely that it will follow the same patterns as the seacucumber fishery. Shakeel (1994) roughly estimated the total maximum sustainable yield for groupers to be about 1800 ± 700 t.

Therefore it is clear that if the fishing is allowed to be continued at the present level it will collapse. Stocks in some central atolls have already been overexploited and it is likely that other atolls will soon follow. In order to monitor the fishery the government in 1994 asked all the cage holders to register their cages with atoll offices. Another management measure that is under consideration is setting up of export quota system.

3.3 Shark fishery (Reef sharks, Deep slope sharks)

The Maldivian shark fisheries were traditionally based on local demand for shark liver oil used for maintenance of wooden fishing boat. Only two main species from which people can extract oil were targeted. Therefore exploitation was sustained at very low level. But the introduction longlining for shark fishing in the 1960's changed the former low level of exploitation. The introduction of gillnetting for shark fishing in the 1970's boosted this fishery further. The average shark catches since 1977 has been about 1400t per year. There have been considerable variations about this average but without any obvious trends (Ahmed, Mohamed & Saleem, 1996).

The main methods used to catch shark in the Maldives are Longlining, Gillnetting and Hand Lining. There are a number of methods used to process shark: Shark fins are mainly sun dried, meat is cooked or salt and dried and oil is extracted

from liver, all mainly for export market. Shark products from Maldives are generally exported to Far Eastern countries and to Sri Lanka.

In general sharks grows slowly, mature late, have small numbers of young and live long. As a result there is direct relationship between the stock size and recruitment, with population replacement rates being very slow. All these factors mean that shark stocks are very easy to overfish. This also means that shark stocks once, overfished may take years, even decades to recover. Based on the shark export data, knowledge of shark biology, interviews with fisherman and interviews with experienced divers, Anders on and Ahmed (1993) suggested that the reef sharks are being fished at a moderate level of fishing effort.

3.4 Aquarium Fishery

Aquarium fishery was introduced to Maldives in 1979. At the initial stages the only export market was Sri Lanka (from here the fish were re-exported). In 1980 Maldives exported 42,128 ornamental fishes. From 1991 there was a sharp increase in the exports (Table 5). This was thought to be due to the availability of new markets from the Far East and USA. All fishing activities are confined to the areas near the International airport where catches can be airfreighted to the destination in the shortest possible time. At present there are about 17 licensed companies engaged in this fishery.

Aquarium fish collection is carried out by snorkelling and using SCUBA. Fish are normally collected using hand nets. After the collection the fish are then transferred to holding facilities which are mostly purpose build concrete tanks which suitably aerated. The fish are kept in these tanks until they are exported.

From the beginning of the aquarium fishery the government authorities have been closely monitoring this fishery. The Customs authorities passes information from export invoices to the Economic Planning and Co-ordination Section of the Ministry of Fisheries and Agriculture, which compiles and analyses these statistics. The main gear used in this fishery is not destructive to the reef habitat. Ministries of Trade and Industries issues export license all the exporters without which they are not allowed to export any aquarium fish. In 1988 Ministry of Fisheries and Agriculture set a blanket quota for this fishery. At the same time a species quota was also introduced. To overcome the problem of species identifications by the Custom and other concerned authorities, the Marine Research Section published an aquarium species Identification Catalogue in 1996.

4. CONCLUSIONS

For a foreseeable future, economic prosperity of Maldives will depend on wise utilization of marine resources. It is extremely important to the country that fishery resources are exploited in a sustainable manner. The unpredictability of the tourism industry which is the country's other main economic sector, reinforces the importance of proper management of the country's fishery resources.

In spite of increased fishing effort, tuna catch rates have stagnated during the last few years. Since tuna is a highly migratory species, recent expansion of tuna fishery activity by other countries in the region may have contributed to this stagnation. Therefore it is clear that international co-operation is vital to the proper management of this commonly shared resource. Since a large area of the country's EEZ beyond the 75 miles coastal fishery zone still remains unexploited to large extent, efforts should be made to properly utilize and manage this unexploited resource. International poaching is another problem facing the country's tuna fishery. Since Maldives has neither the resources nor the manpower to handle this growing problem, this matter needs to be approached at regional and international levels. Almost all the single species targeted reef fisheries that has taken place at commercial scale so far, has proven to be typical boom and bust fisheries. Efforts need to be made to avoid such developments in future, because management measures that has to be taken once a fishery has already been over-exploited are more drastic both economically and socially than proper management measures that are taken in the initial stages of any fishery. Before any fishery develops, proper research should be done on the stock status, biology, and the social impact the fishery will have on the general population of the country. Efforts also need to be put in to avoiding user conflicts that might arise in future because of a common resource being shared by the different sectors of the economy like the fisheries and tourism.

5. REFERENCES.

- Adam M S (1995) The aquarium Fisheries of the Maldives Paper presented at the IRRM Workshop Male' 17 pp.
- Ahmed H, Mohamed M & Saleem R. (1996) Exploitation of reef resources: beach-demer, reef sharks, giant clams, lobsters & others. Paper presented at the IRRM Workshop Male' 21 pp.
- Anderson R C & Ahmed H (1993) The shark fisheries of the Maldives. Final report of the shark resources survey. MOFA Male' and FAO Rome. 73pp.
- MPHRE (1996) Statistical yearbook of Maldives. 324 pp.
- MRS (1995) Executive review of the status of Maldivian fishery resources 1994 - 1995. Unpublished report, M.R.S, MOFS, Male' 28 pp.
- Shakeel H & Ahmed H (1996) Exploitation of reef resources: grouper and other food fishes. Paper presented at the IRRM Workshop, Male' 16 pp.

Table 1. Recorded catches (t) of tunas in the Maldives by species, 1970-94.

Source: Ministry of Fisheries and Agriculture, Economic Planning and Co-ordination Section

Year	Skipjack	Yellowfin	Frigate	Kawakawa	Dogtooth	Total
1970	27,684	1,989	3,023	644	n/a	33,340
1971	28,709	1,227	3,015	473	n/a	33,424
1972	17,971	2,076	3,186	596	n/a	23,829
1973	19,195	5,475	6,626	1,088	n/a	32,384
1974	22,160	4,128	6,006	830	n/a	33,124
1975	14,858	3,774	4,057	415	n/a	23,104
1976	20,092	4,891	2,707	953	n/a	28,643
1977	14,342	4,473	3,080	927	n/a	22,822
1978	13,824	3,584	1,661	768	n/a	19,837
1979	18,136	4,289	1,701	721	n/a	24,847
1980	23,561	4,229	1,595	1,063	n/a	30,448
1981	20,617	5,284	1,606	1,274	n/a	28,781
1982	15,881	4,005	2,061	1,887	n/a	23,834
1983	19,701	6,241	3,540	2,087	n/a	31,569
1984	32,048	7,124	3,105	1,714	376	44,367
1985	42,602	6,066	2,824	2,177	182	53,851
1986	45,445	5,321	1,778	1,071	136	53,751
1987	42,111	6,668	1,921	1,232	105	52,037
1988	58,546	6,535	1,629	1,257	84	68,051
1989	58,145	6,082	2,146	1,322	108	67,803
1990	59,899	5,279	3,013	1,891	281	70,363
1991	58,898	7,711	2,582	1,677	234	71,102
1992	58,577	8,697	3,389	2,541	337	73,451
1993	58,740	10,110	5,456	3,569	628	78,503
1994	69,411	13,126	4,019	2,656	387	89,599
1995	70,372	12,504	3,938	2,694	439	89,947

Table 2. Numbers of fishing vessels registered in the Maldives, 1970-95.

Source: MOFA/EPCS.

Year	Sailing P/L	Mech. P/L	Total P/L	Trolling	Total
1970	1929	--	1929	2789	4718
1971	2011	--	2011	2898	4909
1972	2089	--	2089	2986	5075
1973	2146	--	2146	3012	5158
1974	2131	1	2132	3056	5188
1975	2040	42	2082	3154	5236
1976	1940	218	2158	3284	5442
1977	1801	413	2214	3385	5599
1978	1631	548	2179	3390	5569
1979	1485	767	2252	3386	5638
1980	1255	805	2060	3416	5476
1981	1061	970	2031	3364	5395
1982	952	1166	2118	3428	5546
1983	811	1231	2042	3448	5490
1984	651	1296	1947	3021	4968
1985	561	1202	1763	3115	4878
1986	507	1358	1865	3278	5143
1987	486	1574	2060	3206	5266
1988	449	1558	2007	3072	5079
1989	375	1647	2022	2960	4982
1990	320	1611	1931	2789	4720
1991	371	1754	2125	2680	4805
1992	315	1782	2097	2326	4423
1993	232	1657	1889	1985	3874
1994	262	1839	2101	2351	4452
1995	183	1994	2177	2144	4321

Table 3. Reported exports (tonnes) of groupers from the Maldives, 1993-96

Source: MOFA/EPCS.

	1993	1994	1995	1996
Live	16.7 t	108.5 t	645.8 t	
Fresh & chilled	--	76.5 t	374.6 t	
Frozen	1.1 t	2.2 t	1.04 t	
Frozen dried	--	34.5 t	--	
Total	17.8 t	221.7 t	1020.4 t	

Table 4. Exports of sea cucumber (1985-1994) Source: MOFA/EPCS.

Year	Quantity (tonnes)	Value (Mrf)
1985	0.031	200
1986	2.557	182613
1987	33.886	3,115,632
1988	553.114	39,477,757
1989	410.286	15,775,881
1990	745.925	31,584,050
1991	404.511	20,522,634
1992	118.807	8,408,634
1993	71.574	6,524,719
1994	66.200	5,015,800

Table 5. Export of marine aquarium fish from the Maldives (1980-1994)

Source: MOFA/EPCS.

Year	Number
1980	42,128
1981	43,929
1982	38,332
1983	44,921
1984	37,255
1985	65,065
1986	86,312
1987	69,216
1988	68,102
1989	53,925
1990	54,572
1991	112,918
1992	161,918
1993	184,233
1994	312,483

FISHERIES MANAGMENT SYTEM OF THE MALDIVES
Economic Planning and Co-ordinations Section,
Ministry of Fisheries and Agriculture, Male' Republic of Maldives

1. INTRODUCTION

Maldives is an archipelago of nearly 1200 coral islands grouped into 19 widely dispersed administrative atolls. Marine resources constitute the country's main natural endowments hence economic activities are heavily concentrated on fishing and tourism. Currently, fisheries account for 11.0% of GDP, 20.6% of employment, 74% foreign exchange earnings and 75% of the country's export commodities. (Ministry of Planning Human Resources and Environment, 1996)

The country depended solely on fisheries and fishery related activities until the development of the tourism industry in the 70's. With the development of the tourism industry major changes started taking place as opportunities for alternative income earning activities increased. Even in the fishery industry itself during recent years other existing fisheries have increased in scale and new ones have started. The reef fish fisheries which remained subsistence for a long time have emerged providing additional employment when tuna fishing is poor.

These developments have brought many socio-economic implications to the fishing communities. Detrimental effects such as the over exploitation and user conflict came into existence. To overcome these implications and to sustain the country's only renewable resource as well as to develop its key economic base fisheries management has a vital role to play. The various stake-holders of the fisheries management system need to collaborate and the problems of the current fisheries management system needs to be reviewed from the resource users as well as policy makers point of view. More effective and a efficient fisheries management system capable of carrying out the tasks and responsibilities by different stakeholders need to be formulated.

In view of the central role fisheries management has to play, it is important to understand present fisheries management system and the issues confronted by the system. Putting the above into perspective this paper will attempt to provide an overview of the fisheries management system, highlighting problems of enforcement compliance and violations associated with various types of fisheries.

2. OVERVIEW OF THE FISHERIES MANAGEMENT SYSTEM.

As Maniku (1995), has stated the management of the marine resources is quite a complex task. The legal framework of the current management system for the fisheries sector is found in the constitution, official mandate of relevant ministries and other bodies as well as in relevant laws, regulations, decrees and guidelines. The

National Development Plan outlines the national policies and strategies, including priority to fisheries management and setting long-term fisheries development plans. It covers a wide range of specific issues. These plans are developed by various government and government-related agencies. The most important being the President's Office, the Fisheries Advisory Board (FAB) and Ministry Fisheries and Agriculture (MOFA).

2.1 The President's Office

The President's Office plays an important role in the institutional framework in generating and implementing policies for the fisheries sector. It provides policy direction through decisions taken based on recommendations of the FAB and general policy statements and formulated laws including Presidential Decrees and Regulations of relevant ministries.

2.2 Fisheries Advisory Board. (FAB)

The FAB provides a mechanism for high-level consultation among the various ministries and agencies involved in fisheries development to ensure a more co-ordinated approach to decision making. It is chaired by the Minister of Fisheries and Agriculture and is mandated to provide guidance to the President on matters requiring major policy decisions.

2.3 Ministry of Fisheries and Agriculture (MOFA)

The Fisheries law of Maldives (Law No. 5/87, 24 August 1987) empowers MOFA to "formulate and administer regulations on matters relating to fisheries" and to give it the "obligation... to explore the possibilities for the development of fisheries to carry out the research need for such development and to develop fisheries". (Gozun, 1992). Hence it can be seen that the responsibility of proper and efficient management of the fisheries resources depends on MOFA. It has to provide a basic framework in terms of clear policies for efficient resource management as well as collecting and analyzing statistical information on fisheries necessary for the management and development of the sector.

2.4 Surveillance, monitoring and enforcement

To provide a credible deterrent to the violations of laws and regulations of the management surveillance, monitoring and enforcement measures are provided by the National Security Service (NSS), coast guard section. The purpose is to ensure the observance of agreed measures of both nationals and foreigners. Additional roles include collection of information on fishing agreements, for deciding on national policies and for strategic and tactical decisions about enforcement.

The modes of enforcement are air patrols, sea patrol and special observers on fishing vessels and inspection in harbours. The enforcement modes used depend on the resources available the nature of the regulations and the characteristics of the fishery.

Due to the openness of the seas where traditional fishing for tunas take place, NSS is well equipped for search and rescue activities as well.

2.5 Other responsible bodies

In addition to the above there are various other institutions that are involved either indirectly or directly in the fisheries sector. They play an important role in their respective areas of responsibility and have supportive functions in the sector. These institutions are;

- 1) Maldives Industrial Fisheries Company (MIFCO)
- 2) Ministry of Trade and Industries (MTI)
- 3) Ministry of Planning and Human Resources and Environment (MPHRE)
- 4) Ministry of Atolls Administration (MAA)
- 5) Ministry of Transport and Shipping (MTS)
- 6) Ministry of Finance (MOF)
- 7) Ministry of Education (MOE)
- 8) Vocational Training Center (VTC)
- 9) Maldives Monetary Authority (MMA)
- 10) Ministry of Foreign affairs (MFA).

3. MANAGEMENT ISSUES

Difficult management has given rise to many issues and problems among different interest groups and economic sectors sharing the common resources. These problems are inter-related and are mainly due to institutional weaknesses, geography of the country as well as lack of awareness among the resource users.

The main problems that can be identified are;

3.1 Over exploitation

As stated in a review of the marine resources (Marine Research Section, Ministry of Fisheries and Agriculture 1997) in recent years the most dramatic developments in the fisheries sector has been in the reef fisheries. Several of the newly developed reef fisheries are being driven by demand from the overseas markets. These include the beche-de-mer, live grouper, shark oil, shark fin, giant clam and napoleon

wrasse fisheries. As the gap between the demand and supply of these fisheries increased the prices continued to rise putting pressure on the resources resulting in over exploitation. Consequently many of these fisheries including napoleon wrasses, marine turtles, giant clams, whale shark, and whales had to be banned.

Similarly the condition of the skipjack tuna resources are also worth reviewing. According to the review of the Maldivian living marine resources (Marine Research Section, Ministry of Fisheries and Agriculture, 1997) in recent years catches have stagnated with catch rates as well as the sizes of skipjack declining. The reasons for these changes are still not known though there are many possibilities. Being a country depending almost entirely on marine resources the economic implications of these problems would be disastrous if proper management actions are not taken in time.

3.2 User conflict

In the Maldives the tourist industry contributes 18.4 of GDP (MPHRE, 1996) and it is important to realize that reef resources, alive as a tourist attraction are more valuable than export commodities. It is estimated that for shark watching by direct diving alone also generates US 2.3 million per year. (Marine Research Section, Ministry of Fisheries and Agriculture, 1997). As reef resources gained economic importance by the various sectors of the economy user conflicts also emerged during recent years. Reef resource utilization involves fisheries, coral mining and tourism. The tourist industry often uses reef resources in a non extractive manner like diving and snorkeling while the fisheries industry uses it in a extractive manner. These contrasting patterns of resource utilization has given rise to user conflict.

3.3 Lack of compliance

In getting the management programs to work effectively a lot of difficulties exist. Non compliance is one these problems and there are a number factors which contributes to non-compliance.

Dual ownership is one of the major factors. Maldives became a republic in 1968 and with this change the system of resource ownership also changed. The modern law which came into force during this time changed the communal system of ownership to the dual legal system. In the former system each atoll had a major role to play in managing their immediate resources. The atoll chief control the resources as a common property of that atoll with advice for the elders of the community. In the dual legal system the total control in resource management by the community was in dispute leading to other management problems such as clashes between the traditional and the modern laws and different interpretations of the laws and regulations. (Maniku, 1996)

Lack of information is another major problem encountered by the users. The country lacks a central mechanism where the user can refer to the regulations. Hence in many cases, users who lives in various corners of the country are unaware of the current situation and without knowledge may not act accordingly in implementing the

new regulations. Similarly misunderstanding and misinterpretations of these laws and regulations also contributes as reasons for the lack of success in implementation.

Another major factor that contributes to non-compliance is due to insufficient prior consultation among various stakeholders in developing regulations under the framework. As the opportunities for different types of fishing increased, new laws and regulations were being implemented without much research and consultation among various stakeholders, resulting in conflicts between government objectives and fishermen's profit motives with the various stakeholders, resulting in conflicts between government objectives and fishermen's profit motives

3.4 Inadequate statistics and information

The fisheries sector has the potential to increase its contribution to GDP and employment. To achieve this a number of management measures and policy decisions is required. And to formulate these measures convincing data is of paramount importance. To provide a policy framework for development and management, the fisheries sector urgently requires a scientific data base and sufficient technical support as well as the capability and financial support to do economic analysis on resource data and to undertake broad sector wide analysis.

From a socio-economic point of view one can observe many changes taking place in the fishing industry due to alternative income earning opportunities. Private sector participation in new sectors that are being developed has affected the fishermen and the members of the island communities. The percentage of active fishermen in the country has been stable since 1980 and the number of mechanized fishing vessels has decreased. The reasons and the underlying causes need to be investigated. The national fishery strategy has to be investigated for an efficient management and development of the sector.

3.5 Others

Many other basic difficulties are also encountered in getting the management programs to work effectively.

They include

- 1) Lack of funds as well as lack of manpower to enforce management measures.
- 2) Inappropriate and inadequate policies and objectives arising from conflicting considerations and interest by stakeholders.
- 3) Insufficient co-ordination between the concerned departments involved in the fisheries development and management.

4. CONCLUSION

Thus it can be seen that the Maldivian fisheries management system is confronted with a number of constraints, which needs a collaborative effort by stakeholders. There is a need for the development and the management objectives to be related to resource potential and sustainability with active contribution and commitment from the fishing communities as well as the policy holders. People's participation in decision making needs to be taken as one of the key factors for successful management system.

5. REFERENCE.

Maniku, M. H., (1996). Existing Legal Systems and Institutional Structure as Opportunities and Gaps for Co-ordination in Integrated Reef Resource Management. National Workshop on Integrated Reef Resource Management (pp. 55-71) . Male': Ministry of Fisheries and Agriculture.

Marine Research Section. (1997). Review of the Status of Maldivian Living Marine Resources, 1996-97. Unpublished Report. Ministry of Fisheries and Agriculture, Male'.

Munro, J. L., & Fakahau, S. T., (1996). Management of the Coastal Fisheries Resources. National Workshop on Integrated Reef Resource Management (pp. 55-71) . Male': Ministry of Fisheries and Agriculture.

Shakeel, H., & Ahamed, H., (1996). Exploitation of Reef Resources: Grouper and Other Food Fishes. National Workshop on Integrated Reef Resources Management (pp. 2-16). Male': Ministry of Fisheries and Agriculture.

Swan, J., (1992). Legal Aspects. Maldives Fisheries Sector Strategy Study. Final Report Vol 2. (pp 1-73). Philippines, Germany & Maldives :PRIMEX-GOPA-TCP

Gozun, C. C., (1992). The Maldives Fisheries Institution and Manpower Resources. Maldives Fisheries Sector Strategy Study. Final Report Vol. 2. (pp 1-80). Philippines, Germany & Maldives :PRIMEX-GOPA-TCP

MPHRE., (1994). National Development Plan, Male': Ministry of Planning and Human Resources and Environment, Male' Republic of Maldives.

MPHRE., (1996). Statistical Year book, Male': Ministry of Planning and Human Resources and Environment, Male' Republic of Maldives.

Premix, Gopa Consultants and Thornton Panditharatna co., (1992). Maldives Fisheries Sector Strategy study. Male, Maldives

NATIONAL DEVELOPMENT PLAN 1997-99

FISHERIES

1. SECTOR PERFORMANCE 1994-1996

The fisheries sector has shown stabilised growth during the period of the 4th National Development Plan. Gross Domestic Product (GDP) of the fisheries sector increased from Rf 147.3 million in 1993 to RF 149.5 million 1994. There was no growth from 1994-95. During 1994-1995 contribution of the fisheries to the GDP declined from 11.8 percent to 11.0. This was mainly due to higher than average growth rate achieved by other sectors notably tourism and services. Despite the rapid development of the other sectors, the fisheries sector remained significant in terms of employment, value-added production and export returns.

In general 1993 to 1995 were moderate tuna fishing years with a 16 percent increase in total fish production. Noteworthy is the fact that the reef fishery has increased by 28% during this period where as the tuna catches which consist of more than 85% of the total recorded catch, only increased by 14%. This clearly indicates that more effort has been made on the reef fishery than on tuna fishery. This fact is further substantiated by remarkable achievements of the private sector in exporting the reef fish products.

During this period export earnings has also shown a steady growth of 37% increasing from Rf 316 million in 1993 to Rf 433 million in 1995. This is mainly the result of private sector efforts in the development of the fishery activities. Government sectors exports increased from RF 195 million in 1993 to RF 270 million in 1994 but declined to RF 241 million in 1995. The decline in 1995 is mainly the result of the dramatic fall in frozen skipjack exports, which has fallen by 60%. The drop in frozen skipjack exports was to some extent compensated by the canned fish exports by MIFCO.

Total fish purchased by MIFCO dropped by 10% from 1993 to 1994 and again improved by 28% in 1995. MIFCO's collection is expected to increase in 1996 through the freezing facilities that have been established at Laamu Maandhoo and Ga.Kooddoo. With Kooddoo and Maandhoo in operation, the two complexes will have a cold storage capacity of close to 2500 MT. Under the circumstances the fish processing industry is adequate to meet the present demand.

Major exports of MIFCO still remains as canned tuna and frozen fish. MIFCO has developed export of Maldives Fish (dried skipjack) during the period 1994-96. Diversification of export is a priority for MIFCO and it has built a fish processing plant in Felivaru to process small size fish and similar plants is planned for Kooddo and

Maandhoo. Sashimi grade tuna and fresh fish loins have also continued to be exported by MIFCO.

The private sector's growth in the fishery sector is outstanding for the period 1993-95 and is the direct result of the exploitation of reef fish resources dependent to a large extent on groupers, snappers and other food fish. Private sector contribution to export earnings shows a 37% growth between 1993 to 1995. Export-wise their activities are limited to dried skipjack, salted dried fish and sashimi grade fresh and chilled tuna. Investments made by the private sector due to the demands of the Chinese markets of the Far East have intensified the reef fish fishery countrywide. In 1994 about 2000 MT of reef fish in various form including live, frozen, chilled, salt dried were exported which corresponds to an earning of RF 32 million whilst in 1995 about 2500 MT of reef fish and reef products were exported with an earning of RF 67 million.

Towards the end of 1996 the government opened up a new area for investment in the tuna fishery by the private sector. New regulations for the export of large yellowfins were formulated so that the private companies can export fresh large yellowfin tunas. These exports were targeted for the sashimi market in Japan and the Far East. By the end of the year no venture has yet taken off with this new initiative but it is hoped that this would become a new frontier for investment by the private sector. Furthermore in 1996 fishing licences were issued to a number of foreign fishing vessels to fish in the Exclusive Economic Zone (EEZ) of the Maldives and considerable increase in revenue was achieved through this venture.

The installation of Fish Aggregating Devices (FAD) has continued during the plan period at a faster pace than before. New Fish Aggregating Devices have been installed at selected atolls to increase catch and a number of old FADs have been strengthened or redeployed. During 1995 13 FADs were installed and 19 were installed in 1996. There are 31 FADS in total now functioning throughout the country. The main reason for the success of the FADS is their applicability to the live bait pole and line fishery. It increases the fish catch reducing the searching time and fuel cost proving it as a success when there is a shortage of manpower.

The number of active fishermen as well as the total fishing fleet engaged in fishing decreased by 5% from 1993 to 1995. The number of mechanised mass dhonies which accounts for over 97% of the total fish catch has also dropped slightly from 1993 to 1995 although the fishing effort has increased by 7 %. These figures indicate the changes that are taking place in the fishing communities as opportunities for alternative income earning activities increased. The gradual drop in the number of vessels engaged in fishing could also be due to the introduction of the larger sized boats into the fishery.

Fisheries regulations are being reviewed to take into account the recent developmental trends and policy changes emphasising private sector involvement in coastal and reef resource management areas. It is expected to improve the performance of the fisheries sector during the plan period.

2. PERFORMANCE OF THE MAJOR PROGRAMMES 1994-96

For the planned period 1994-96 major objectives of the fisheries sector were achieved through many programmes and projects implemented.

Fisheries resources survey programme continued throughout the plan period. Fish stock research and resources survey of tuna was conducted with technical and financial assistance from the IDA Third Fisheries Project's tuna component. Tuna tagging and stock assessment studies were carried out and completed during the plan period.

Reef fish resources survey work continued during the period with financial contributions from the government budget. The status of the grouper fishery and aquarium fish exports were studied and reports were produced. Collection and identification of economically important fish species has continued during the period and a checklist of fish species has been produced.

A hatchery has been established for rearing giant clams and a project is under way for the introduction of mariculture and sea farming of seaweed and sea cucumbers in Laamu Atoll with financial assistance from the FAO. The Laamu Mariculture project is carried out by the Oceanographic Society of Maldives a non governmental organisation (NGO) in the Maldives, in co-operation with MOFA. A survey project has been developed for the culture of pearl oysters with assistance from Japan through the UNDP and this project has been initiated in 1996.

A mariculture facility is being developed at Addu Atoll with assistance from IFAD under the Southern Atoll Development Project and work is expected to be complete during 1997. Preliminary assessments and site investigation for the mariculture facility has been completed. The objective of the project is to rear potential species, which can be used as a baitfish supplement in Addu Atoll.

Fisheries extension work was carried out in selected atolls during the plan period. Training courses on hook making, engine repair and maintenance and fish processing were conducted for fisherfolk at selected atolls. With assistance from the Bay of Bengal Programme, a study was carried out in Vaavu and Meemu Faafu and Dhaalu Atolls in the management of reef resources. A workshop on integrated reef resources management was held in 1996 under this programme.

Efforts continued to establish standards for fishery harbours under a project funded by BOBP. VESHI an NGO was contracted to carry out the awareness programme under the project.

Under the infrastructure development programme efforts were made for the introduction of modern fishing vessels. Increasing fish catch is very important to meet the present demand and GOM is negotiating with the Japanese Government to introduce new type of fishing boat which could have extended range of fishing and keep fish fresh in ice.

Work has progressed under the Third IDA Fisheries Project to establish a Cold Storage Facility at Gaafu Alif Kooddoo and the project has been completed during the plan period and fish collection had started. This will increase MIFCO's collection capacity to satisfactory limits. The Coastal Fisheries Promotion Project for the Meemu, Thaa, Dhaalu and Laamu has also been partly completed during the plan period and fish collection has begun. The major components of these major capital investments projects include establishment of freezing and cold storage facilities, construction of harbours, upgrading collector vessels and associated infrastructure.

Under the fisheries resources management programme, efforts have been made to develop and review existing legal framework for fishery management. Of particular interest is the Integrated Reef Resources Management (IRRM) Programme targeted for Vaavu, Meemu, Faaflu and Dhaalu Atolls. A workshop was held in March 1996 to review the issues for IRRM in the Maldives and to formulate recommendations for IRRM. Work continued during the Plan period for formulation of regulations for coral mining and was completed during the plan period.

A satellite tracking system has been established within the Coast Guard Section of the National Security Services with MTI and MOFA under the Marine Resources Surveillance, Monitoring and Control Project. This has proved to be a very useful system for the surveillance of the EEZ of Maldives and serves as a deterrent for illegal fishing in the EEZ.

The Government on 8th October 1996 signed the United Nations Agreement relating to the Conservation and Management of Straddling Fish Stocks and Highly Migratory Fish Stocks, drawn under the Law of the Sea Convention.

3. INSTITUTIONAL DEVELOPMENT

The Ministry of Fisheries and Agriculture remains the key organisation in implementing government policies relating to the development of the fisheries sector and managing fisheries rationally in the Maldives. MIFCO, the state owned industrial fisheries company is entrusted to carry out all commercial capital investment projects undertaken by the Fisheries Sector and the organisation is under the MOFA.

The Fisheries Section of MOFA has sub sections in the implementation of its various roles. The Marine Research Section carries out marine and fisheries research to support the management efforts implemented by MOFA. Efforts have been to upgrade the facilities at MRS and training qualified manpower. Trained staff has joined MRS during the plan period and currently there are 10 technical staff at the section at graduate level of which 2 are under going training abroad. The information centre-cum- library has been upgraded and the laboratory facilities have also been improved. Specialised training has been provided to selected staff on diving and there are 6 qualified divers at MRS.

The Economic Planning and Co-ordination Section is responsible for the collection, compilation and analysis of fisheries statistics and economic data of the

section. Two staff had undergone graduate training during the plan period. A project was undertaken to strengthen the collection of agricultural statistics with technical and financial assistance from FAO during the plan period and was completed in 1996. Under the IDA Third Fisheries Project technical assistance component, fisheries statistics collection system was upgraded. Training was provided for staff of EPCS under both these programmes.

The Administrative Section and the Accounts Section is responsible for the day to day running of the ministry's administration and finances and for the implementation of Fisheries laws and regulations. Training has been secured for one staff to undergo training in Law on Natural Resources Management commencing in January 1997. The section started receiving the services of a part time legal advisor in 1994 from the Attorney Generals Office.

Projects and Extension Section is responsible for fisheries extension services and for the installation of FADs. Training has been provided for staff of the section in Marine Engine Repair and Maintenance and fish processing. Capability building for the installation of FADS had been carried out successfully and the section is self sufficient in carrying out its tasks including Fisheries Extension and Training.

MIFCO is now attached to MOFA for administrative and control purposes. As the agency, which implements all major fisheries projects many activities were completed during the plan, period and some are on going. Staff upgrading programmes has been undertaken by MIFCO too. MIFCO is responsible for the IDA Third Fisheries Project, Coastal Fisheries Promotion Project currently. It also runs the Felivaru Tuna Processing Plant and the Kooddoo Fishery Complex constructed under the Third Fisheries Project as well as the Maandhoo Fishery complex.

The Ministry of Defence and National Security assists and co-operates with MOFA in the enforcement of Fisheries Laws and surveillance of EEZ. A satellite tracking system has been established within the Coast Guard of defence as part of a marine surveillance programme.

The Ministry of Trade Industries and Labour is responsible issuing licenses for foreign vessels fishing in the EEZ of Maldives as well as foreign investments in fisheries. Quotas are set by MOFA and enforced by Ministry of Trade and Industries and Labour.

4. SECTOR ISSUES AND CONSTRAINTS

Sector issues and constraints continued to hinder the development of the sector during the period 1994 to 1996.

4.1 Manpower

There is a severe shortage of manpower in technical as well as unskilled level required by the fishing industry. As a result there is shortage of fishermen on some

fishing islands shortage of factory workers, shortage of teachers and trained personals to carry out the technical work relating to management and development in the fisheries sector.

4.2 Insufficient information on fisheries resources

There is lack of scientific information including traditional knowledge used in the past required for management and development in the sector.

4.3 Infrastructure

There is over capacity in the fish-processing infrastructure as a result of insufficient supply of fish to the processing plants. The need to supply enough quantities of fish is of paramount importance to justify the existing processing facilities on an economic basis.

4.4 Fisheries harbours

There is an urgent need for better harbours to accommodate ever-increasing fishing fleet. As the size of the fishing vessels engaged in fishing are being increase proper fisheries harbours with necessary facilities such as ice supply, engine repair facilities, fuel supply are required at the major fishing areas.

4.5 Legal framework

The fishing industry is expanding and non-traditional fisheries are being introduced mainly due to demand in the foreign markets. There is an urgent need for legal framework to manage and develop the existing as well as new fisheries on a sustainable basis.

4.6 Pricing

As the government now have to complete with the private sector for the supply of fish for processing there is a need to adjust prices for buying fish according to supply for processing there is a need to adjust for buying fish according to supply and demand. However to guarantee socio-economic development in the fishing communities pricing is a major factor.

4.7 Research

Proper facilities are lacking in the marine research in terms of trained manpower equipment building, transportation and funds for research activities. There is a need to develop guideline for fisheries research in the Maldives. The assistance and corporation form international regional and bilateral are required to achieve proper understanding of the marine resources in the country.

4.8 Funding for investment

In the past funding for investment for the government sector in the form of grant and loans have been secured from number of international organisations specially World Bank and bilateral. For the private sector Bank of Maldives and some Integrated Rural Development Projects has provided the credit required by the fishing communities. However credit system has to be expanded and increased for the needs in the development of fisheries sector.

4.9 Institutional Corporation

Number of different institutions need to work simultaneously in corporation to maximise benefit from fisheries resources of the country. Wider consultation and awareness creations are required to achieve sustainable development in fisheries.

4.10 Enforcement of laws and regulations

As the Exclusive Economic Zone and coastal waters are a vast area, the enforcement of laws and regulations is critical issue due to the common property nature of the fisheries resources. However if management has to be effectively carried out diversification of authority in enforcement is essential at least at the atoll level.

4.11 Quality of fishery product

With the diversification of the fishery products quality aspect has to emphasise to maximise profit. However there are difficulties of getting better prices for the traditional markets.

4.12 Health and Nutrition

Since the source of protein in the Maldivian diet is fish and fishery products. There is a need to develop educational material in health and nutrition.

5. MAJOR OBJECTIVES

The major objectives for the development of the fisheries sector over the next 3 year plan period are:

- 1) Increase fishery sector contribution in the national economy
- 2) Strengthen the implementation capacity of institutions
- 3) Improve research and legal framework required from sustainable development of fisheries
- 4) Encourage wider consultation and awareness building in fisheries management and development.

- 5) Man power development
- 6) Encourage investment in the sector
- 7) Modernisation and wider distribution of economic benefits from the sector
- 8) Improve surveillance and management of Exclusive Economic Zone
- 9) Increase co-ordination among the concerned institutions
- 10) Introduce improve fisheries technologies

6. STRATEGIES AND POLICIES

To achieve the objectives and to guide the development of fisheries during the Fifth Development Plan 1996-1998 the following strategies and policies will be adopted.

- 1) Provide improved and extensions services in fishing and fisheries technology
- 2) Commercialisation of fishing operations
- 3) Increase in the value added products
- 4) Protection and management of marine resources
- 5) Attain greater catch of high value fish including mariculture
- 6) Improvement of fishing technology and research capacities
- 7) Establishment of a continuous bio-statistical information system concerning the exploitation of marine resources
- 8) Improvement of fisheries credit
- 9) Adequate supply of manpower
- 10) Formulate a long term Fisheries Development Plan
- 11) Increase food supply and nutritional standards of island communities
- 12) Encourage private sector investments in fisheries infrastructure and marketing

7. INFRASTRUCTURE DEVELOPMENT

The Ministry fisheries and Agriculture remains the key organisation in implementing government policies relating to the development of the fisheries sector and managing fisheries in the in the Maldives. MIFCO the state owned industry is entrusted to carry out all capital investment projects undertaken by the fisheries sector. Major projects have been implemented during the 4th National Development Plan to upgrade MIFCO's capacity and in general to improve the fisheries sector development. Freezing and cold storage facilities had been established Kooddoo and Maandhoo and were functioning by the end of the Plan period.

8. MAJOR PROGRAMMES AND PROJECTS 1997-99

- 1) Marine Bio-diversity Assessment
 - Stock research and resource survey of tuna
 - Collection and identification of economically important fish species
 - Whale and dolphin survey
 - Manta ray tagging
 - Exploration and identification of deep sea fishes.
- 2) Coral Reef Research
 - Integrated reef resources management
- 3) Strengthening of Infrastructure
 - Establish a marine research station in Addu Atoll
 - Construction of a Marine Research Institute building
 - Development of fish aggregation devices
 - Construction of a slipway in Kooddoo
 - Fishery harbour development
- 4) Promotion of Mariculture
 - Giant clam
 - Seaweed

- Beche de mer
 - Lobster
 - Grouper
 - Pearl
- 5) Manpower development
- Feasibility study in establishment of fisheries co-operatives
 - Development of manpower fisheries sector
 - Support of fisheries extension services
 - Development of marine resources surveillance monitoring and control
 - Assist fisheries science teaching in schools
- 6) Development of fish and fishing technologies
- Assistance to the development of traditional crafts
 - Introduction of modern fishing crafts
 - Diversification of marine products
 - Fish waste utilisation
 - Development of non tradition fisheries
- 7) Improvement of legal frame work for fisheries management and regulations
- 8) Development of fisheries development plan (2000-2010)