FISHERY COUNTRY PROFILE	Food and Agriculture Organization of the United Nations	FID/CP/MAD
PROFIL DE LA PÊCHE PAR PAYS	Organisation des Nations Unies pour l'alimentation et l'agriculture	May 2008
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THE REPUBLIC OF MADAGASCAR

1. GENERAL GEOGRAPHIC AND ECONOMIC DATA

Area:	587,041 km²
Water area:	5 500 km²
Population (2006):	19.2 million
GDP current (2006):	5.5 billion $US
GNI per head (2006):	280 $US
Agricultural GDP (2006):	27.5% of GDP
Fisheries GDP (2005):	160 million $US

2. FISHERIES DATA

2005	Production	Imports	Exports	Total supply	Per caput supply
	tons liveweight				kg/year
Fish for direct human consumption	142,899	17,782	34,458	126,223	6.8
Fish for animal feed and other purposes	2,001	-	-	-	-

Estimated employment (2006):	
Primary sector (including aquaculture)	193,370
Secondary sector:	3,000
Gross value of fisheries output US$	
Trade (2006):	
Value of fisheries imports:	32 102 000 US$
Value of fisheries exports: US$	162 606 000 US$

3. FISHERY AREAS AND MAIN RESOURCES

The production from the shrimp sector constitutes the major export in fisheries of Madagascar. However since 2004 the sector has experienced difficulties due to: low profitability, climate change, low price due to great Asian and South American production and increase in price of petroleum products.

Madagascar lies in the tropical Western Indian Ocean, surrounded by waters of the Southern Equatorial Current (SEC) and forming part of the Agulhas Large Marine Ecosystem (LME). Madagascar's long coastline is estimated at 5,600 km, east and west coasts, large latitudinal range and upstream location in relation to eastern and southern Africa.

Madagascar includes the smaller offshore islands and the main island. The island has a central high plateau that is 1,000 to 2,000 metres in altitude and fall steeply into a narrow coastal line.

Madagascar continental shelf has a breadth of 20 to 30 km in the North West and 2 to 5 km along certain areas on the east coast. The surface area is 177,000 km². The west side of the continental shelf is conducive to traditional fishing There are basically two types of fisheries in Madagascar the industrial fisheries which targets off-shore tuna, bill-fish, sharks (as by catch) and the near shore shrimp fishery.

The traditional fisheries are carried out from dugout canoes using oars and sails and exploits marine mammals, sea turtles, fish, sharks and rays, echinoderms, molluscs, crustaceans and some sea weeds. In addition non-edible resources such as aquarium fish, corals and sponges are also periodically collected. The collection of sea cucumber from deeper waters is also a growing industry.

Madagascar large shrimp production sub-sector has over the years recorded a continued growth and is the main export commodity bringing in the much needed foreign exchange.

4. FISHERY SECTOR STRUCTURE

The different categories of fishing are:

- Subsistence fishing as food for the family
- Traditional fishing using smaller traditional crafts
- Industrial fishing aimed at local market and for export
- Sports fishing (as a leisure activity) and
- From time to time exploratory/scientific fishing carried out by the authorities

The conditions of fishing are defined as follows:

- zones of fishing
- opening and closure of fishing seasons
- size of the fish allowed for capture and the protection of the hatchery
- forbidden materials and method of fishing
- forbidden baits
- forbidden species (breeding and capture fisheries)
- special measures applicable to established aquaculture

Prohibited for the capture of fish:

- the use of toxic substances, explosives and electrical methods
- the use of the air cylinders or other devices which allow a very long immersion

4.1 Overall Fishery Sector

The fisheries sector of Madagascar is divided in three sub sectors:

- Inland fisheries (freshwater fishing in streams and lakes);
- Marine fisheries (structured in three main segments: traditional fisheries, artisanal fisheries and industrial fisheries);
- Aquaculture (marine aquaculture and freshwater aquaculture).

Marine aquaculture includes the culture of shrimp, seaweed and collect of sea cucumber. Freshwater aquaculture is dominated by the culture of Tilapia and Carp. The culture of *Spirulina* is fast becoming an important activity in the fight against mal-nutrition.

The estimated potential for capture fisheries and aquaculture is 480,000 tonnes, out of which some 300,000 tonnes of fish with commercial interest are exploited.

Capture Country	Species	Species	Fishing area	2006
Madagascar	Cyprinids nei	Cyprinids nei	Africa – inland waters	4,000
Madagascar	Cichlids nei	Cichlids nei	Africa – inland waters	21,500
Madagascar	Freshwater fishes nei	Freshwater fishes nei	Africa – inland waters	4,500
Madagascar	Demersal percomorphs nei	Demersal percomorphs nei	Indian Ocean, Western	...
Madagascar	Narrow-barred Spanish mackerel	Narrow-barred Spanish mackerel	Indian Ocean, Western	12,000
Madagascar	Skipjack tuna	Skipjack tuna	Indian Ocean, Western	-
Madagascar	Yellowfin tuna	Yellowfin tuna	Indian Ocean, Western	-
Madagascar	Marine fishes nei	Marine fishes nei	Indian Ocean, Western	79,385
Madagascar	Marine crabs nei	Marine crabs nei	Indian Ocean, Western	1,600
Madagascar	Tropical spiny lobsters nei	Tropical spiny lobsters nei	Indian Ocean, Western	550
Madagascar	Natantian decapods nei	Natantian decapods nei	Indian Ocean, Western	9,382
Madagascar	Cephalopods nei	Cephalopods nei	Indian Ocean, Western	600
Madagascar	Marine molluscs nei	Marine molluscs nei	Indian Ocean, Western	400

Madagascar	Marine turtles nei	Marine turtles nei	Indian Ocean, Western	-
Madagascar	Sea cucumbers nei	Sea cucumbers nei	Indian Ocean, Western	500
Total	Total	Total	Total	134,417
Aquaculture Country	**Species**	**Species**	**Fishing area**	**2006**
Madagascar	Common carp	*Cyprinus carpio*	Africa – Inland waters	2,750
Madagascar	Tilapias nei	*Oreochromis* (= Tilapia) spp	Africa – Inland waters	0
Madagascar	Rainbow trout	*Oncorhynchus mykiss*	Africa – Inland waters	0
Madagascar	Giant tiger prawn	*Penaeus monodon*	Indian Ocean, Western	8,463
Madagascar	Brine shrimp	*Artemia salina*	Indian Ocean, Western	-
TOTAL	TOTAL	TOTAL	TOTAL	11,213

4.2 Marine Sub-Sector

4.2.1 Fish production

Marine capture fisheries accounts for more than 80% of total fish production and is derived mainly from:

- Industrial fishing (shrimps, tunas, etc.)
- Smaller craft fishing or semi industrial fishery (shrimps, tunas, fishes)
- traditional fishing (all the species)

For a long time, the industrial fishing has been the source of foreign exchange earnings in Madagascar mainly with the export of shrimps and tunas. However in the past few years a net decline has been noted probably due to increased recurrent charges and climatic conditions.

Fishing by the EU fleet is limited to 43 purse seiners and 50 Surface longliners. In 2007, the EU fleet consisted of 97 tuna purse seiners out of which 41 was from France, 48 from Spain, 7 from Portugal and Italy with one fishing vessel. Furthermore, Spain had 24 longliners, Portugal 6, and France with 10 longliners.

Trawling is the main method for shrimp fishing. The industrial fleet trawls off the central and north-west and east coasts and 1 to 2 miles from shore line. They also exploit a coastal belt around 1 to 10 miles wide on the west coast. It has been noted that industrial shrimp production has decreased over the last three years due to climate change and high level of exploitation of the resources. The catch has stabilized at around 8,500 tonnes annually for the last ten years. The By catch from the industrial fishery amounts to 3,175 tonnes and is entirely sold on the local market.

Tuna production stood at 10,000 tonnes/year, and is mainly caught by the EU fleet. Similar decline has been noted over the past few years.

Artisanal fisheries though still at a low level of development, they are better organized and technically more advanced than traditional fisheries with each level exploiting different fishing grounds.

The coastal marine resources have been estimated at 180,000 tonnes and 140,000 tonnes for ocean fishing. Coastal resources are mainly exploited by industrial fishing units catching some 15,800 tonnes of fish and 5,400 tonnes of shrimps. Traditional fishermen using dug out canoes with or without outriggers produce some 72,300 tonnes whilst the small scale fishery produces some 600 tonnes per year.

Employment in the traditional fisheries approximates 60,000 fishers using 62,000 low equipped canoes. At a national level, it is conducted mainly along the coast. The coastal area is under-exploited and the yields are usually low 2 to 3 tonnes of fish per year per canoe. Usually targeting octopus, squids and crabs for export.

The traditional fishing sector is responsible for 53% of the total marine fish catch, whilst the industrial shrimp and deep water fisheries accounts for 8.8 % of the total catch). This industry is in a period of expansion as it was authorized only in 2001.

There are two different types of vessels in the fisheries sector:

- Fishing vessels aimed at capture fisheries
- Support vessels aimed at collecting, storage, and transportation of the catch.

4.3 Inland Fisheries

The inland fisheries exploit various streams and lakes and are aimed mainly at local consumption. The main species targeted are the tilapia's, carps, black-bass and fibata.

The following fishing grounds are exploited:

- Lakes of Alaotra (East – center)
- Lakes of Miandrivazo (West Center)
- Lakes of Betsiboka (West Center)
- Lake of Itasy (Centre)
- Lake of Marovoay (West)
- Channel of Pangalanes (East)
- Lake of Mantasoa

The production is limited to 32,000 tonnes. Note that some amateur fishing is also carried out on the lakes.

4.3.1 Catch data for the Inland Fisheries

Sources: Ministry of fisheries, Madagascar

Species/years	2000	2001	2002	2003	2004	2005	2006
Cichlids nei	21,500	21,500	21,500	21,500	21,500	21,500	22,000
Common carp	2,480	2,350	2,400	2,500	2,500	2,500	2,500
Cyprinids nei	4,000	4,000	4,000	4,000	4,000	4,000	4,100
Freshwater fishes nei	4,500	4,500	4,500	4,500	4,500	4,500	4,500
Nile crocodile	6,606	9,408	6,936	7,300	4,760	4,850	4,850

Rainbow trout	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0,5
Tilapias nei	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0,5

5. POST HARVEST USE

5.1 Fish Utilization

Fish is utilized in many forms. The following main products are found at most markets:

- fresh products for human consumption
- dried, salted and smoked products
- frozen products for export and local consumption
- transformed products for export
- Animal feed

5.2 Fish Markets

Madagascar's main fish export markets are listed below:

- Shrimps: Japan, Europe, USA, Réunion and Mauritius
- Fish: Réunion
- Crab: Réunion and Mauritius
- Lobster: France
- Shellfish: Italy, France, Germany, India
- Sea cucumber: Singapore, Hong Kong SAR
- Shark fins: Singapore, China

Shrimp export is the major export commodity for Madagascar. The total shrimp output from aquaculture increased from 406 tonnes in 1994 to about 6,770 tonnes in 2006, following an expansion in the industry.

Due to the high shrimp prices, domestic demand for shrimp is very low. Local consumers usually purchase the small and medium-sized dried shrimp originating from the artisanal fisheries sector which are cheaper. The high quality, large-sized industrial shrimp landings are mainly for the export market, although a significant quantity is sold to the local restaurants, supermarket chains and hotels.

The total value for fish exports is increasing annually with shrimps as the principal export commodity and the main source of foreign exchange earnings. Around 33,000 tonnes are exported out of which more than 50% are exported to the European countries and the rest mainly to Japan, Mauritius and some Asian countries.

6. FISHERY SECTOR PERFORMANCE

Fisheries and aquaculture sector is one of the three main pillars of the economy, together with the mine industry and the tourism industry. Madagascar has a rich biodiversity in terms of flora and fauna including the marine sector. Sustainable exploitation of these resources will ensure the future of the fishing industry.

Shrimp culture is quite developed and occupies a major place in the national economy. The industry has been expanding year by year and production through aquaculture present stands at around 50% of total production and is being actively promoted by the authorities to reduce the pressure on the natural resources.

6.1 Economic Role of Fisheries in the National Economy

The fisheries sector plays a major socio-economic role in the country. The capture fisheries including aquaculture contributes 7 percent to the gross Domestic Product (GPD) and is also a provider of employment. Approximately 194,000 direct jobs in the primary sector of which 33,365 as fish farmers and 3,000 indirect jobs have been created. In rural communities, fishing is the main source of income.

Fish Consumption is a major source of protein for the coastal population and stood at about 7 kg per caput per year, well below the average of 16 kg/caput. Fisheries play a predominant role in employment creation, food security and poverty alleviation.

The Fishing industry contributed more than US$ 161 million to foreign exchange earnings in 2001, representing more than 20% of the total export earnings for the same year and 7% as PIB.

6.2 Demand

The demand for fish and fish products annually in Madagascar exceeds 130,000 tonnes, however it also depends on the purchasing power of the population and the availability of the products on the market. Over the last two years, mining and tourism development have increased the demand in quantity and in quality for fish and fish products.

6.3 Supply

Data collection in the fisheries sector is not dependable, given the great price variation between species, size, value added (smoking, salting, drying) and the geographical location of the sale points. Nonetheless, it is certain that marine fish production, mostly traditional, is important to local market food supply.

6.4 Trade

The main markets for Malagasy shrimp are France and Japan. Significant volumes are also exported to Réunion island, Mauritius, South Africa, Portugal and United Kingdom.

Madagascar is actively pursuing its policy of encouraging joint ventures in the fisheries sector. In this context, it is strengthening its capacity to establish an effective fish inspection system and to assist seafood exporters in meeting the quality standards in terms of staff capacity and training on trends in Quality Assurance and the HACCP concept.

6.5 Food Security

Fish and fish products plays an important role as regards to food security in Madagascar and is an important source of animal protein to coastal population. It has been estimated that fish and fish products contribute about 20% of animal protein consumption of total population to improve the quality of nutrition of population.

7. FISHERIES SECTOR DEVELOPMENT

7.1 Development Prospects/Strategies

The government of Madagascar has listed a number of development policies to sustain the fishery industry. These are:

- A drive force to support to food and dietary security;
- Ongoing support to traditional and non-industrial fishing;
- Enhance existing regulation and enforcement of control measures to curb over exploitation and non discriminatory use of gears by operators in the sector;
- Support to the establishment of land base activities such as cold storage and processing, and/or rehabilitation of facilities already existing for the development of sea food industry; and
- Development of industrial and inland fisheries.

The following opportunities and potential have been identified:

- The water resources are not fully exploited;
- The culture of marine algae;
- Possibility to triple the aquaculture production in the next 10 years through expansion;
- Trout culture using the various water ways; and
- Improvement in the production of tuna.

7.2 Main Constraints to Development

Some of the major constraints are listed below:

- The lack of traditional fishing equipment and materials, notably for the small unmotorized dug out canoes with very limited radius of action.

- IUU fishing especially by unlicensed vessels
- Industrial trawling especially on shallow continental shelf seas and sea mounts
- Degradation of coral reefs through over fishing, climate change effects and sedimentation
- Hunting or incidental capture of large marine fauna (dugong, dolphins, sea turtles, sharks, and sawfish).
- Local exploitation of high-value species such as sea cucumbers
- Conflicts between resource users
- Insufficient protection for marine environment like the MPAs and no take zones
- Insufficient capacity and information management
- No security for traditional fishery in marine areas

- Access difficulty to finance

7.3 Research

List of Institute for research:

- PNRC - Programme National de Recherche Crevettière in Mahajanga
- IHSM - Institut Halieutique des Sciences Marines in Toliara
- CNRE - Centre National de Recherche Environnementale in Antananarivo
- OFCF - Overseas Fishery Corporation Foundation in Toamasina
- FOFIFA - Agriculture centre for Research including Fish research

7.4 Education

There are two levels of education in fisheries and aquaculture in Madagascar:

- EASTA - for secondary school which supply technician for the fishery sector
- EESSA - University which offer diploma in Engineering

7.5 Foreign Aid

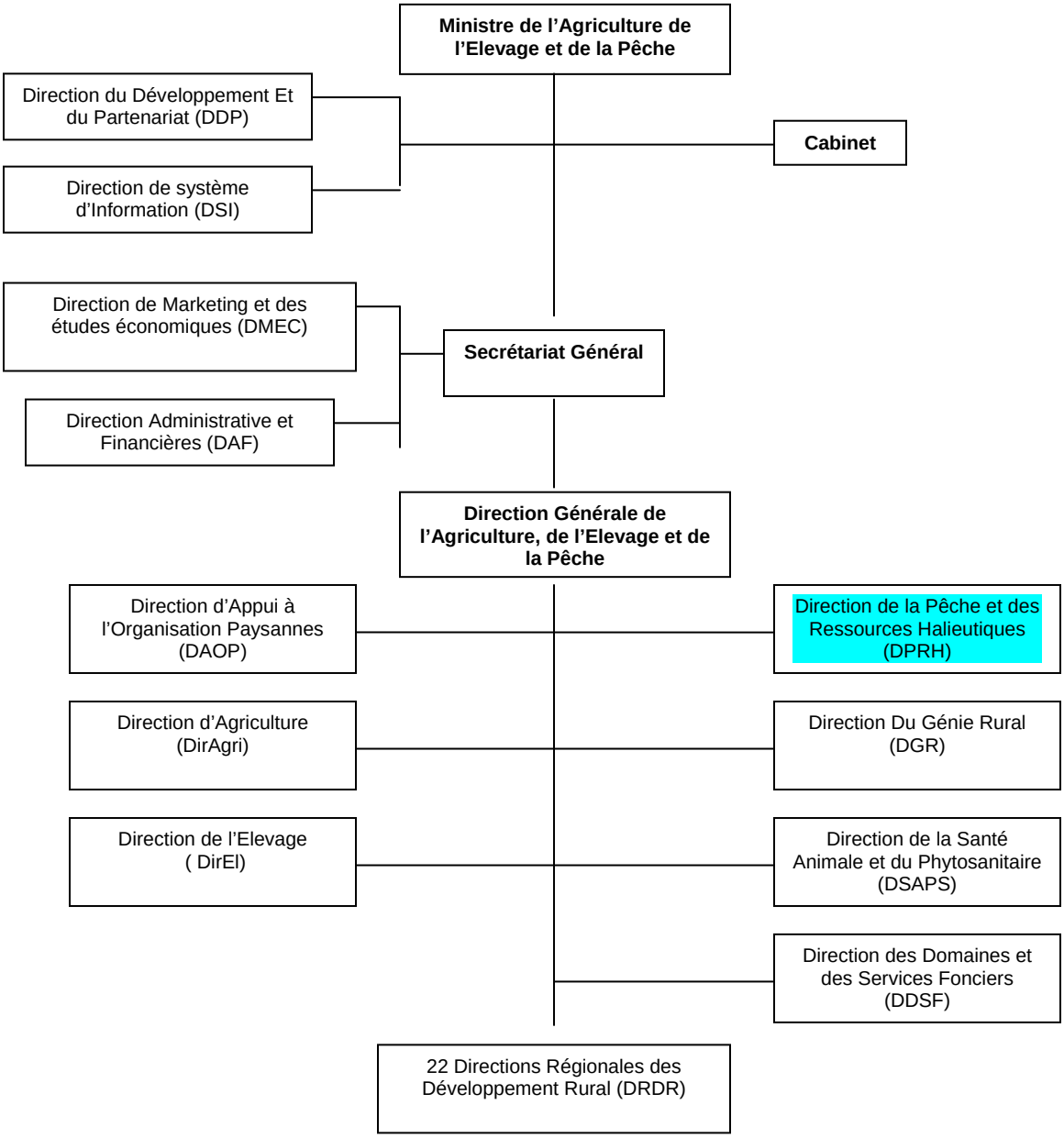
The following contributing partners have helped Madagascar in the implementation of various projects in Fisheries:

- PACP (Projet d'appui aux communautés des pêcheurs) by BAD
- PGRC (Programme de Gestion durable de la ressource Crevettière) by AFD
- CDPHM (Centre de Distribution des Produits Halieutiques de Madagascar) by JICA
- CDCC (Centre de Développement de la Culture de la Crevette) by JICA
- CSP (Centre de Surveillance de Pêche) by European Union
- ASH (Autorité Sanitaire Halieutique) by AFD and EU
- Recherches sur les poissons de fond sur la Côte Est by OFCF

8. FISHERY SECTOR INSTITUTIONS

The Ministry of Agriculture and Fisheries (MAEP) is responsible for the management of fishing through the Directorate of Fishing and Fish Resources. The organigram set out below gives the organizational structure of fisheries authorities at national level, listing the main institutions responsible for fisheries management as well as major stakeholders.

Organizational chart of the MAEP



The Regional Directorate for Rural Development, the Regional Services for Fishing and Fish Production are responsible for implementation of projects and providing services at a regional level. They work in collaboration with the councils for fishing and agriculture. The various agencies co-ordinate the application of fisheries legislation.

9. GENERAL LEGAL FRAMEWORKS

The following legal frameworks govern the fisheries sector:

- Ordonnance n°93-022 du 4 mai 1993, portant réglementation de la pêche et de l'aquaculture
- Décret n° 94-112 du 18 février 1994, portant organisation générale des activités de pêche maritime
- Décret n° 2007-957 du 31 octobre 2007, portant définition des conditions d'exercice de la pêche des crevettes côtières.

10. MANAGEMENT APPLIED TO THE MAIN FISHERIES

The Ministry for Agriculture and Fisheries (MAEP) in Madagascar has the responsibility for the management of the different fisheries. The Ministry define the guidelines and policies necessary to the development of the fishing and aquaculture sectors over a period of four years (2004-2007). This four year plan is based fundamentally on research and good management practices for fish production and the development of new resources.

For the 2004-2007 periods, the economical and social objectives of the plan were to:

- Increase state revenue;
- Satisfy the needs of the country in terms of fish and fish products;
- Improve the living standard and revenue of traditional fishermen;
- Increase employment in the fisheries industry.

The management plan has had little impact on traditional fishing, except for some local initiatives involving shrimp fishermen. Measures such as the obligation for industrial shrimp fishermen to land a minimum of 0.5 kg of fish for every kg of shrimp have nonetheless contributed to a certain extent to the improvement of living conditions for traditional fishermen. Even though all fishing is regulated in Madagascar, only shrimp, tuna, lobster, crab, holothurians and algae are covered by specific management plans.

For endangered stocks (shrimp and lobster stocks) and which are important to the economy of the country, strict management measures are taken based on scientific data and analysis. For example, from 1996 the results of stock evaluation (1996, 1998) have shown that the fishing effort was at its maximum (all sectors) for shrimp fishing. In 1998, during a workshop on shrimp fishing under the responsibility of the MPRH and organized in the framework of the Sectorial Fishing Programme of the FAO, the GAPCM proposed to freeze the fishing effort. The MPRH then limited the number of licenses to 1998 level for duration of two years (order 4982/99). In 2000, this freeze was maintained at 36 licenses for artisanal fishing and 75 licenses for industrial fishing, based on 1999 references (Decree 2000-415). This measure was not accompanied by supplementary measures, such as restrictions in the volume of the catch and industrial companies compensated their diminishing returns by increasing the fishing effort to maintain production volume.

Over-exploited trepang and shark stocks, whose production in tonnage and export value are less important than shrimp have not been the focus of specific management measures to reduce or counteract any over-exploitation.

For under-exploited stock, the 2004-2007 Plan for fishing and aquaculture foresaw an annual production increase of 1,000 tonnes for deep water fish and crab. For the latter, the MAEP estimates the exploitable potential to be 15 times the present production. Moreover, deep water crustacean and cephalopod fishing offer interesting development possibilities. The major constraint has been the availability of finance for the proper implementation of the 2004/07 plan for the fisheries sector.

10.1 Main Goals/Objectives

Not much emphasis have been laid on the management of traditional fisheries as these are regulated like individual fishing, with a ban on the use of toxic substances, explosives and electrical devices to stun the fish as well as any equipment to extend diving time.

For the management of lobsters, crabs, holothurians and algae, an authorization from the Faritany Executive Committee is necessary. Same is true for the creation or the exploitation of a fishing enterprise and/or the sale and collection of its fishery products. In this case, the firm is obliged to technically assist fishermen and help them purchase materials and fishing vessels as and when required. He must also collect sales data and communicate same on a monthly basis. The holothurians and lobster fisheries are submitted to size restrictions (minimum of 11 cm fresh and 8 cm dry for holothurians and 20 cm for lobster). However, the restrictions concerning lobster are not actively enforced. Lobster fishing is also banned each year from the 1st of January to the 31st of March.

Shrimp production is by far the most important industrial fishery both in terms of volume or value. Industrial shrimp fishing has been exploited since 1967 and is constantly being monitored by the Ministry and international organisations. Formal and documented management plans have been put in place over the last years.
Deep water fishing is submitted to a regime of licences and taxes. Fishing zones are regulated (two miles in the West coast and eight miles in the East). Net sizes are regulated and vessel-owners have to provide the Ministry with catch data.

A vessel monitoring system is operational since 2002. All artisanal and industrial fishing vessels are fitted with the Inmarsat C global positioning system and must transmit their location to the CSP every hour (24 positions daily). CSP qualified observers, paid by the ship owners are placed on each vessel.

10.2 Institutional Arrangements

10.2.1 Co-management activities and participatory approaches

Madagascar has a unique mode of management for the shrimp fishery encompassing co-management of the fishery with stakeholders. New regulations have been promulgated. The control and monitoring of the fishery is carried out by the “programme national de recherche crevettière, observatoire économique de la filière crevette, autorité sanitaire halieutique”.

It is also felt that this participatory approach will be beneficial in the long term to the sustainable exploitation of the stock.

10.2.2 Rights-based approaches to fisheries management

Madagascar has not so far implemented the right based management approaches to its fisheries. However, the present management system, including data collection, analysis and organisational structure needs to be revisited for a more effective and efficient control of the various fisheries.

10. AQUACULTURE SUB-SECTOR

Species	Type	2000	2001	2002	2003	2004
Aquatic plants nei	Mariculture					
Brine shrimp	Mariculture					
Common carp	Freshwater culture	2,480	2,350	2,400	2,500	2,500
Giant tiger prawn	Mariculture	4,800	5,399	7,313	7,007	6,243
Rainbow trout	Freshwater culture	<0.5	<0.5	<0.5	<0.5	<0.5
Tilapia nei	Freshwater culture	<0.5	<0.5	<0.5	<0.5	<0.5
Total		**7,280**	**7,749**	**9,713**	**9,507**	**8,743**

Source: Fishstat 2004

Madagascar has had many problems with regards to environmental destruction by the rural population as 77% live in poverty. Aquaculture has become one of the alternatives projects in Madagascar to reduce poverty and to contribute to social well being of the population.

The USAID is one of the organizations that is helping the country with aquaculture as a way to promote rural development. This project encourages rural people to culture fish in rice fields. This project is funded by the USAID. Ever since there has been a constant supply for fingerlings since the establishment of a fish nursery. At the moment there are 210 commercial fingerlings centers producing some 6,000,0000 fingerlings for local rural fish farmers.

About 40% of the farmers raise royal carp directly in rice fields. After each season, they dig out the manure rich mud and use this to fertilize garden plots or small plots of land devoted to intensive rice production. Farmers report that the yields on these plots have increased significantly. However, due to severe food shortages, fish theft is widespread. Markets need to be expanded to cater for increased production. It is worthy to note that fish culture is helping to reduce pressure on natural resources and providing local families with food and income they need.

10.1 Fishing Communities

Madagascar is implementing various forms of community based management for its marine resources. The communities involved in fishing activities are encouraged to work in consultation with local tourism authorities, the Ministry of Fisheries and local operators to limit excessive take and reduce conflict among users.

Strategies include the establishment of a no-take zone and gear restrictions as well as re-investing from tourism into conservation and social projects.