



Republic of Mauritius

## Ministry of Agro Industry, Food Production and Security

### Annual Report 2008

#### Fisheries Division



Saving energy – Training fishermen to use sails

**Ministry of Agro Industry, Food Production and Security**

**Annual Report 2008**

**Fisheries Division**

## **Foreword**

I am pleased to present the Annual Report of the Fisheries Division for the year 2008. The report highlights the main achievements of the Fisheries Division as well as that of the fisheries sector in Mauritius. It contains information relating to the artisanal, banks and tuna fisheries, fisheries management including licensing of fishing vessels, import and export of fish and fish products, transshipment of fish, studies on the marine ecosystem, marine parks, aquaculture and fisheries protection. It also illustrates the ongoing activities of the Fisheries Training and Extension Centre which are focussed on training of fishermen and development of the FAD fishery.

Seafood hub activities are now recognised as contributing significantly to the economy. During the year, 56 723 tonnes of fish were processed by the local cannery and processing plants. 588 fishing vessels called at Port Louis for transshipment and related activities. 250 licensed fishing vessels reported to the Fisheries Monitoring Centre. The training programme for fishermen was pursued. An average of 20 Fish Aggregating Devices (FADs) were kept active around the island.

The Blue Bay Marine Park was officially designated as a Ramsar site in January 2008 and included in the List of Wetlands of International Importance.

The Norwegian Agency for Development and Cooperation (NORAD) and Mauritius entered into an agreement in April 2008 for financial assistance to fund projects for sustainable utilization of marine living resources in the waters of Mauritius.

Mauritius participated in the Indian Ocean Tuna Commission (IOTC) meeting and implemented all measures adopted by the Commission. Joint fisheries patrols were held in the waters of Mauritius and other member states of the Indian Ocean Commission (IOC) under the “Plan Regional de Surveillance des Peches dans le Sud Ouest de l’Ocean Indien” project. The South West Indian Ocean Fisheries Project (SWIOFP), a regional fisheries project including Mauritius, Comoros, Kenya, Madagascar, Mozambique, Reunion, Seychelles, South Africa and Tanzania as members, became operational.

I hope that this report will give readers a better insight into the activities carried out by the Fisheries Division and the development of the fisheries sector in Mauritius and will be a valuable source of reference for the public.

I take this opportunity to thank all the staff of the Fisheries Division, particularly the editing team for the preparation of this report.

**Mr. V. Gondeea**  
**Ag. Permanent Secretary**

## **Vision**

To be an economic pillar of Mauritius with due regard to sustainability of aquatic resources and social development for the benefit of all stakeholders.

## **Mission**

To provide an enabling environment for the promotion of sustainable development of the Fisheries Sector and to ensure continued economic growth and social development within the framework of good governance.

## **Objectives**

- Establish a conducive environment in which the fishing industry can develop.
- Contribute towards the development of Mauritius in a world class seafood hub and derive optimal benefits from marine living resources.
- Promote and regulate the optimal long-term sustainable utilisation of living marine resources.
- Carry out and promote applied research, development and management of aquatic living resources.
- Ensure that all fisheries activities allow for the conservation of vital marine ecosystems.
- Foster the interest of Mauritius within the international fisheries community, including encouraging the international trade of fish commodities within the framework of international law and conventions.
- Provide professional, responsive and customer friendly services.
- Deliver our services efficiently and effectively providing value for money.
- Continuously invest in human resource development.
- Promote the social welfare status of fishermen.

## **CONTENTS**

*Foreword*

*List of appendices*

*List of tables*

*List of figures*

*Executive Summary*

### **1. FISHERIES RESEARCH**

#### **1.1 Coastal (artisanal) fishery**

1.1.1 Catch, effort and catch per fisherman day

1.1.2 Monthly landings

1.1.3 Catch by gear

1.1.4 Fishermen

1.1.5 Price of fish

1.1.6 Study on net fishery

#### **1.2 Banks fishery**

1.2.1 Production of frozen fish

1.2.2 Comparative analysis of data from Nazareth and Saya de Malha banks

1.2.3 Length frequency distribution of *Lethrinus mahsena*

1.2.4 Fishing in the waters of the Chagos Archipelago

#### **1.3 St. Brandon inshore fishery**

1.3.1 Sampling of fish from St. Brandon

#### **1.4 The semi-industrial fishery**

#### **1.5 The fishery on the drop-off of banks**

#### **1.6 Ecotoxicology**

1.6.1 Fish toxicity

1.6.2 Harmful marine microalgae

#### **1.7 Identification of fish specimens**

#### **1.8 Sea cucumber fishery**

1.8.1 Survey on sea cucumbers

1.8.2 Sea cucumber production

## **2. MARINE SCIENCE**

### **2.1 Coastal ecosystem research**

2.1.1 Long-term monitoring of the coral reef ecosystem

#### **2.1.2 Other ecological surveys**

**2.1.3 *Biodiversité des Milieux Pélagiques marins de l’Océan Indien (BIOPS)***

#### **2.1.4 Coral farming trial**

#### **2.1.5 Coral Reef Monitoring Network**

2.1.5.1 Focal point meeting

2.1.5.2 Workshop on COREMO III software

#### **2.1.6 Mangrove propagation**

#### **2.1.7 Marine turtle nesting at Gris Gris**

### **2.2 Coastal water quality**

2.2.1 Monitoring of chemical parameters

2.2.2 Analysis for trace metals

2.2.3 Fish mortality and water quality

2.2.4 Independent Environmental Audit on Wastewater Projects

2.2.5 Monitoring of mercury level

### **2.3 Monitoring of coliform bacteria in seawater at public beaches**

### **2.4 Environment Information System (EIS)**

### **2.5 Accreditation of Laboratories**

## **3. AQUACULTURE**

### **3.1 Plankton culture**

### **3.2 Camaron culture**

- 3.2.1 Broodstock
- 3.2.2 Seed production
- 3.2.3 Sale of camaron

### **3.3 Berri rouge culture**

- 3.3.1 Broodstock and fingerlings production
- 3.3.2 Pilot project for small entrepreneurs and cooperative societies

### **3.4 Breeding and seed production of freshwater ornamental fish**

### **3.5 Aquaculture extension service**

### **3.6 Amendments to the Fisheries and Marine Resources Act 2007**

### **3.7 Guidelines for fish farming in the sea**

### **3.8 Commercial aquaculture production**

## **4. MARINE CONSERVATION**

### **4.1 Blue Bay Marine Park (BBMP)**

- 4.1.1 Management
- 4.1.2 Blue Bay Marine Park Ramsar Site
- 4.1.3 Coral reef ecosystem monitoring at BBMP

### **4.2 Balaclava Marine Park (BMP)**

- 4.2.1 Management
- 4.2.2. Construction of the BMP Centre
- 4.2.3 Demarcation of the BMP
- 4.2.4 Interference permit
- 4.2.5 Coral reef ecosystem monitoring at BMP

### **4.3 Firework displays**

### **4.4 Underwater surveys in connection with coastal development projects**

#### **4.5 Environmental Impact Assessment (EIA)**

#### **4.6 Undersea walk sites**

#### **4.7 Partnerships for Marine Protected Areas of Mauritius and Rodrigues**

#### **4.8 Marine Protected Areas Network of the Indian Ocean Commission (IOC) countries**

### **5. FISHERIES TRAINING, DEVELOPMENT AND EXTENSION**

#### **5.1 Training**

##### **5.1.1 In-service training course for Fisheries Protection Officers**

#### **5.2 FAD fishery**

##### **5.2.1 FAD deployment and maintenance**

##### **5.2.2 FAD fishery monitoring**

##### **5.2.3 Consolidation of control measures**

##### **5.2.4 FAD fishery development sub-programme under the Rural Diversification Programme**

#### **5.3 Demonstration fishing for deepwater shrimp**

### **6. FISHERIES MANAGEMENT**

#### **6.1 Licensing of fishing vessels**

##### **6.1.1 Licences issued under fishing agreements**

##### **6.1.2 Fishing licences for other foreign vessels**

##### **6.1.3 Licence fees from foreign vessels**

##### **6.1.4 Licences issued to foreign fishing vessels over the last five years**

##### **6.1.5 Licensing of Mauritian fishing boats and vessels**

#### **6.2 Port State Control**

##### **6.2.1 Monitoring of local fishing vessels**

##### **6.2.2 Monitoring of foreign fishing vessels**

##### **6.2.3 Monitoring of patagonian toothfish fishing vessels**

##### **6.2.4 Calls and transhipment of deep-sea trawlers**

### **6.3 Tuna fisheries**

#### 6.3.1 Sampling of catch from licensed purse seiners

6.3.1.1 Length frequency distribution of skipjack tuna (*Katsuwonus pelamis*)

6.3.1.2 Length frequency distribution of yellowfin tuna (*Thunnus albacares*)

6.3.1.3 Length frequency distribution of bigeye tuna (*Thunnus obesus*)

#### **6.3.2 Species composition**

#### **6.3.3 Reproductive biology of skipjack tuna**

6.3.3.1 Gonado-somatic Index (GSI)

6.3.3.2 Spawning period

6.3.3.3 Sex ratio

6.3.3.4 Length at first maturity ( $L_{m50}$ )

#### **6.3.4 Monitoring of the catch of licensed longliners**

6.3.4.1 Species composition of the catch of licensed longliners

6.3.4.2 Spatial distribution of the catch of licensed longliners

#### **6.3.5 Sampling of albacore tuna from licensed longliners**

#### **6.3.6 The local longline fishery**

#### **6.3.7 Transshipment by tuna longliners**

#### **6.3.8 Swordfish fishery**

6.3.8.1 Length frequency distribution of swordfish

#### **6.3.9 Length frequency distribution of albacore**

### **6.4 Vessel Monitoring System**

### **6.5 Import and export of fish and fish products and fish processing**

6.5.1 Import of fish and fish products

6.5.1.1 Imports for direct consumption

6.5.1.1.1 Chilled fish and fish products

6.5.1.1.2 Frozen fish and fish products

- 6.5.1.1.3 Dried fish and fish products
- 6.5.1.1.4 Smoked fish and fish products
- 6.5.1.1.5 Canned fish and fish products
- 6.5.1.1.6 Live crustaceans
- 6.5.1.2 Live ornamental fish
- 6.5.1.3 Live fish for culture
- 6.5.1.4 Fishmeal
- 6.5.1.5 Pet food
- 6.5.1.6 Sea shells

## **6.5.2 Export of fish and fish products**

- 6.5.2.1 Export of chilled fish
- 6.5.2.2 Export of marine ornamental fish
- 6.5.2.3 Re-export of freshwater ornamental fish

## **6.5.3 Fish processing**

- 6.5.3.1 Canned tuna
- 6.5.3.2 Tuna loin production
- 6.5.3.3 Salted fish
- 6.5.3.4 Fish meal production
- 6.5.3.5 Re-export of canned products

## **6.6 Fish production, consumption and trade balance**

- 6.6.1 Total fish production
- 6.6.2 Per capita consumption
- 6.6.3 Trade balance in relation to total imports and exports

## **7 FISHERIES PLANNING**

### **7.1 Fisheries Sector Strategy Paper (2008 – 2015)**

### **7.2 Regional and International Cooperation**

- 7.2.1 Interim Economic Partnership Agreement
- 7.2.2 Cooperation with Norway
- 7.2.3 Cooperation with the Overseas Fisheries Cooperation Foundation of Japan
- 7.2.4 Cooperation with Greece

- 7.2.5 Cooperation with Seychelles
- 7.2.6 Cooperation with Mozambique
- 7.2.7 Cooperation with Pakistan

## **8. FISHERIES PROTECTION SERVICE (FPS)**

### **8.1 Artisanal fishermen**

### **8.2 Registration of boats**

### **8.3 Licences**

### **8.4 Illegal fishing**

### **8.5 Allowances to artisanal fishermen**

- 8.5.1 Bad weather allowance
- 8.5.2 Closed season allowance
- 8.5.3 Sick leave allowance

### **8.6 Incentives to registered fishermen**

- 8.6.1 Scholarships to children

### **8.7 Buy-back scheme for nets**

## **9. MISCELLANEOUS**

### **9.1 Visits**

### **9.2 Information Service**

### **9.3 New library holdings**

### **9.4 Sales and distribution of publications**

### **9.5 The Fisheries and Marine Resources Act**

### **9.6 South West Indian Ocean Fisheries Project (SWIOFP)**

### **9.7 “Plan Regional de Surveillance des Peches dans le Sud-Ouest de l’Ocean Indien”**

## **LIST OF APPENDICES**

1. Organisational Chart of the Fisheries Division of the Ministry of Agro-Industry, Food Production and Security
2. Organisational Chart of the Fisheries Division (Technical services)
3. Activities of the Fisheries Division (Technical Services)
4. Organisational Chart of the Fisheries Protection Service
5. List of projects and services
6. Meetings, workshops, seminars and courses attended
7. Coastal development projects
8. Environment Impact Assessment
9. Publications on Sale at the Documentation Unit
10. Extract of the First Schedule of the FMRA 2007 (amended)

## **LIST OF TABLES**

- 1.1 Catch, fisherman-days and CFPD
- 1.2 Monthly catch with value, effort and CFPD
- 1.3 Annual catch (kg) by gear
- 1.4 Number of fishermen by gear type
- 1.5 Yearly average retail price of fresh fish (Rs/kg)
- 1.6 Fish sampled with size range
- 1.7 Particulars of the fishing fleet
- 1.8 Annual catch (t) of frozen fish by fishing area/bank
- 1.9 Fishing effort, catch (t) and catch per fisherman day (kg) by the fishing areas
- 1.10 Catch (t), effort (fisherman-days) and CFPD (kg) in the fishery
- 1.11 Particulars on fishing in the waters of the Chagos Archipelago
- 1.12 St. Brandon inshore fishery production (t)
- 1.13 Particulars of vessels operating in the semi-industrial fishery
- 1.14 Catch (kg) by species and fishing area
- 1.15 Catch, effort and CFPD in the fishery
- 1.16 Catch (kg) by species from drop-ff of banks
- 1.17 Results of tests by mouse bioassay

- 1.18 Total number of dinoflagellates recorded (cell count)
- 2.1 Average percentage cover of substrate at monitoring stations
- 2.2 Abundance of fish, sea urchins and sea cucumber
- 2.3 Other ecological surveys
- 2.4 Range of values for results of water analyses (2006 - 2008)
- 2.5 Sites of alleged pollution and fish mortality
- 2.6 Water quality at the three outfalls (2006 - 2008)
- 2.7 Results of coliform analysis at the monitoring sites
- 3.1 Aquaculture production (t)
- 4.1 Number of permits issued and fees collected
- 4.2 Percentage substrate cover at BBMP
- 4.3 Number of fish/100m<sup>2</sup> at BBMP
- 4.4 Percentage substrate cover at BMP
- 4.5 Number of fish/100m<sup>2</sup> at BMP
- 5.1 Summary of training courses and number of fishermen trained from 1986 to 2008
- 5.2 Location of FADs
- 5.3 Sea trips effected
- 6.1 Licences issued to foreign vessels under fishing agreements
- 6.2 Licences issued to foreign fishing vessels not falling under fishing agreements
- 6.3 Licences issued to foreign vessels by category (2004 - 2008)
- 6.4 Categories of local vessels
- 6.5 Details of calls of vessels
- 6.6 Details of vessels calling at Port Louis
- 6.7 Calls of foreign vessels at Port Louis
- 6.8 Transshipment of patagonian toothfish (t)
- 6.9 Transshipment by trawlers (t)
- 6.10 Species composition of purse seiners catch (%)
- 6.11 Species composition of the catch of licensed foreign longliners
- 6.12 Species composition of fish transhipped (t)
- 6.13 Catch composition of the local swordfish fishing vessels (kg)
- 6.14 Vessels reporting to the FMC
- 6.15 Imports of chilled fish and fish products (t)
- 6.16 Imports of frozen fish and fish products (t)
- 6.17 Import of dried fish and fish products (t)
- 6.18 Import of canned fish (t)
- 6.19 Export and local sale of canned tuna and pet food (t)
- 6.20 Import, production and sale of salted fish (t)

- 6.21 Production of fish meal (t)
- 6.22 Total fish production (t)
- 6.23 Per capita consumption of fish (kg)
- 6.24 Import and export of fish and fish products and trade balance
- 8.1 Details of registered fishermen
- 8.2 Registration of artisanal fishing boats
- 8.3 Number of licences
- 8.4 Number of interventions and court cases
- 8.5 Bad weather allowance
- 8.6 Number of bad weather days by zone
- 8.7 Closed season allowance
- 8.8 Sick leave allowance
- 8.9 Scholarship allowance
- 8.10 Amount paid (Rs)
- 9.1 Visits to AFRC

## **LIST OF FIGURES**

- 1.1 Fisherman-days and total catch
- 1.2 Catch per fisherman-day
- 1.3 Trend in catch for the banks fishery (1999 – 2008)
- 1.4 Trends in CPFD for the Nazareth and the Saya de Malha banks (2004 – 2008)
- 1.5 Length frequency of *Lethrinus mahsena* from the Nazareth bank
- 1.6 Length frequency of *Lethrinus mahsena* from the Saya de Malha bank
- 1.7 Length-weight relationship of *Lethrinus mahsena* from St. Brandon
- 1.8 Length frequency distribution of *Lethrinus mahsena* from St. Brandon
- 1.9 Length frequency of *Lethrinus mahsena* from Albatross bank
- 1.10 Length-weight relationship of *Lethrinus mahsena* from Albatross bank
- 1.11 Percentage representation of catch (A) by banks and species (B) of the deepwater snapper and grouper fishery
- 1.12 Length frequency of gueule pavée doré from the Nazareth bank
- 2.1 Percentage of substrate cover at monitoring stations
- 2.2 FAD at Baie du Tombeau
- 2.3 FAD as seen from underwater
- 2.4 Basal plate with coral fragments in lagoon at Albion
- 2.5 Turtle hatchling
- 5.1 FADs around Mauritius

- 6.1 Length frequency distribution of skipjack tuna
- 6.2 Length frequency distribution of yellowfin tuna
- 6.3 Length frequency distribution of bigeye tuna
- 6.4 Gonado-somatic Index (GSI) of skipjack tuna
- 6.5 Length of skipjack tuna v/s percentage maturity
- 6.6 Catch distribution of licensed longliners
- 6.7 Length frequency distribution of albacore tuna
- 6.8 Catch composition of Mauritian longliners
- 6.9 Percentage of the three main species transhipped by longliners
- 6.10 Species composition of the catch
- 6.11 Length frequency distribution of swordfish
- 6.12 Length frequency distribution of albacore tuna
- 6.13 Imports per category
- 6.14 Categories of fish and fish products for direct consumption
- 6.15 Import of fish and fish products by country of origin
- 6.16 Import of frozen fish

## **Executive Summary**

Fresh fish production in the coastal fishery was 682 tonnes comprising 367 tonnes from the lagoon and 315 tonnes from off-lagoon areas. There were 2 028 fishermen and 1 457 boats operating in the artisanal sector.

A total of 1 694 tonnes of frozen fish was landed from the fishing banks and comprised mostly of lethrinids (91%). The total amount of fish and fish products produced from the St. Brandon fishery was 454 tonnes. Besides, 21 semi-industrial vessels landed 173 tonnes of chilled fish and 7 tonnes of frozen fish from the Albatross and Nazareth banks.

The long term monitoring of the coral reef ecosystem and seawater quality was continued at the established sites around the island. No coral bleaching was observed. The pilot project of coral farming in the lagoon of Albion was initiated. Coral fragments from different species were collected and cultured on basal plates deployed in the lagoon of Albion. The cultured coral fragments settled successfully and were growing.

A 5-year action plan for the accreditation of the laboratories at AFRC was formulated. Designs and layout for the renovation/upgrading of the laboratories as well as the animal house were prepared.

Seed production of berri rouge, fresh water ornamental fish and the giant freshwater prawn were continued. Breeding techniques of sailfin molly, platy and goldfish were successfully developed. Technical advice was provided to 350 persons willing to embark in aquaculture projects.

The monitoring of the two marine parks was continued. 105 new permits were issued to the different users of the Blue Bay Marine Park (BBMP) and 246 permits were renewed against payment. The BBMP was officially designated as a Ramsar site and listed as a Wetland of International Importance.

A total of 46 fishermen had benefited from various training courses dispensed at FITEC. An average of twenty FADs was kept active around the island. Regulations for the control of fishing around FADs were drafted.

99 fishing licences were issued to foreign fishing vessels to operate in Mauritius waters while 23 licensed Mauritian vessels were involved in different fishing activities. A total of 588 fishing vessels called at Port Louis for transshipment, bunkering, dry-docking, provisions and changing of crew. 250 fishing vessels reported to the Fisheries Monitoring Centre comprising 31 local and 219 foreign vessels.

Licensed and non-licensed tuna longliners transhipped 20 250 tonnes of tuna and tuna-like species. The amount of toothfish transhipped was 1 764 tonnes.

The Fisheries Sector Strategy Plan (2008 - 2015) was prepared and submitted in December for incorporation in the Agriculture Sector Strategy Plan with the objective to embed the Medium Term Expenditure Framework within the Programme Based Budget.

Sea cucumber surveys were carried out at 8 sites in Mauritius to re-assess the status of the stock. The overall density was estimated at 58 000 individuals/km<sup>2</sup> in the lagoon around the island. A maximum allowable catch of 275 tonnes (wet weight) was imposed for the exploitation of the resources for the period 1<sup>st</sup> August 2008 to 31<sup>st</sup> July 2009 with a closed season from January to March 2009.