

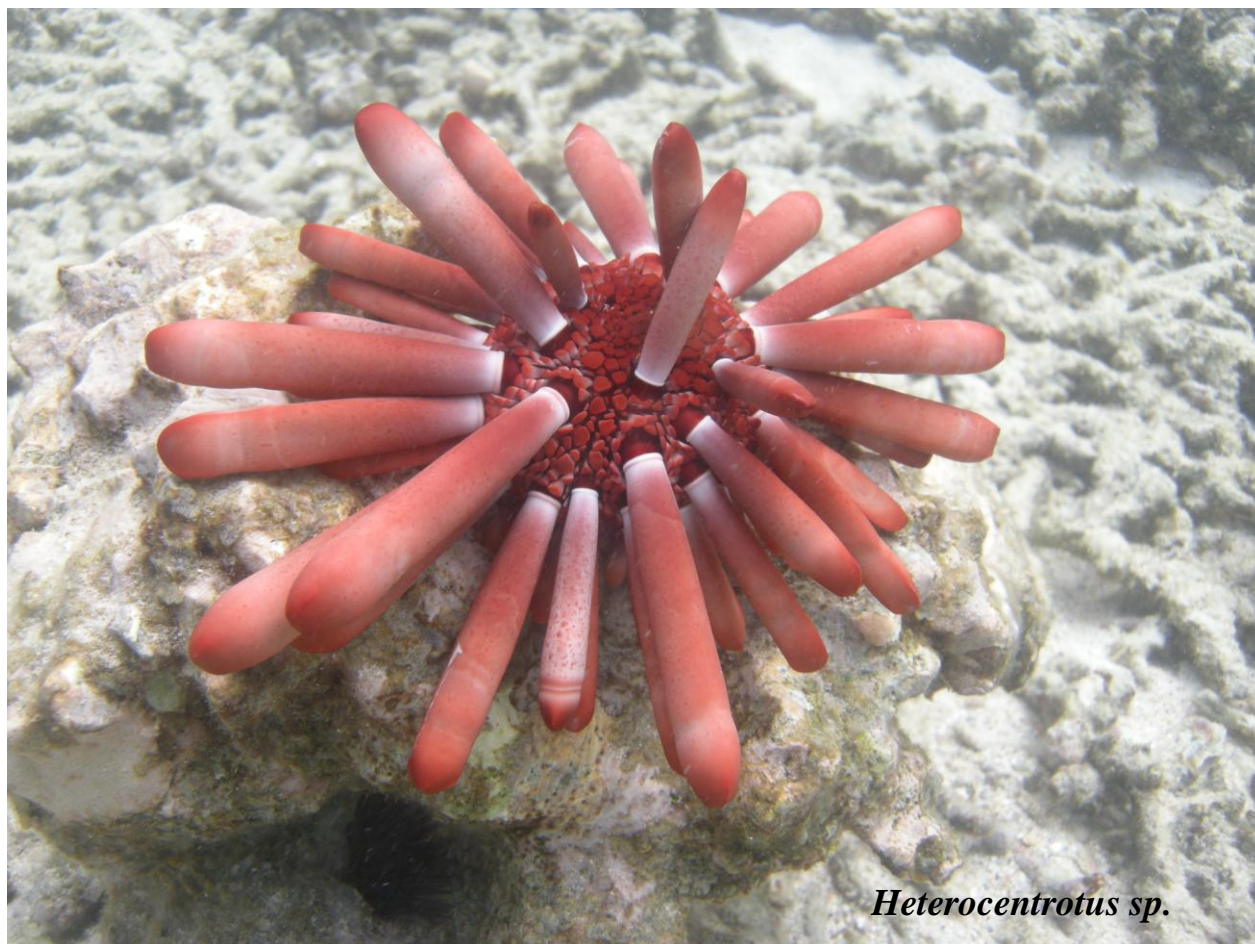


Republic of Mauritius

Ministry of Agro Industry, Food Production and Security

Annual Report 2009

Fisheries Division



Heterocentrotus sp.

Ministry of Agro Industry, Food Production and Security

Annual Report 2009

Fisheries Division

Foreword

I am pleased to present the Annual Report of the Fisheries Division for the year 2009. The report contains information on the activities carried out by the Albion Fisheries Research Centre, the Fisheries Training and Extension Centre and the Fisheries Protection Service. It covers the areas of fisheries research, fisheries development and management, aquaculture and the marine environment, training and enforcement of fisheries legislation. The monitoring of fisheries activities and the marine ecosystems are important for the analysis of trends in the fisheries sector and for the establishment of management measures for sustainable exploitation of the fisheries and marine resources.

During the year, the Ministry has pursued several programmes aimed at increasing fish production, promoting conservation of the marine ecosystems and combating illegal, unreported and unregulated (IUU) fishing. The year marked the finalization and approval of the National Plan of Action to combat IUU fishing in line with the FAO – International Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing.

This Annual Report will provide a valuable reference document to all stakeholders, the fishing industry, all those concerned with the protection and conservation of the marine environment and the public at large.

I wish to express our gratitude to funding partners, namely, UNDP, FAO, Commission de l’Océan Indien, Norwegian Agency for Development Cooperation (NORAD), the World Bank and other countries for their partnership in implementing various projects and look forward to their continued support in the future.

I take this opportunity to thank the staff of the Fisheries Division, particularly the dedicated editing team, for their active participation in 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

1.2 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 tests

1.6.2 Harmful marine microalgae

1.7 Identification of fish specimens

1.8 Sea cucumber fishery

1.9 South West Indian Ocean Fisheries Project (SWIOFP) – Components 1 and 3

2. MARINE SCIENCE

2.1 Coastal ecosystem research

- 2.1.1 Long-term monitoring of the coral reef ecosystem
- 2.1.2 Survey on algal bloom and coral bleaching
- 2.1.3 Other ecological surveys
- 2.1.4 Coral farming
- 2.1.5 Mangrove propagation
- 2.1.6 Stranded marine mammals/turtles

2.2 Coastal water quality

- 2.2.1 Monitoring of chemical parameters
- 2.2.2 Monitoring of the levels of trace metals
- 2.2.3 Fish mortality and alleged pollution
- 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 Accreditation of Laboratories

3. AQUACULTURE

3.1 Plankton culture

3.2 Freshwater prawn culture

- 3.2.1 Broodstock
- 3.2.2 Seed production
- 3.2.3 Sale of freshwater prawn seed

3.3 Berri rouge culture

- 3.3.1 Broodstock and fingerlings production

3.4 Training on breeding and seed production of freshwater ornamental fish

3.5 Sea cucumber culture

3.5.1 Maintenance of broodstock

3.5.2 Culture trial of *Holothuria leucospilota*

3.5.3 Asexual reproduction

3.6 Aquaculture extension service

3.7 Commercial aquaculture production

3.8 Assistance from Overseas Fisheries Cooperation Foundation (OFCF)

4. MARINE CONSERVATION

4.1 Blue Bay Marine Park (BBMP)

4.1.1 Management

4.1.2 Permit fees

4.1.3 Coral reef ecosystem monitoring at BBMP

4.2 World Environment Day 2009 celebration - BBMP

4.3 Balaclava Marine Park (BMP)

4.3.1 Management

4.3.2 Construction of the BMP Centre

4.3.3 Demarcation of the BMP

4.3.4 Biological inventory of the BMP

4.3.5 Coral reef ecosystem monitoring at BMP

4.3.6 Monitoring of coral bleaching at the BBMP and BMP

4.4 Permits/Clearances

4.4.1 Firework displays

4.4.2 Interference permits within MPAs

4.5 Environmental Impact Assessment (EIA)

4.6 Underwater surveys in connection with coastal development projects

4.7 Undersea walk sites

4.8 Monitoring of ex-sand mining sites

4.9 Partnerships for Marine Protected Areas in Mauritius and Rodrigues

4.10 Marine Protected Areas Network of the Indian Ocean Commission Countries (MPA-IOC)

5. FISHERIES TRAINING, DEVELOPMENT AND EXTENSION

5.1 Training

5.1.1 Training of fishermen

5.1.2 Training in fish handling, preservation and marketing for fishmongers

5.2 FAD fishery

5.2.1 FAD fishery monitoring

5.2.2 FAD fishery development sub-programme under the International Fund for Agricultural Development (IFAD) Rural Diversification Programme

5.2.3 Research/Training boats

5.2.4 Consolidation of control measures

5.2.5 Assistance from the Government of Japan

5.2.6 Cooperation with Norway

5.2.7 ISO Quality Management System project

6. FISHERIES MANAGEMENT

6.1 Licensing of fishing vessels

6.1.1 Licences issued to foreign vessels under fishing agreements

6.1.2 Fishing licences issued to other foreign vessels

- 6.1.3 Licence fees from foreign fishing vessels
- 6.1.4 Licences issued to foreign fishing vessels over the last five years
- 6.1.5 Licensing of Mauritian fishing vessels

6.2 Port State Control

- 6.2.1 Monitoring of local fishing boats/vessels
- 6.2.2 Monitoring of foreign fishing vessels
- 6.2.3 Monitoring of patagonian toothfish fishing vessels
- 6.2.4 Calls and transshipment 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 Monitoring of the catch of licensed longliners

- 6.3.3.1 Species composition of the catch of licensed longliners
- 6.3.3.2 Spatial distribution of the catch of licensed longliners
- 6.3.3.3 Sampling of catch of licensed longliners

6.3.4 The local longline fishery

6.3.5 Transshipment by tuna longliners and carriers

6.4 Vessel Monitoring System

- 6.4.1 Logbooks verification

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
 - 6.5.1.2 Chilled fish and fish products

- 6.5.1.3 Frozen fish and fish products
- 6.5.1.4 Dried fish and fish products
- 6.5.1.5 Smoked fish and fish products
- 6.5.1.6 Canned fish and fish products
- 6.5.1.7 Live crustaceans
- 6.5.1.8 Live ornamental fish
- 6.5.1.9 Fishmeal
- 6.5.1.10 Pet food
- 6.5.1.11 Dried seashells

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

6.5.3 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
- 6.5.3.6 Export of fish oil

6.6 Fish production, consumption and trade balance

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

7. FISHERIES PLANNING

7.1 Regional and International Cooperation

- 7.1.1 Cooperation with the Government of Western Australia
- 7.1.2 Cooperation with Norway
- 7.1.3 Cooperation with the European Community
- 7.1.4 Fish Auction Market

- 7.1.5 Cooperation with Japan
- 7.1.6 Cooperation with Pakistan

7.2 Fisherman Investment Trust (FIT)

7.3 Fisheries Project Appraisal

7.4 Projects under the Food Security Fund

7.5 IFAD/MARS Programme

8. FISHERIES PROTECTION SERVICE

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
- 8.6.2 Fishermen lost at sea

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 Reprints

9.6 Placement

**9.7 Project “Plan Regional de Surveillance des Peches dans le Sud-Ouest de l’Ocean Indien” –
Commission de l’Ocean Indien/Monitoring, Control and Surveillance (COI/MCS)**

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
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 training courses attended
7. Publications on Sale at the Documentation Unit
8. Environmental Impact Assessment
9. Underwater ecological surveys
10. Missions and visits at AFRC

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 Particulars of the fishing fleet
- 1.7 Annual catch (t) of frozen fish by fishing area/bank
- 1.8 Fishing effort, catch (t) and catch per fisherman day (kg) by fishing areas
- 1.9 Catch (t), effort (fisherman-days) and CFPD (kg) for the Nazareth and Saya de Malha banks
- 1.10 Details on fishing activities in the waters of the Chagos Archipelago
- 1.11 St. Brandon inshore fishery production (t)
- 1.12 Details of boats operating in the semi-industrial fishery
- 1.13 Catch (kg) by species and fishing area
- 1.14 Catch, effort and CFPD in the fishery
- 1.15 Catch (kg) by species and fishing location from drop-off fishery of the banks
- 1.16 Results of tests by mouse bioassay
- 1.17 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 Stranded marine mammals/turtles
- 2.5 Range of values for results of water analyses (2007 - 2009)
- 2.6 Sites of alleged pollution and fish mortality
- 2.7 Water quality at the three outfalls (2007 - 2009)
- 2.8 Results of coliform analysis at the monitoring sites
- 3.1 Aquaculture production
- 4.1 Return of permits
- 4.2 Percentage substrate cover at Blue Bay Marine Park
- 4.3 Number of fish/100m² at Blue Bay Marine Park
- 4.4 Percentage substrate cover at Balaclava Marine Park
- 4.5 Number of fish/100m² at Balaclava Marine Park
- 5.1 Summary of training courses and number of fishermen trained from 1986 to 2009

- 5.2 Location of FADs
- 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 gear type
- 6.4 Details of calls of foreign fishing vessels
- 6.5 Details of fishing vessels calling at Port Louis
- 6.6 Calls of foreign fishing vessels at Port Louis
- 6.7 Transshipment of patagonian toothfish (t)
- 6.8 Transshipment by trawlers (t)
- 6.9 Species composition of purse seine catches (%)
- 6.10 Species composition of the catch of licensed foreign longliners
- 6.11 Species composition of fish transhipped (t)
- 6.12 Vessels reporting to the FMC
- 6.13 Number of data reports received by the FMC from fishing vessels using Inmarsat transponders for the past five years
- 6.14 Imports of chilled fish and fish products (t)
- 6.15 Imports of frozen fish and fish products (t)
- 6.16 Import of dried fish and fish products (t)
- 6.17 Import of canned fish (t)
- 6.18 Export and local sale of canned tuna and pet food (t)
- 6.19 Import, production and sale of salted fish (t)
- 6.20 Production of fish meal (t)
- 6.21 Total fish production (t)
- 6.22 Per capita consumption of fish (kg)
- 6.23 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 Details of fishmongers' licences
- 8.5 Number of interventions
- 8.6 Payments of bad weather allowance
- 8.7 Bad weather days and number of beneficiaries
- 8.8 Payments of closed season allowance
- 8.9 Sick leave allowance

- 8.10 Scholarship allowance
- 8.1 Amount paid (Rs) under net reduction scheme
- 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
- 1.4 Trends in CPFD for the Nazareth and the Saya de Malha banks (2005 – 2009)
- 1.5 Length frequency of *Lethrinus mahsena* from the Saya de Malha bank
- 1.6 Length-weight relationship of *Lethrinus mahsena* from St. Brandon
- 1.7 Length frequency distribution of *Lethrinus mahsena* from St. Brandon
- 1.8 Length frequency of *Lethrinus mahsena* from the Albatross bank
- 1.9 Length-weight relationship of *Lethrinus mahsena* from the Albatross bank
- 1.10 Breakdown of frozen and chilled catches by fishing locations on the drop-offs of Nazareth, Saya de Malha, St. Brandon and Albatross
- 1.11 Percentage representation of catch by banks
- 1.12 Percentage representation of the deepwater snapper and grouper fishery by species
- 1.13 Length frequency of *Polysteganus baissaci* (gueule pavée doré) from the Nazareth bank
- 2.1 Percentage of substrate cover at monitoring stations
- 2.2 Dead millepora (fire coral) corals due to the algal bloom at Poudre d’Or
- 2.3 Tabular corals totally bleached at Belle Mare
- 2.4 Success rate of farmed coral species (%)
- 2.5 Comparison of a plate in November 2008 and December 2009
- 2.6 Dead pilot whale in Belle Mare
- 4.1 Sea cucumber (*Holothuria atra*) in seagrass bed (*Halophila* sp.)
- 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 Catch distribution of licensed longliners
- 6.5 Length frequency distribution of albacore tuna
- 6.6 Catch composition of Mauritian longliners

- 6.7 Percentage of the three main species transhipped by longliners
- 6.8 Imports per category
- 6.9 Categories of fish and fish products for direct consumption
- 6.10 Import of fish and fish products by country of origin
- 6.11 Import of frozen fish

Executive Summary

Fresh fish production estimates from the coastal fisheries increased slightly to 820 tonnes, as compared to 682 tonnes in 2008, comprising 496 tonnes from the lagoon and 324 tonnes from off-lagoon areas with an average catch per fisherman day of 6.4 kg. There were 2 303 fishermen and 2 525 boats operating in the artisanal sector.

A total of 2 232 tonnes of frozen fish, mainly lethrinids (87.1%) was landed from the fishing banks. The increase of 32% in the total catch was attributed to a greater fishing effort. In addition, 120 tonnes of chilled fish and 5 tonnes of frozen fish were landed by 10 semi-industrial boats and 9 carrier boats. The produce from the St. Brandon fishery amounted to 390 tonnes of chilled, salted and frozen fish, including frozen octopus and lobster.

The long term monitoring of the coral reef ecosystem and seawater quality was continued at the established sites around the island. Some back reef stations of the coral reef monitoring sites showed a gradual decline in coral cover over the past 5 years. Sea surface temperature recorded in the lagoons in the north of Mauritius showed a significant increase up to 31 °C in January. This contributed to a bloom of microalgae which led to the depletion of dissolved oxygen resulting in some fish mortality and the smothering of live corals in the lagoon of Poudre d'Or and Anse La Raie. Surveys were conducted at Belle Mare, Anse La Raie and Bel Ombre, and at the fore reef of Ile aux Benitiers to assess the extent of bleached coral. Follow up surveys during the year showed that 85% of the bleached corals at Belle Mare had recovered.

Monitoring of the growth of coral fragments from different species cultured on basal plates in the lagoon of Albion was continued. *Acropora* spp. had the fastest growth rate and were less resistant to coral bleaching. The other species, *Galaxea fascicularis*, *Pocillopora damicornis* and *Porites* sp. had a relatively good growth and were resistant to bleaching.

As part of the accreditation process of the laboratories at AFRC, the renovation works in the fish toxicity, chemistry and bacteriology laboratories and animal house were completed in September.

Seed production of berri rouge, fresh water ornamental fish and the giant freshwater prawn were pursued. Officers dispensed training sessions on breeding and culture of freshwater ornamental fish which were sponsored by the National Women Entrepreneur Council. Technical advice was provided to 92 persons

willing to embark on aquaculture projects. The total aquaculture production (freshwater and marine) amounted to 435 tonnes.

The monitoring of the two marine parks was continued. 413 permits were issued for the various activities at the Blue Bay Marine Park. Registered artisanal fishermen were exempted of charges for permits. The Indian Ocean Commission (IOC) Project “Network of Marine Protected Areas of the IOC Countries – (NMPA-IOC)” funded the inventory of the Balaclava Marine Park and the manufacture of buoys for the demarcation of its conservation and mooring zones. The inventory identified 275 species of fish, 118 species of hard corals and 219 species of molluscs.

A total of 48 fishermen benefited from various training courses dispensed at FITEC. 269 fishmongers attended the training course in fish handling, preservation and marketing. Fish Aggregating Devices (FADs) were deployed for the first time off Grand River North West and Mon Choisy. Regulations for the control of fishing around FADs were drafted. The regulations on “The Safety and Security Measures for Fishermen at Sea” were finalised.

192 fishing licences were issued to foreign vessels to operate in Mauritius waters while 20 licensed Mauritian vessels were involved in different fishing activities. A total of 604 fishing vessels called at Port Louis for transshipment, bunkering, dry docking, supply of provisions and changing of crew. 264 fishing vessels, comprising 32 local and 232 foreign vessels, reported to the Fisheries Monitoring Centre. A total of 35 088 tonnes of tuna and tuna-like species was transshipped at Port Louis by tuna fishing vessels and carriers. The amount of toothfish transshipped was 1 276 tonnes.

Technical assistance was obtained from the Government of Western Australia (GoWA) through the MoU between GoWA and Mauritius for the implementation of the “Assessment of Bad Weather Allowance” and the “Assessment of lagoon and off-lagoon fish stocks using existing data”. Both projects were funded by the International Fund for Agricultural Development (IFAD) – Marine Agricultural Resources Support (MARS) programme.

The National Plan of Action to prevent, deter and eliminate illegal, unreported and unregulated fishing (NPOA-IUU) was finalised under the Mauritius-Norway bilateral cooperation agreement. An acoustic survey of the deep-water fish stocks on the northern slopes of the Nazareth Bank was carried out to assess the deep-water resources under the same agreement.