



REPUBLIC OF MAURITIUS

NATIONAL AUDIT OFFICE

PERFORMANCE AUDIT REPORT

MOVING TOWARDS SUSTAINABLE ARTISANAL FISHERY IN MAURITIUS

**Ministry of Ocean Economy, Marine Resources,
Fisheries and Shipping**

DECEMBER 2018

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ABBREVIATIONS AND ACRONYMS

AFRC	Albion Fisheries Research Centre
BWA	Bad Weather Allowance
DBM	Development Bank of Mauritius
FAD	Fish Aggregating Device
FAO	Food and Agricultural Organisation
FIT	Fishermen Investment Trust
FITEC	Fisheries Training and Extension Centre
FPS	Fisheries Protection Service
GEF	Global Environment Facility
JICA	Japanese International Cooperation Agency
METT	Management Effective Tracking Tool
MPAS	Marine Protected Areas
NAO	National Audit Office
SDG	Sustainable Development Goals
UNDP	United Nations Development Programme

EXECUTIVE SUMMARY

Fisheries is a priority sector in the Republic of Mauritius as it provides an important source of income and nutrition, and attracts investment in areas of fishing, seafood hub and aquaculture. Government provides support to this sector through the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, formerly known as the Ministry of Fisheries.

The main supply of fresh fish to the local market is from artisanal fishery which also provides employment opportunities in the coastal regions, thereby contributing significantly to poverty alleviation and food security. Over the years, the Ministry took several measures to sustain artisanal fishery. It paid registered artisanal fishermen some Rs 60 million annually as Bad Weather Allowance (BWA), spent some Rs 50 million on projects for their relocation to off lagoon and adoption of aquaculture during the period 2012 to 2017, and some Rs 68 million as payroll costs on the Fisheries Protection Service (FPS) in financial year 2016-17. Despite these measures, the artisanal fishery production during the period 2012 to 2017 was on the decrease, while total local fish consumption kept on increasing.

Inefficiencies in the allocation of BWA were highlighted by the National Audit Office (NAO). Reports commissioned by the Ministry also highlighted similar inefficiencies. Moreover, issues relating to inadequate protection and enforcement activities by the Ministry were reported in the media.

The NAO participated in a collaborative audit project undertaken by AFROSAI-E, focusing on Coastal Management Governance and environmental protection of coastlines. In the project, critical issues, such as over-fishing, and measures taken by Governments to align national priorities with the 2030 Agenda for Sustainable Development, Africa Agenda 2063 and other international, regional and national commitments were being assessed.

It was against this background that the NAO carried out this Audit on ‘Moving Towards Sustainable Artisanal Fishery in Mauritius’ to assess whether measures implemented by the Ministry were effective to support sustainable artisanal fishery.

Key Findings

In line with SDG 14.B ‘Provide access for small-scale artisanal fishers to marine resources and markets’, the Ministry took measures comprising a range of incentives and projects to support and sustain artisanal fishery. The measures formed part of a three-pronged approach, namely targeting individual fisherman, those grouped in cooperatives, and interventions at national level through conservation, protection and enforcement activities.

Key findings at each of the three levels of interventions are presented in the paragraphs below:

Effectiveness of Incentives and Supports to Individual Artisanal Fishermen

Presently, the BWA Scheme is used as an income support to compensate for decreasing revenue from catch. Also, grant scheme set up for purchase of ‘Canottes’ and equipment is expected to shift fishermen to off lagoon fishing, where the catch is relatively higher. These initiatives are aligned to the Food and Agricultural Organisation (FAO) Code of Responsible

Fisheries which promotes measures aiming at reducing the pressure on ecosystems and allows the regeneration of fish stocks. Main findings are as follows:

- BWA was being paid irrespective of whether fishermen were actually engaging in fishing activity, were medically fit and were able to fish in even declared bad weather days. Payment of BWA, which was initially designed to sustain livelihood of artisanal fishermen, was not determined by the criteria set;
- The Scheme was not supporting the shift of artisanal fishermen to off lagoon fishing as it entailed increase in yearly BWA payments. Still, due to inadequate safeguards in the Scheme, the FPS could not prevent a fisherman who had benefited from grants targeting off lagoon fishing, be in receipt of higher number of Bad Weather Days, and yet, was fishing in the depleted lagoon. This resulted in BWA being continuously paid for fishing in an already stressed lagoon, when such Allowance should have been a support to sustain off lagoon fishery;
- In March 2018, without seeking the approval of Government, the Ministry decided to allocate 151 new Fisherman Cards, including to those fishermen who were fishing for less than 10 per cent of the time, contrary to established criteria set in the policy of 2007. Allocating Fisherman Cards to those not satisfying established criteria, did not ensure registration of genuine applicants;
- The ‘Canotte’ Scheme introduced in 2014 aimed at providing financial support to registered artisanal fishermen to acquire newly constructed fishing boats (‘Canottes’), and related accessories to enable them to go fishing off lagoon where the catch per fisherman per day was higher than that in the lagoon. This would enhance their livelihood and reduce pressure on the lagoon. However, the Scheme was not adequately designed, implemented and monitored to ensure that the objectives were met.

Effectiveness of Projects to Relocate Artisanal Fishermen at Community Level

In 2007, Government set up the Fishermen Investment Trust (FIT) as an investing arm of the Ministry to venture in projects that would support the fishermen community to move to off lagoon and encouraging them to adopt aquaculture. The Ministry, on the other hand, also invested in Fish Aggregating Devices (FADs) to move fishermen off lagoon, and in 10 floating cages culture to promote shift to aquaculture. Moreover, two pilot aquaculture projects were undertaken in collaboration with Japan International Corporation Agency and SmartFish Programme.

- Since its inception, of the nine projects FIT planned to undertake, seven were either not developed or not implemented. The two projects implemented, namely, the Acquisition and Rental of three Fishing Boats and the Sale of Fish Quota, did not meet their objectives. FIT eventually ceased its activities in 2014 due to difficulties experienced. However, as of March 2018, the Ministry had not yet taken any decision on the future of FIT. In the meantime, its main assets (three fishing boats) were lying idle and subject to deterioration;
- In April 2013, the Project ‘Support for Sustainable Aquaculture Development through the Promotion of Small-Scale Cage Culture in the Lagoon of Mauritius’ was developed through a collaboration between the FIT and the Indian Ocean Commission (SmartFish

Programme). The objectives were to train beneficiaries, academics and Albion Fisheries Research Centre Technicians on the construction of small farming cages and their settling at sea, as well as technical and financial management of a small aquaculture farm. Six floating cages costing some US \$ 61,000 (some Rs 1.8 million) were set up. In December 2017, personnel of FIT reported that no monitoring on the Project was carried out, and beneficiaries reported hardship in managing the project. As at April 2018, the Ministry could not confirm the outcome of this Project;

- In November 2016, a Floating Cage Project costing some Rs 11 million was implemented by the Ministry. It was expected that with the success of this Project, more fishermen would, in the longer term, be involved in a profitable and sustainable aquaculture business project. Cages which were expected to sustain harsh sea conditions were damaged leading to loss of fish, and subsequently, left in an abandoned state. Monitoring and follow up on cage maintenance and fish growth were not adequate. Lessons learned on previous two pilot projects had not been embedded in the design, implementation, monitoring and follow up on this Project. As at March 2018, the actual outcome of the Project did not indicate that it was supporting the switch to successful small scale fish farming;
- As of November 2017, there were 28 dedicated sites where FADs had been set up, with the aim to increase and diversify the income of fishermen, and concurrently, divert fishing effort from the exploited lagoon. To promote off lagoon fishery, FADs were maintained at a cost of some Rs 2 million annually. However, the number of beneficiaries who was effectively engaged in that fishery was not ascertained, and the benefits achieved were not assessed by the Ministry.

Effectiveness of Conservation, Protection and Enforcement Activities to Promote Sustainable Artisanal Fishery

Marine Protected Areas (MPAs), Fishing Reserves and marine ranching are part of conservation strategies supported by the Ministry to conserve marine biodiversity and replenish fish stock. Equally important are activities of the FPS of the Ministry to prevent damage to the parks, reserves and lagoons through illegal and destructive fishing activities.

- Management Plans for Blue Bay and Balaclava Marine Parks were prepared under a project sponsored by the United Nations Development Programme and the Global Environment Facility. Under a cost-sharing contribution, the Ministry disbursed some Rs 10.5 million for the project. As at March 2018, the Management Plans were not yet approved by Government. No Action Plans were developed and resources committed for their implementation. Actions so far undertaken by the Ministry were inadequate to provide the required overview and assurance on governance, conservation, sustainable financing and livelihoods and environmental awareness in respect of the Parks;
- Under the “Mainstreaming Biodiversity in the Management of the Coastal Zone in the Republic of Mauritius’ Project of 2016, it was emphasised to enhance enforcement measures in all the six Fishing Reserves as they obtained a low score on the assessment of the enforcement of conservation activities. In March 2018, examination of enforcement activities of the FPS in Poudre d’Or Fishing Reserve confirmed the prevailing low level of surveillance on this reserve of some 25 km²;

- Fingerlings were released in lagoon areas in view of replenishing the lagoon for their eventual capture at marketable size by local fishermen. During the period 2012 to 2017, some 2.1 million fingerlings, costing some Rs 4.2 million, were released in Marine Parks, Fishing Reserves and lagoon areas. The Ministry had not assessed whether the objectives, such as the increase in catch recorded at Fish Landing Stations, were met and corrective actions needed to enhance the process;
- Protection and enforcement activities of FPS included surveillance through patrols. However, issues relating to staffing and logistics, which were of recurrent nature, impacted negatively on surveillance. Overall, during the day, most of the time, only one of the three officers in Fisheries Posts was involved in surveillance duties. Surveillance on beach or in patrol boats was even more reduced during night time in most of the Fisheries Posts;
- There was a positive correlation between number of contraventions established and number of boat patrols. From an analysis of the average monthly boat patrols carried out at the 13 Fisheries Posts, the level of surveillance was as follows:
 - Only four Fisheries Posts carried out at least one boat patrol weekly during day time;
 - As regards night boat patrols, only one of these 13 Posts carried out at least one weekly;
 - Three Fisheries Posts did not carry any night boat patrol.
- There was no guidance from management for a specific number or type of patrols to be carried out. Patrol reports submitted by Fisheries Posts to the FPS's management did not include important details, such as time spent and number of personnel involved during patrols. This reporting mechanism was insufficient to provide adequate oversight on the performance of the Fisheries Posts;
- The organisation and surveillance operations of the five Flying Squads were different from those of Fisheries Posts. Minimum weekly number and type of patrols were prescribed by FPS. Though the Flying Squads carried out some six times less patrols than Fisheries Posts, they established three times more contraventions during the 12 month period ending 31 December 2017. However, none of the Flying Squads executed the required minimum number of boat (two weekly) and crackdown (one weekly) patrols;
- At the FPS, there was no documented system to capture and process information from different sources that would have allowed targeting areas where illegal fishing activities were more likely to occur. The Weekly Programme of Work of each Flying Squad team was linked to only a few documented requests from management. In most of the cases, the Programme did not include information justifying patrols in specific parts of their surveillance areas and how these patrols were complementing those effected by the Fisheries Posts in their respective areas. Co-ordinations between Flying Squads and Fisheries Posts would have contributed to plan patrols to ensure a better coverage in terms of time, area and risk profiles. However, records at Fisheries Posts indicated few cases of such co-ordinations;
- Since 2013, the FPS was operating a Hotline with some 30 complaints on illegal fishing received annually, averaging some three monthly. The linkage to an intelligence-led

planning, based on public complaints through this Hotline or other correspondences, could not be established;

- On average, for every one offender prosecuted during the past years, there were at least some three offences committed where only exhibits, such as fishing gears and nets were picked up, and the offenders were unknown. The annual number of picked up cases recorded by FPS indicated that illegal fishing activities were ongoing over the years, and the low level of surveillance reported above, contributed towards offenders not being intercepted and prosecuted.

Conclusion

The Ministry has taken laudable initiatives in devising and maintaining a wide a range of interventions targeting artisanal fishermen individually, collectively at community and at national level through preservation and protection of lagoon ecosystems. All these interventions are aligned to SDG 14B and the FAO Code of Conduct for Responsible Fisheries which promote sustainable artisanal fishery.

The Ministry has the resources, mechanism, legal framework, and exercises either control or strong influence on key factors required to implement measures effectively. However, it has missed out opportunities to maximise effectiveness in most of its interventions. This is due to important issues in design, implementation, monitoring and follow up on these interventions which are not properly addressed.

Key Recommendations

The Ministry needs to focus more at the three levels of interventions, namely individual, community and national to address the issues identified above. Specific recommendations on issues not properly addressed relating to design, implementation, monitoring and follow up are as follows:

- The work schedule at Fisheries Posts needs to be re-organised in order to have more man-hours available for enforcement and protection duties. For example, FPS may consider scheduling its tasks by allocating specific time slots for executing the administrative ones during the day;
- Criteria for the payment of BWA need to be reviewed in order to fit the context which will ensure its effectiveness and efficiency and sustain livelihood of artisanal fishermen;
- The Ministry should confirm approval of Government on the decision to grant new Fishermen Cards to those not satisfying the criteria of having fished for at least 50 per cent of the time, excluding declared bad weather days, in any month;
- In respect of the next phases of the ‘Canotte’ Scheme, the Ministry should ensure that it is well designed, implemented and assessed to ensure that objectives are met;
- The Ministry should finalise whether FIT should be wound up or re-organised to pursue its objective relating to sustainability of artisanal fishery;

- The Ministry should follow up the 10 floating cages more closely, and evaluate whether the output is likely to support the switch to successful small scale fish farming;
- Relevant information on FAD fishery should be collected in order to ascertain what issues are impacting on the reported reduction of fishing efforts and productivity, and the associated initiatives to shift artisanal fishermen outside the depleted lagoons;
- The Ministry needs to evaluate the Marine Ranching Project to ascertain to what extent the objective has been achieved, and what changes are needed to improve its benefits to lagoon ecosystem;
- The current low level of surveillance by the FPS needs to be addressed to intercept illegal fishing activities more effectively.

Ministry's Response

Following discussion of the draft Report with the Ministry, necessary amendments were made. The amended Report was submitted to the Ministry for comments and any additional information deemed necessary for its finalisation.

The Ministry took note of the amended Report and confirmed its finalisation.

CHAPTER ONE

INTRODUCTION

1.1 Background

The Republic of Mauritius has an Exclusive Economic Zone of 1.96 million km² (excluding 396 km² of Continental Shelf co-managed with Republic of Seychelles) which provides opportunities to develop an ocean economy related activities. These include a fisheries sector that provides an important source of income and nutrition and attracts investment in areas of fishing, seafood hub and aquaculture. In 2016, it accounted for some 17.6 per cent of export earnings and 1.5 per cent of Gross Domestic Product, and employed some 12,000 people directly.

Consequently, this sector is critical and has been a priority one for support by Government through the Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping, formerly known as Ministry of Fisheries.

1.1.1 Fish Production and Artisanal Fishery

There are two forms of fish production in the Republic of Mauritius, namely marine capture and commercial aquaculture. Marine capture consists of a combination of industrial, semi-industrial, sports, amateur and artisanal fishery.

The artisanal fishery is the main supplier of fresh fish to the local market. It also provides employment opportunities in the coastal regions, and protein diets to several thousand households, and thereby contributes significantly to poverty alleviation and food security. According to the Ministry, there was a decreasing trend in artisanal fish productions during the period 2011-2017, from 892 tonnes in 2011 to 569 tonnes in 2017.

The Ministry has identified the risks and impacts of depleted fish stocks on sustainable artisanal fishery. Several measures are being implemented to reduce fishing pressure on the lagoons, and concurrently enhance and preserve fish stocks. These measures include allowances to support livelihood, incentives to shift to off lagoon fishing and to aquaculture projects to relocate artisanal fishermen, conservation and protection of fish stock in lagoons.

1.2 Motivation

To sustain artisanal fishery, over the years, Government paid some Rs 60 million annually as Bad Weather Allowance (BWA) to artisanal fishermen, and spent some Rs 50 million on projects for their relocation to off lagoon and aquaculture during the period 2012 to 2017, and some Rs 68 million as payroll costs on the Fisheries Protection Service (FPS) for the financial year 2016-17. Despite these measures, the artisanal fish production during the period 2012 to 2017 was on the decrease, while total local fish consumption kept on increasing.

Past reports of the National Audit Office (NAO) highlighted inefficiencies in the allocation of BWA, which unduly increased the total amount payable. Other reports commissioned by the Ministry indicated that the BWA had counterproductive effect in reducing pressure on lagoon fishery, though it was supporting financially the livelihood of artisanal fishermen. The media

also reported several issues in respect of inadequate protection and enforcement activities by the Ministry.

Further, this Performance Audit forms part of a collaborative project undertaken by AFROSAI-E. The project focuses on Coastal Management Governance and environmental protection of coastlines. Critical issues, such as over-fishing, and whether measures taken are being aligned with the 2030 Agenda for Sustainable Development, Africa Agenda 2063 and other international, regional and national commitments are being assessed.

It was against this background that the NAO carried out this Audit on ‘Moving Towards Sustainable Artisanal Fishery in Mauritius’.

1.3 Audit Objective

The audit assessed whether measures implemented by the Ministry were effective to support sustainable artisanal fishery.

1.4 Audit Design

The audit objective is further detailed by the audit questions and audit scope as described below:

- Were incentives and direct support to artisanal fishermen effectively contributing to reduce pressure on lagoon fishery?
- Had projects implemented to relocate artisanal fishermen met their objectives?
- Were conservation, protection and enforcement activities adequate and effective to promote sustainable artisanal fishery?

These questions were developed into sub questions as listed in Appendix I. The answers to these questions supported the conclusion against the audit objective.

1.5 Audit Scope

This Report focused on all activities of the Ministry and its related entities to sustain artisanal fishery in the Island of Mauritius. The relevant structures, processes, procedures and practices were examined.

The audit covered the period January 2015 to April 2018, and was supplemented with information relating to artisanal fishery for period prior to January 2015.

1.6 Audit Methodology

The audit was conducted in accordance with the requirements of the NAO Performance Audit Manual, which is based on International Standards of Supreme Audit Institutions. Different methodologies were used to understand the audit area, along with obtaining sufficient, relevant and reliable audit evidence that support the conclusions and recommendations.

1.7 Methods of Data Collection

In order to carry out the audit, data was collected from files and documents reviewed and interviews. Site visits were also carried out to confirm information in files and to get acquainted with the activities carried out.

1.7.1 Documents Reviewed

Information relating to policies, regulations, structures, processes, systems, procedures, practices and amount spent was collected through review of files, documents and databases.

Data was collected mainly through review of documents and files kept at the Ministry, Albion Fisheries Research Centre (AFRC), Fisheries Training and Extension Centre (FiTEC), the seven Fisheries Posts visited and Blue Bay and Balaclava Marine Park Centre. The data was used to confirm information obtained from interviews.

1.7.2 Personnel Interviewed

Interviews were carried out with key personnel at operational, middle and senior management levels of the:

- Ministry - AFRC, Marine Resources Division, Marine Conservation Division, Marine Science Division, Aquaculture Division, Blue Bay Marine Park Centre, Balaclava Marine Park Centre, FiTEC, and FPS;
- Entities operating under the aegis of the Ministry, namely the Fishermen Investment Trust (FIT) and Mauritius Oceanography Institute;
- Department for Continental Shelf, Maritime Zones Administration and Exploration under the Minister Mentor's Office, Ministry of Defence and Rodrigues;
- Environment Division of the Ministry of Social Security, National Solidarity and Environment and Sustainable Development;
- Fishermen Cooperative Societies.

The interviews were used to confirm the information obtained from the documents reviewed and for providing more explanation where information was not available in the reviewed documents.

1.7.3 Site Visits

Site visits were effected at seven Fisheries Posts, two Marine Parks and one Fishing Reserve (Poudre d'Or) to ascertain the conservation, protection and enforcement activities being carried out, as well as the structures, processes, systems, procedures, practices in place and the resources (such as personnel, patrol boats, vehicles, equipment and accessories) deployed by the Ministry.

1.8 Sampling

The Weekly Programmes of Work in respect of conservation, protection and enforcement activities of all Fisheries Posts over the 12-month period ending 28 February 2018 were examined. Non-statistical sampling was used in the choice of visits to Fisheries Posts, Fishing Reserves and Floating Cages.

The seven Fisheries Posts and one Fishing Reserve visited have the similar organisational structure, responsibilities, resources and under common managerial reporting. Though there were differences relating to topography, number of registered fishermen per Post, site visits covered more than 50 per cent of total island wise registered fishermen and catch.

1.9 Assessment Criteria

Criteria used as a basis for evaluating the evidence collected, developing audit findings and reaching conclusions on the audit objectives were extracted from the following sources:

- Legislations – The Fisheries and Marine Resources Act, Fishermen Investment Trust Act, Marine Protected Areas Regulations 2001, and Regulations on Fishing Reserves;
- Code of Conduct for Responsible Fisheries - Food and Agricultural Organisation;
- Report on ‘Value Change Analysis of Artisanal Fisheries – Mauritius’ of June 2012, under the assistance of European Union and Indian Ocean Commission;
- The ‘Fisheries Master Plan’ of 2012 funded by the European Union;
- Reports under the Project ‘Partnerships for Marine Protected Areas in Mauritius and Rodrigues’ by United Nations Development Programme (UNDP) and Global Environment Facility (GEF) in 2012:
 - Mauritius Carrying Capacity Assessment Report
 - Blue Bay Marine Park Management Plan
 - Balaclava Marine Park Management Plan
- Reports on ‘Support for Sustainable Aquaculture Development through the Promotion of Small-Scale Cage Culture in the Lagoon of Mauritius’, and on European Union-funded

SmartFish Project managed by the Indian Ocean Commission and co-implemented by the Food and Agriculture Organisation (FAO) of the United Nations.

Details on other assessment criteria used are in the relevant Sections in this Report.

1.10 Data Validation Process

Management of the Ministry was provided with the audit criteria, findings and recommendations to confirm their relevance, accuracy and suitability.

1.11 Structure of the Audit Report

The remaining part of the Report covers the following:

- Chapter Two describes the audit area, the roles and responsibilities of key players and other stakeholders involved in artisanal fishery;
- Chapter Three presents the audit findings based on the three specific audit questions;
- Chapter Four provides audit conclusion;
- Chapter Five presents the recommendations based on the audit findings and conclusions.

CHAPTER TWO

DESCRIPTION OF THE AUDIT AREA

This Chapter describes the audit area, the roles and responsibilities of key players and other stakeholders involved in artisanal fishery.

2.1 Introduction

In this Chapter, the regulatory framework governing artisanal fishery and associated strategic plans are outlined. The objectives, roles, responsibilities and commitments of the Ministry and entities operating under its aegis are described. Key aspects of the current mechanism and practices for conservation, protection and enforcement of lagoons fishery, inclusive of marine parks and reserves are explained. Salient aspects of projects and incentives to support artisanal fishery are also expounded. The roles of artisanal fishermen, being the main beneficiary of the incentives and schemes either individually or collectively, are presented. The key tasks of local entities which support administration of grants, enforcement of laws are highlighted. The roles of International Organisations in supporting artisanal fishery are also presented.

2.2 Development of Fisheries Sector

Over the past 30 years, in plans developed to support the fisheries sector, its potential was highlighted and concerns over the sustainability of in-shore artisanal fishing were raised. Mention was made that the potential for expansion was limited and efforts should instead focus on sustainable management of available resources and value addition.

A Master Plan was developed in 2012 to cover the period 2011 to 2020. Its goal was to provide a framework for sectoral development, and was supported by six strategic objectives. Two of which were as follows:

- Achieve sustainable domestic fish resources in accordance with ecologically sustainable development principles, including, where appropriate, ecosystem-based fisheries management;
- Support the international obligations of Mauritius in fisheries and marine resource management.

Moreover, in the Government's Economic Mission Statement – 'Vision 2030' of Mauritius, emphasis was on Ocean Economy which is called to be one of the main pillars of development. According to the Ministry, the above strategic objectives and Vision 2030 are aligned to SDG 14 which focusses on the need to 'conserve and sustainably use the oceans, seas and marine resources for sustainable development'.

2.3 Policy and Legal Framework

The fisheries sector is governed mainly by the Fisheries and Marine Resources Act, enacted in 2007 and by other related regulations. The Act was amended under the Finance (Miscellaneous Provision) Act 2008 to provide for the legal framework for fish farming at sea.

Under the Fisheries and Marine Resources Act, the Ministry formulated several regulations followed by policies and management measures to reduce pressure in the lagoon and better protect and conserve marine biodiversity, while promoting sustainable utilisation of marine resources. The regulations and policies set are as follows:

- Banning of coral sand extraction from the lagoon since October 2001;
- Marine Protected Area Regulations 2001;
- Prohibition of removal of coral and sea shell from the maritime zone of Mauritius;
- Moratorium on sea cucumber exploitation since 2008;
- Extension of Net Fishing Regulations;
- Prohibition of the use of hooks of small size;
- The Undersized Fish Regulations;
- Policy on the carrying capacity in Blue Bay Marine Park.

2.4 Vision and Mission of Ministry of Ocean Economy, Marine Resources, Fisheries and Shipping

The Ministry has been set up in line with Government vision to make the ocean economy an important industry to sustain economic diversification, job creation and wealth generation. It has the vision to be an economic pillar with due regard to sustainability of aquatic resources and social development for the benefit of all stakeholders.

In line with Government vision, the Ministry aims towards an integrated approach to the development, management, regulation and promotion of ocean-related economic activities in the ocean, whilst improving Ocean Governance and ensuring proper ocean and coastal management, conservation, healthy marine eco-system and safety for all ocean related activities.

The Ministry has under its portfolio all ocean-related activities and various industries/sectors, namely fishing industry, maritime industry, research development and innovation, and promotion of ocean sector and governance.

2.5 Government Commitments towards Artisanal Fishery

As per National Budget documents for the period 2012-2017, a healthy fishing community was considered not only essential to the wellbeing of the fishermen, but also, for provision of regular supply of seafood to the nation. In order to restock the lagoon and increase the livelihood of fishermen, new opportunities to engage more and more in aquaculture were envisaged and also incentives for relocation to off-lagoon were provided. The budgetary measures to promote artisanal fishery included the following programmes:

- Marine Ranching - to replenish lagoons by releasing fish fingerlings;
- Aquaculture - with new opportunities through partnership with large operators;
- Cage culture - through the acquisition of floating cages;
- Compensation packages - to fishermen as an incentive to surrender large nets and fishing licences;
- ‘Canotte’ Scheme - to encourage fishermen to relocate to off-lagoon.

2.6 Roles and Responsibilities of the Ministry towards Artisanal Fishery

The Ministry is the lead entity to drive SDG 14 which includes SDG 14.B ‘Provide access for small-scale artisanal fishermen to marine resources and markets’. In line with SDG 14.B, it has embarked on a capacity building programme to empower artisanal fishermen to earn a better livelihood in an effort to encourage them to venture off-lagoon for a better catch and are provided with essential equipment and services, such as:

- Deployment of Fish Aggregating Devices (FADs) around the island;
- Demonstration of advanced fishing techniques to target high value species;
- Financial schemes to Fishermen Cooperatives and fishermen to enable them to purchase better equipped boats (both artisanal and semi industrial) as a tool to enhance their livelihood;
- Floating net cages to Fishermen Cooperatives with a view to enabling them to embark on small scale aquaculture activities;
- Training in aquaculture to develop alternative income generating activities;
- Training in fish handling, preservation and marketing for value addition and safer products.

2.7 Roles and Responsibilities of Units Operating directly under the Ministry

To discharge its responsibilities related to artisanal fishery, the Ministry is organised into two distinct units – the Fisheries Division and Fisheries Protection Services. The Fisheries Division comprises three units, namely AFRC, FiTEC and the Blue Bay Marine Park. The set up of all units and entities under the purview of the Ministry is as per Appendix II.

2.7.1 Fisheries Division

The Fisheries Division is responsible, among others, for management and policy advice, as well as for development of near-shore and off-shore fisheries and aquaculture. The AFRC, which is the technical arm of the Fisheries Division of the Ministry, carries out applied research, development and management activities.

To ensure continued economic growth, and social development within the framework of good governance, the Ministry has established eight divisions, five of which are based at AFRC. These five divisions relate to Aquaculture, Marine Conservation, Marine Science, Marine Resources and Laboratories.

2.7.1.1 Main Activities of Albion Fisheries Research Centre

The main activities relating to artisanal fishery carried out by the Centre are as follows:

- development and improvement of aquaculture production techniques;
- ecological surveys to monitor and collect baseline data on coral reefs and water quality for the conservation of aquatic biodiversity and the marine environment;
- management of marine protected areas;
- enhancement of fish stocks and rehabilitation of ecosystems, such as the release of juveniles in the lagoon and mangroves propagation in the coastal zones;
- screening of potentially toxic fishes and harmful microalgae;
- coral farming for the rehabilitation of the coral reefs.

Except for amateur fishery, statistics are collected and compiled by the Centre for official publication in the following ways:

- Catch and effort data of the artisanal fishery are collected by a team of enumerators covering the 61 Fish Landing Stations. A computer package was designed with assistance from the FAO for the data entry and processing. Besides, the monthly estimates of the fish catch, information, such as Catch per Fisherman Day, Total fishing efforts, Value of fish catch, Average catch per boat and Catch by gear and ground of fishing is also obtained. Data in respect of FAD was captured up to 2012. In 2016, this was resumed on a reduced scale;
- As regards Sport Fishery, daily catch statistics and boat characteristics on a monthly basis are provided by operators in that segment to the Centre.

2.7.1.2 Fisheries Training and Extension Centre

FiTEC, through its training activities, aims at empowering fishermen to earn a better livelihood and facilitates them to venture into more profitable off lagoon fishing around FADs by deploying and maintaining a number of these FADs around the island.

The following are among the training objectives of FiTEC:

- To provide basic knowledge and skills to new entrants for a career in the fishing industry;
- To upgrade knowledge and skills of fishermen to operate in the off lagoon area;
- To encourage use of effective and efficient fishing techniques;
- To promote production and supply of safe and quality sea food;
- To educate fishermen to develop a safety at sea culture;
- To create awareness on the protection and conservation of the marine environment, and foster the ecosystem approach in fisheries for sustainability.

Statistics on catch from FADs were compiled by FiTEC up to 2012, and thereafter, no statistics up to 2015 were kept. As from 2016, the AFRC started collecting the data.

2.7.2 Fisheries Protection Service

The FPS, which is the enforcement arm of the Ministry, is responsible for the protection and conservation of fishery resources for sustainable development. FPS cater for control over the fishing activities in lagoon, off lagoon, and also joint patrol under the Monitoring, Control and Surveillance Programme in the Economic Exclusive Zone and over territorial waters of Mauritius.

Officers of the FPS operate at its Head Office, Prosecution Unit, at 14 Fisheries Posts, in five regional Flying Squads, and at Blue Bay and Balaclava Marine Parks. The FPS has a work force of 229 officers, with an annual payroll cost of some Rs 68 million.

The main services provided are as follows:

- overall control on all fishing activities around the island;
- enforcement of the provisions of the Fisheries and Marine Resources Act, with a view to combatting illegal fishing;
- responding to calls from the public on alleged malpractices in the fishing sector;
- protection of controlled marine species and sue all defaulters/contraveners within the least possible delay;
- tracking defaulters in the fishing sector throughout the lagoon;

- entertaining applications for registration of fishermen, use of fishing nets and other related services.

The duties assigned to a Fisheries Protection Officer include the following:

- enforce the Fisheries Legislations, Regulations and any other laws related to fisheries on land and at sea;
- carry out enquiries, prepare case files, depone in Court and execution of Search Warrants;
- drive vehicles for coast patrol and man boats during afloat patrol;
- collect data and assist in all matters relating to fishermen, fisheries management, marine resources and marine conservation and keeping of records.

2.8 Roles and Responsibilities of Other Players Operating under the Aegis of the Ministry

The FIT and the Mauritius Oceanography Institute, which are operating under the aegis of the Ministry, have roles and responsibilities related to artisanal fishery.

2.8.1 Fishermen Investment Trust

The FIT is a body corporate, established under the Fishermen Investment Trust Act and falls under the aegis of the Ministry. The Act came into operation by proclamation on 31 January 2007. The shareholders of FIT are the registered artisanal fishermen of Mauritius and Rodrigues.

The FIT has been primarily set up to empower fishermen, build capacity and promote the development of fisheries and aquaculture in Mauritius.

One of the objectives of the Trust is to operate on a commercial basis by investing in fishing activities in the interests of fishermen and earn a reasonable return on investment. For this purpose, FIT has been allocated a fishing entitlement with a quota of 1,000 tonnes of fish. The Trust is managed by a Board of Directors which includes three representatives of fishermen.

2.8.2 Mauritius Oceanography Institute

The Mauritius Oceanography Institute falls under the aegis of the Ministry and plays a key role in rationalising and coordinating research and development activities related to oceanography. It also provides data and information to assist Government in the sustainable development of the ocean economy. The Ministry has initiated a UNDP/GEF funded Project “Mainstreaming Biodiversity in the Management of the Coastal Zone in the Republic of Mauritius”. The Project’s goal is to contribute to the integration of biodiversity and ecosystem management into physical development planning and tourism sector activities to safeguard biodiversity and maintain ecosystem services that sustain human wellbeing. The Mauritius Oceanography Institute was responsible for the implementation of the Project and would have acted as the Implementing Partner. As from 2017, the Ministry has taken over this Project. Funds have been allocated under the Project for surveillance equipment in Blue Bay Marine Park.

The Institute has successfully developed and optimised locally adapted techniques for culture of corals on-land and at sea for conservation purposes. It has initiated a community based coral culture which aims at training and capacity building of coastal communities in coral farming and reef rehabilitation.

2.9 Registered Artisanal Fishermen

The artisanal fishery of Mauritius is confined mainly to the lagoon and near the outer reef areas. Artisanal fishermen use traditional means and methods of fishing, consisting of implements, such as basket traps, large nets, gill nets, canard nets, hooks and lines and harpoons. Fishing activities are carried out in wooden or fiberglass boats 6 -7 metres long and propelled by outboard motors, oars and sails and a few with inboard motors. Artisanal fishery remains the main source of fresh fish supply to the local market.

According to FAO, artisanal fishermen are those who are involved in fisheries which can be of subsistence or commercial type and provide for both local consumption and export, but catches are generally used or marketed locally. These fisheries typically use relatively small amounts of capital and energy, as well as small fishing vessels to make short fishing trips close to shore.

2.9.1 Profile of Registered Artisanal Fishermen

As at March 2018, there were some 1,900 registered artisanal fishermen registered at 15 Fishing Posts around the island. They were classified based on their fishing grounds, namely Lagoon (72 or 4 per cent), Lagoon/Off Lagoon (1,110 or 58 per cent) and Off Lagoon (718 or 38 per cent). Lagoon fishermen are those who fish within the reef area in small embarkations, and Off Lagoon fishermen fish outside the reef up to some 20 kilometers and around FADs. Lagoon/Off Lagoon are registered to fish both inside and outside the reef.

There are arrangements to record the daily catch of each registered fisherman at one of the 61 Fish Landing Stations by officers of the FPS. Appendix III refers.

2.10 Other Players

There are also five players which support artisanal fishery in terms of grant administration, consultancy, financing and enforcement activities.

2.10.1 Development Bank of Mauritius Ltd

Under an agreement with the Ministry, the Development Bank of Mauritius (DBM) Ltd administers the 'Canotte' Scheme for off-lagoon fishing. Eligible registered fishermen/Fishermen Cooperative Societies are provided a grant of 50 per cent of the cost of the 'Canotte' up to a maximum amount of Rs 200,000. The 'Canotte' should be a new newly constructed boat, made of fibre glass, above 7 metres and less than 12 metres in length, equipped with either an inboard or outboard engine of 15 hp or above, safety equipment, life jacket for each person on boat, a set of three hand flares and radar reflector. The Bank processes applications of registered fishermen, and after approval from the Ministry, disburses the funds and surveys construction of the 'Canotte' against payment of an administrative fee. Cost in

excess of the grant element is financed by the Bank under its Micro Credit Scheme at three per cent interest rate per annum.

2.10.2 National Coast Guard

The National Coast Guard works closely with the Ministry and other Ministries involved in marine and coastal management. It has 26 posts which monitor vessels/ fishing boats/ pleasure crafts inside and outside the lagoon and carries out surveillance activities. They also carry out boarding, and all observations are forwarded to a Base Station for monitoring. These posts assist in enforcing fisheries, tourism and beach laws, make enquiries relating to fisheries offences and conduct search and rescue operations. The protocol for surveillance includes collection and analysis of data, location of hotspot areas, carrying out targeted patrol/joint patrol and enforcement of laws and regulations.

2.10.3 Department for Continental Shelf, Maritime Zones Administration and Exploration

The Department for Continental Shelf, Maritime Zones Administration and Exploration operates under the aegis of the Minister Mentor's Office, Ministry of Defence and Rodrigues. The mandate of the Department is primarily to ensure the effective management of its maritime zones and to delineate and establish its maritime zones in accordance with international laws and conventions, crucial inputs have been identified to achieve the goals set out under SDG 14. Among the 10 targets contained in SDG 14, Targets 14.1, 14.2, 14.5, 14.7, 14.A and 14.C are of major concern to the Department. Interventions which reduce pressure on lagoon, relocation of artisanal fishermen to off lagoon and conservation through marine protection areas, protection and enforcement activities to promote sustainable artisanal fishery fall under the above mentioned targets.

The Department is responsible as the focal working group for SDG 14.

2.10.4 Indian Ocean Commission - SmartFish Programme

The Indian Ocean Commission SmartFish is a regional fisheries programme managed by the Indian Ocean Commission, funded by the European Union and co-implemented by the FAO. Indian Ocean Commission SmartFish, which operates in 20 countries throughout the Indian Ocean Region, Southern and Eastern Africa, focuses on fisheries governance, management, monitoring control and surveillance, trade and food security. The programme is implemented by the Indian Ocean Commission in collaboration with the Common Market for East and Southern Africa, the East Africa Community and the Inter-Governmental Authority on Development, the Southern African Development Community and the Indian Ocean Tuna Commission.

The programme assists with integrating fisheries and aquaculture into national and regional food security action plans. It also assists with the implementation of selected actions identified, such as those relating to improved knowledge and preparedness to climate change impacts on fisheries, the promotion of aquaculture and diversification initiatives in favour of coastal fisheries communities.

2.10.5 Food and Agricultural Organisation and Sustainable Fisheries

The FAO is a specialised agency of the United Nations that leads international efforts to defeat hunger. Mauritius embarked on the formulation of the FAO Country Programming Framework in 2013 for the period 2013-17 with focus on three priority areas, including the promotion of sustainable fisheries.

This would be achieved in enhancing the:

- capacity of the Ministry for the formulation of aquaculture development and management policy through a provision of policy advice and building relevant capacities;
- capacity of key stakeholders in the sustainable development of off-lagoon fisheries through technical support in the implementation of fisheries management plan, technical advice in the development of regulatory framework for/and installation of FADs, as well as training of the selected number of fishermen for their use and maintenance;
- knowledge and skills of relevant stakeholders in sustainable fisheries sector through awareness raising campaigns and sessions about nutrition values of fish and improvement of processing methods.

CHAPTER THREE

FINDINGS

This Chapter presents the audit findings on whether measures implemented by the Ministry to support sustainable artisanal fishery were adequate and effective. Findings are presented at three levels - at the individual fisherman level through income support and incentives, at fishermen community level through projects, and at national level through conservation and protection of fishery resources.

3.0 General

In line with SDG 14.B ‘Provide access for small-scale artisanal fishers to marine resources and markets’, the Ministry took measures comprising a range of incentives and projects to support and sustain artisanal fishery. The measures formed part of a three-pronged approach, namely targeting individual fisherman, fishermen grouped in cooperatives, and at national level through conservation, protection and enforcement activities.

Findings in respect of the three audit questions set at the three levels of interventions of the Ministry are presented in the paragraphs below.

3.1 Effectiveness of Incentives and Supports to Individual Artisanal Fishermen

Presently, the BWA Scheme is used as an income support to compensate for decreasing revenue from catch. Also, grant scheme set up for purchase of ‘Canottes’ and equipment is expected to shift fishermen to off lagoon fishing, where the catch is relatively higher. These initiatives are aligned to the FAO Code of Responsible Fisheries which promotes the reduction of pressure on ecosystems and allows the regeneration of fish stocks.

This Section examined whether the income support and grant scheme targeting individual artisanal fisherman were producing the intended results.

3.1.1 Income Support through the Bad Weather Allowance

In the Master Plan of 2012, artisanal fishermen were identified to be among the poorest in the fisheries sector. Their earnings were mainly from their fishing activities in the lagoon. A BWA was introduced in 1965 to cater for income forgone on days when fishing would be unsafe in designated areas due to weather conditions, as determined by the Mauritius Meteorological Service. This Allowance, as an income support, contributes to sustain the livelihood of the fishermen. For the period 2010 to 2017, some Rs 487 million were paid as BWA to registered fishermen.

In the reports¹ commissioned by the Ministry, it was stressed that the BWA was not aligned to the policy of reducing pressure on fish stock in the following ways:

¹ Among are ‘Report on the Review and Assessment of the Mauritius and Rodrigues Bad Weather Allowance Program of December 2009’ and ‘Fisheries Master Plan of 2012’

- To be eligible for BWA in a particular month, a registered fisherman had to engage in fishing activities which was evidenced by the catch recorded over the month at a designated Fish Landing Station by the FPS. This attracted more fishermen in the already over-exploited lagoons;
- The administration of the BWA used significant resources of the FPS and affected its performance in the discharge of its law enforcement responsibilities.

In the reports, the de-coupling of the BWA from the requirement to fish was recommended. This would lead to immediate and long term benefits in the following ways:

- reduced fishing pressure on inshore fisheries;
- availability of Fisheries Protection Officers to undertake fisheries law enforcement, thereby improving fisheries management;
- move away from a welfare-dependent fishing sector to a development-focused sector.

A sample of seven Fisheries Posts was visited, and documents thereat were reviewed to ascertain to what extent the allocation of BWA impacted on the activities of the FPS, fishery resources in the lagoon and financial resources of the Ministry.

The details are as follows.

3.1.1.1 Impact on the Core Duties of Fisheries Protection Officers

During day shifts on weekdays, of the three officers on duty, two were engaged in administrative works between 8 00 hrs and 16 00 hrs. The third one was involved in recording catch of registered artisanal fishermen and updated catch records of new applicants at the selected Fish Landing Stations. Other ancillary duties included attending complaints, inspection of outlets, monitoring visits in respect of Environmental Impact Assessment licences.

The core duties of FPS personnel, according to their Scheme of Service, included enforcement activities and provision of services related to the artisanal fishermen community, such as administrative works relating to processing of BWA, renewal of licences and permits (fishing gears, fishmongers), new applications and registration of boats. As every month, personnel in the Fisheries Posts were mobilised for these administrative works, less resources were available for enforcement activities. As a result, Fisheries Posts reported inadequate personnel for patrolling duties, and its impact on the protection of lagoon resources are described at paragraph 3.3.4.3.

3.1.1.2 Criteria for Payment of Bad Weather Allowance

BWA is paid under Social Aid Regulations. Monthly allowances are paid at a daily rate after deducting Sundays and Public Holidays from the number of bad weather days determined by the Mauritius Meteorological Services. There are two designated areas, namely off lagoon and lagoon. Within the lagoons, there are four zones each with a specific sea condition assigned. Payments are made for the 'rough', 'very rough', 'moderate to rough' and 'rough to moderate' sea conditions. On an annual average, every month, there are 10 bad weather days for off

lagoon fishermen and five for lagoon fishermen. Personnel of Fisheries Posts send monthly reports to management detailing out the list of eligible fishermen registered at their respective Posts, and the number of bad weather days allocated individually. The following conditions should be satisfied by each fisherman:

- Each fisherman should produce the Registration Card to the allocated Fisheries Post between the first and eighth day of the month. The Card is stamped and attendance is recorded. Payment will be made in the ensuing month;
- The fisherman should not have another occupation or hold a trade licence, has not ceased fishing and Card not cancelled;
- The fisherman should be medically fit to work at sea as certified by a Government Medical Officer.

In principle, the criteria for payment of BWA have been designed to ensure that fishermen have indeed fished to qualify for the BWA and do not fish when it has been declared a bad weather day. Fishermen have to demonstrate that they are engaged in fishing activity for a particular month, and the FPS have to certify same for payment of BWA. As at April 2018, the criteria were not being applied as described below:

- The daily catch recorded at Fish Landing Stations was not used to assess eligibility for payment of BWA. Once a registered fisherman has called at the Fisheries Post during the first and eighth day of the month, he or she was entitled for the Allowance for the whole month irrespective of whether he or she went fishing or not. For a sample of payments examined, though there was no recorded catch at Fish Landing Stations over a consecutive period of two years or more, monthly allowances were paid (paragraph 3.1.2.2 refers).

For example, for the month of April 2018, there were 107 registered fishermen at Case Noyale Fisheries Post, and the catch records of 34 of them were collected at La Gaulette Fish Landing Station. BWA was paid to 32 eligible fishermen for the month out of the 34. However, for only 11 fishermen, catch records of 27 and 28 April 2018 were available, and for the remaining 21 fishermen, there was no catch record for the whole month.

- In October 2015, the Ministry initiated an exercise in collaboration with the Ministry of Health and Quality of Life to determine the medical fitness of a sample of 670 registered fishermen above 60 years. The objective was to assess whether the registered fishermen were medically fit to be engaged in fishing activities. The outcome of the exercise would have helped to formulate a policy whereby the allocation of a Fisherman Card and its validity could be reviewed. Out of the 670 fishermen selected for examination, the Ministry received only 393 Medical Reports, of which 109 were found medically fit². However, this one off exercise did not enable the Ministry to determine medical fitness and ability of all fishermen above 60 years to fish. As at March 2018, there were 377 (some 20 per cent) aged 65 above out of 1,900 registered fishermen. 82 of the 377 fishermen were in the range 75 - 94 years.
- When a fisherman had gone fishing on bad weather days and had recorded catch, his or her BWA was reduced by the number of days fished during declared bad weather days.

² As per Internal Audit Report dated August 2016.

As per the Fisheries Master Plan 2012, skilled fishermen with seaworthy boats were able to operate in bad weather when others were unable to do so. Also, fish that would have been caught on a 'bad weather day' still existed for capture on good weather days to compensate for the income foregone due to inactivity on the bad weather days. Such cases indicate that declared bad weather days did not mean inability to fish, and income foregone on bad weather days could be recouped by potentially larger catch when the weather was conducive for fishing. This was confirmed during examination of BWA paid for the month of March 2018 at Mahebourg Fisheries Post.

BWA was being paid irrespective of whether fishermen were actually engaging in fishing activity, were medically fit and were able to fish in even declared bad weather days. Payment of this Allowance which was initially designed to sustain livelihood of artisanal fishermen was not determined by the criteria set. These criteria for the payment of BWA no longer fit the context which would ensure effective and efficient allocation of resources.

3.1.1.3 Alignment of the Bad Weather Allowance with Policy to Fish Off Lagoon

In order to reduce pressure on the lagoon, allow replenishment of fish stock and thereby increase lagoon fish catch, the Ministry through FiTEC decided in 2012 to move 172 lagoon fishermen (at that time) to off lagoon by imparting training in FAD fishery. This was in line with one of the recommendations the Fisheries Master Plan 2012. This relocation of fishermen to off lagoon would lead to a reclassification of those fishermen and would entail an additional payment of BWA of Rs 3.5 million annually.

However, the decision was not implemented because of the financial implication. As at March 2018, the training, relocation and reclassification of the fishermen were not reconsidered leading to continuous exploitation of the lagoon as their fishing ground.

As at March 2018, the fishing grounds of 1,900 registered artisanal fishermen and monthly average payment of Bad Weather Days were as follows:

- Lagoon only - 72 fishermen, average five bad weather days;
- Both Lagoon/Off lagoon – 1,110 fishermen, average 10 bad weather days;
- Off Lagoon only - 718 fishermen, average 10 bad weather days.

The lagoon (except in the Marine Parks and Barachois) around Mauritius is of open access type, and according to the Ministry, there is no regulation which restricts fishing activity thereat. In addition, during site visits, officers of the FPS confirmed that they could not prevent an off lagoon fisherman to fish in the lagoon. The absence of such an enforcement mechanism undermined the effective and efficient application of the criteria for BWA and grant under the 'Canotte' Scheme. Under the prevailing condition, a registered off lagoon fisherman who had benefited from grant under such Scheme (promoting off lagoon fishery as per paragraph 3.1.2 below) might fish exclusively in the lagoon and still claimed BWA for off lagoon (on average 10 days monthly). Still, the fisherman might not be engaged in any fishing activity or engaged in fishing activity not confirmed by FPS (as referred in the sample case of La Gaulette Fish Landing Station at paragraph 3.1.1.2 above). In these cases, the fisherman might continue to have his Fishing Cards stamped on a monthly basis and to benefit from higher number of off lagoon Bad Weather Days. The risk of such occurrences was higher in the case of the

1,110 lagoon/off lagoon fisherman as they were registered to fish both in lagoon and off lagoon. They were paid off lagoon BWA, while they could still fish in the lagoon when no bad weather day had been declared for lagoon fishery by the Mauritius Meteorological Services.

The Scheme is not supporting the shift of artisanal fishermen to off lagoon fishing as it entails a potential increase in yearly BWA payments. Still, due to a lack of safeguards in the Scheme, the FPS cannot prevent a fisherman who has benefited from grants targeting off lagoon fishing, be in receipt of higher number of Bad Weather Days, and yet, fish in the depleted lagoon. This resulted in Allowance being continuously paid by the Ministry for fishing in an already stressed lagoon, when such Allowance should have been a support to sustain off lagoon fishery.

3.1.1.4 Registration of New Artisanal Fishermen

As at April 2018, there was no legal definition of ‘artisanal fisherman’ and no regulation providing for the entitlement of a person registered as a fisherman or terms and conditions to be fulfilled upon registration. The FAO’s definition for artisanal fisherman is commonly used, and according to the Fisheries and Marine Resources Act, the registration is at the discretion of the Permanent Secretary. In 2007, a policy was formulated following advice from the Office of the Solicitor General, in respect of registration of new artisanal fisherman, not covered by the Act and any other regulations.

The following conditions were set in the policy for registration:

- Fisherman not to be less than 18 and not more than 50 years, not holder of a trade licence and be medically fit (certified by a Government Medical Officer) to work at sea;
- The fishing activities of the fisherman are to be monitored for a consecutive period of six months, during which he or she should have fished for at least 50 per cent of the time, excluding declared bad weather days in any month;
- The fisherman has produced his or her Card for stamping for a continuous period of six months.

A registered fisherman is entitled to the following:

- Off-lagoon fishing activities and grants and duty concessions for purchase of outboard motors and accessories;
- Bad Weather Allowance;
- A sum of Rs 200,000 to heirs, in case of loss of life at sea;
- Scholarship awards from the Fishermen Welfare Fund for children, grants in case of injury and damage to boats, etc.

The criteria set helped to identify genuine artisanal fishermen who were earning their livelihood through fishing activities and needed support through the benefits associated with the Fishermen Cards. When applied consistently, it would avoid allocation of Cards to those not engaged in fishing activities for their livelihood, but who were attracted by allowances and benefits as described above.

In the Consultancy Report of 2012, an excess of boat and fishermen in the artisanal fishery was identified. In the Fisheries Master Plan of 2012, attention was drawn on the risk that the payment of BWA would attract new entrants into the already overfished lagoon fishery, applicants who otherwise would have entered different economic spheres of activity.

As at March 2014, there were 495 new applications for registration as artisanal fishermen. 86 of them (17 per cent) were considered genuine cases by the Ministry. The Ministry informed all stakeholders that no new Fishermen Cards were being issued and that applications received would be kept for future references. In March 2017, the number of applications increased to 643. To ensure sustainability of artisanal fishery, the Ministry then reconsidered these applications to involve young fishermen as a high percentage of registered artisanal fishermen were above 65 years. An analysis of the 643 applications received is as follows:

- Only 263 were recorded to be involved in fishing activities. 35 of the 263 applicants were in employment, and the applications received from the remaining 228 were processed;
- Only 11 applicants satisfied one of the criteria for registration, namely, to have fished for at least 50 per cent of the time in any month during a monitoring period of six months. 122 were fishing for less than 10 per cent of the time and the remaining 95 in the range 10 to 49 per cent.

In November 2017, the Ministry considered the granting of Fishermen Cards to those who had 10 per cent or more attendance during the monitoring period of six months. As this would involve additional financial resources and departure from already established criteria, the Ministry envisaged the approval of Government on the proposed revised conditions.

In March 2018, it decided to allocate 151 new Fisherman Cards, including to those who were fishing for less than 10 per cent of the time. This decision was not in line with the established criteria set in the policy of 2007 of having 50 per cent of time involved in fishing during a monitoring period of six months. Allocating of Fisherman Cards to those not satisfying established criteria, did not ensure registration of applicants who were genuinely engaged in fishing and depended on this activity to sustain their livelihood. Moreover, no Government approval was sought for the decision to allocate the new Fisherman Cards.

3.1.2 Effectiveness of ‘Canotte’ Scheme

The ‘Canotte’ Scheme was initiated in 2014 under the Fisheries Sector Programme of the Fisheries Partnership Agreement with the European Union. The objective was to provide financial support to registered artisanal fishermen to acquire newly constructed fishing boats (‘Canottes’), outboard engines, fishing and navigation equipment and accessories. Same would enable them to go fishing off lagoon where the catch per fisherman per day was higher than that in the lagoon. This would enhance their livelihoods and reduce fishing pressure on the lagoons. As at March 2018, the two Phases of the Scheme (Phase I and II) were already completed and grant disbursed amounted to some Rs 3.9 million. For the year ending 30 June 2018, Rs 10 million had been allocated for Phase III and IV of the Scheme.

The Ministry had the overall responsibility of the Scheme, and delegated the administration of the grant to DBM Ltd. The latter had to process applications from registered fishermen, and obtain approval from the Ministry in respect of eligible applicants, disburse the grants, monitor and supervise construction of the ‘Canottes’. Three per cent of the grant disbursed was payable

as management fee to DBM Ltd. The latter hired the services of a Marine Expert to monitor the construction of the ‘Canottes’ and purchase of equipment by fishermen so as to ensure that the ‘Canottes’ were safe, seaworthy and properly equipped. A consultancy fee of Rs 9,200 was payable to the Marine Expert through additional funds provided by the Ministry for each ‘Canotte’ surveyed and certified.

For Phase I, the Ministry provided the grant component only, whereas for Phase II, both grant and loan were provided. Details on the two Phases are as per Table 1.

Table 1: Details on Phases I and II of ‘Canotte’ Scheme

Phase	Number of Beneficiaries	Project Cost (Rs 000)	Grant from Ministry (Rs 000)	Loan from DBM Ltd (Rs 000)	Beneficiaries’ Own Fund (Rs 000)
I	10	3,802	1,770	1,770	264
II	12	4,869	2,171	1,770	927
Total	22	8,671	3,941	3,540	1,191

Source: Ministry’s Records

22 beneficiaries obtained a grant of some Rs 3.9 million out of the total projects costing some Rs 8.7 million. The balance was financed by individual loans contracted with the DBM Ltd and the beneficiaries’ own funds.

3.1.2.1 Design of the Scheme

The Scheme was designed by the Ministry and opened to all registered fishermen. To ensure that the grant was effectively allocated to fishermen with the expressed intentions to leave lagoon fishery, or to those involved in off lagoon fishery in need of funds to renew their boats, engine and equipment, a consultation or survey exercise was necessary to screen and select such fishermen. Supporting these fishermen would have ensured that allocation of grant was aligned with the objective of the Scheme. However, no such exercise was carried out and its effects on the implementation of the Scheme are described below.

3.1.2.2 Grant under the Scheme Allocated to Net Fishermen

Fishing with nets in the lagoon was considered as a destructive method of fishing, and in the Master Plan 2012, it was recommended that closure of this type of fishery be considered. In 1996, management measures were taken to reduce the fishing pressure in the lagoon due to net fishing. These included a buy-back policy for large nets and gill nets, consisting of payment of compensation to fishermen who relinquished their net licences.

Under the Rural Development Programme of the International Fund for Agricultural Development, funds were provided to reduce the number of nets in operation in Mauritius. As at 2013, some Rs 6.1 million had been disbursed in respect of net licences relinquished, nets surrendered and compensation offered to net fishermen under the Rural Development Programme. In 2014, under the Buy-Back Scheme of Large Nets, the compensations for relinquishing of licences and nets were increased from Rs 280,000 to Rs 420,000 and from Rs 42,000 to Rs 63,000 respectively.

As at March 2018, grants were allocated to three net fishermen as described below:

- A grant of Rs 200,000 was provided to a lagoon net fisherman who registered his 'Canotte' at Baie du Cap Fisheries Post in November 2016. As at March 2018, no catch was recorded in respect of this fisherman at this Fisheries Post since the 'Canotte' was registered;
- Two other beneficiaries, who were allocated grant of Rs 138,000 each, registered their 'Canottes' in September 2015 at Grand Gaube Fisheries Post. As at March 2018, no catch in respect of these two beneficiaries was recorded since September 2015.

The allocation of grant to these net fishermen referred above, without ensuring that they ceased net fishing and committed themselves to off lagoon fishing, indicated that this Scheme was not properly designed. A proper design of the Scheme would have supported Government commitment towards banning of net fishing and relocation of artisanal fishermen to off lagoon in order to protect lagoon fishery.

3.1.2.3 Implementation and Monitoring of the Scheme

The DBM Ltd paid some 40 to 50 per cent of the construction cost of a boat directly to a boat builder in order to start work. In the agreement between the DBM Ltd and the Marine Expert, the latter had to visit the boat builders' sites to report on the construction of the boat, and then to submit a final report that the boat was safe and seaworthy, and the equipment was new and in good working condition. The remaining amount of the grant and loan would be released after the Final Certificate of the Marine Expert.

The Ministry followed up on the implementation of the project by the DBM Ltd. However, it did not keep inspection reports related to the survey made by the Marine Expert. These reports were requested from the Ministry and same were submitted by DBM Ltd. They were scrutinised. Details are as follows.

- The status of interventions of the Marine Expert in respect of certification is as per Table 2 below.

Table 2: Status of Interventions of Marine Expert

Status of Interventions	No of 'Canottes'
Survey reports on construction, but none on navigation and safety equipment. 'Canotte' already registered with the FPS	10
No survey report on construction, navigation and safety equipment. 'Canotte' already registered with the FPS	6
Construction and registration with the FPS already completed before first inspection by Marine Expert	1
Only one inspection at 70 per cent of construction stage. 'Canotte' already registered with the FPS	1
Construction of wooden boat certified, but fiberglass 'Canotte' registered with the FPS	1
Survey in June 2015 revealed an old construction. No 'Canotte' yet registered	1
Neither inspection carried out nor 'Canotte' registered as at March 2018	2

Source: Ministry's Records

- In the case of beneficiary Mr SL, a down payment (Grant of Rs 200,000 and loan of Rs 199,000) was made in September 2016. Some 18 months later, on 7 March 2018, a 'Canotte' was registered by the beneficiary at Grand Gaube Fisheries Post. During a site visit on 21 March 2018, the 'Canotte' which was lying inland, close to the compound of the Fisheries Post was reported to be that of the beneficiary. It had no engine or any other associated equipment and accessories. No inspection reports in respect of this 'Canotte' were yet available at the Ministry;
- One of the conditions of the grant was that the 'Canotte' acquired should be a new one and must be constructed by a Boat Builder recognised by the Ministry. The latter did not have a list of recognised Boat Builders nor carried out an exercise to compile such a list, and to use same for the Scheme. Instead, it had a list of Marine Carpenters which dated back to 2003;
- In four cases (Beneficiaries JJD, SL, LA and KIS), the DBM Ltd reported in April 2017 that the respective builders were late with the boat constructions and were requesting extension of time to complete same. In the first three cases, disbursements were made in September 2016. The boat of Mr LA was registered some one year later and that of Mr SL 18 months later. The construction of Mr JJD boat was still outstanding as at April 2018;
- In the case of another beneficiary (Mr KIS), an old construction was surveyed on a premise, not mentioned to be that of a Boat Builder in the Marine Expert's inspection report of June 2015. A first disbursement of Rs 177,471 had already been made at the date of inspection. Despite the report mentioned an old instead of a new construction, another

disbursement of Rs 125,000 was made in July 2016. As at March 2018, no new ‘Canotte’ has been registered with the FPS by this beneficiary, and no follow up was carried out;

- As at December 2017, the Marine Expert had invoiced the DBM Ltd for 18 inspections on ‘Canottes’ construction, totalling Rs 165,600. The invoices were supported by the first (interim) reports only, with no mention about the final certification, as well as that on the equipment and accessories.

Monitoring of the ‘Canotte’ Scheme by the Ministry was inadequate to ensure that construction of ‘Canotte’ was timely. Moreover, the certification process was not appropriately documented to provide assurance that the ‘Canottes’ were safe, seaworthy and properly equipped.

3.1.2.4 Feedback / Evaluation on Effectiveness of the Scheme

In order to evaluate the effectiveness of the Scheme, it was necessary to collect information on whether beneficiaries were really fishing off lagoon with increased catch per fisherman day, and hence, making beneficial use of grant provided.

Under Phase I, five ‘Canottes’ were already registered during 2015. Under Phase II, seven ‘Canottes’ were registered in 2016 and five in 2017. Catch records of these beneficiaries as at March 2018, since registration of these ‘Canottes’ with the FPS were examined. Details were as follows:

- There were no catch records for each of the three beneficiaries referred to at paragraph 3.1.2.2;
- Beneficiary JCR who obtained a grant of Rs 200,000 under Phase II for a project value of Rs 400,000 registered his ‘Canotte’ at the Poudre d’Or Fisheries Post in August 2016. During the period January 2017 to February 2018, his recorded catch for six fishing trips totalled 41 kg. The catch consisted of fish classified as ‘other species’ of total market value less than Rs 10,000;
- Beneficiary SN obtained a grant of Rs 182,450 and loan of same amount for a ‘Canotte’ registered at the Riambel Fisheries Post in March 2017. During the period April 2017 to March 2018, four fishing trips were recorded with catch totalling 59 kg, and market value of some Rs 12,000;
- According to catch data of two beneficiaries registered at Case Noyale Fisheries Post, four trips were effected over a 15 month period since registration. As regards two beneficiaries at La Preneuse Fisheries Post, one had recorded nine trips and the other 27 trips since registration;
- In the case of beneficiary HMSUD, who benefited from a grant of Rs 190,400 and loan of same amount, his ‘Canotte’ was registered with Grande Riviere Sud Est Fisheries Post in November 2016. In April 2018, the FPS reported that the beneficiary had also registered this ‘Canotte’ as a commercial pleasure craft with the Tourism Authority and was engaged in commercial activities.

The above shortcomings indicated that the Ministry had designed a Scheme without ensuring that its objectives were being met.

3.2 Effectiveness of Projects to Relocate Artisanal Fishermen at Community Level

This Section examined projects undertaken by the Ministry and the FIT which aimed to support the fishermen community to move to off lagoon and encouraging them to adopt aquaculture. This would thus reduce pressure in the lagoon and contribute towards ensuring its sustainability.

The projects examined related to the acquisition and rental of multi-purpose vessels by FIT, the two pilot floating cage cultures under the support of the SmartFish Programme and the Japanese International Cooperation Agency (JICA) respectively, the maintenance of FADs and the 10 floating cage cultures.

3.2.1 Involvement of Fishermen Investment Trust in Sustainable Artisanal Fishery

FIT was set up as an investing arm of the Ministry, with registered fishermen as shareholders. The Ministry contributed some Rs 13.4 million as share capital on behalf of the fishermen. It was mandated to invest in fishing, logistics and marketing activities. Since it started operation in 2007, FIT ventured into several projects. However, out of the nine projects, seven were either not developed or not implemented. The two projects implemented, that is the Acquisition and Rental of three Fishing Boats and the Sale of Fish Quota, did not meet their intended objectives.

After seven years of operation, FIT ceased its activities in 2014. The Office of Public Sector Governance conducted an overall assessment of FIT and recommended the following three options:

- Option 1 – merger of FIT with the Fishermen Welfare Fund;
- Option 2 – integrate FIT as one unit of the Ministry; or
- Option 3 – winding up of FIT.

However, as of March 2018, the Ministry had not yet taken any decision on the future of FIT. In the meantime, its main assets, the three fishing boats, were lying idle and subject to deterioration (paragraph 3.2.1.1 refers).

3.2.1.1 Provision of Multipurpose Fishing Boats to Artisanal Fishermen

In 2009, FIT initiated an artisanal fishing project on a pilot basis to promote outer lagoon and FAD fishery. In that respect, to support artisanal fishery, the Mauritius Export Association donated one fishing boat (MEXA 1) to FIT in December 2009.

In the same line, in February 2010, following a tender exercise, the Ministry awarded a contract for the construction, supply, commissioning and testing of three fishing boats at the cost of Rs 10.35 million to a private Contractor. Two boats FIT 1 and FIT 2 were received, and as the Contractor subsequently went into receivership, FIT concluded an agreement with the contractor not to pursue the construction of the third boat. The total amount spent on the two boats amounted to some Rs 5.9 million.

3.2.1.2 Renting of the Boats

Despite several efforts made by FIT, it faced difficulties in leasing the boats to potential Fishermen's Cooperatives/ Associations. There was little interest among potential lessees as they were willing to rent the boats free of charge during the summer season only, and were reluctant to contribute towards their insurance cover.

FIT managed to rent MEXA 1 and FIT 1 to a private enterprise for an initial period of one year starting 1 May 2014. The lessee proposed to lease the boat to carry out deep water/shallow demersal fishing activities. However, numerous mechanical problems occurred with the two boats and fishing operations were discontinued.

Total rental income collected as at April 2018 amounted to some Rs 158,000. Since end of 2014, none of the two boats were in operation. At 28 March 2018, FIT 1, FIT 2 (delivered in 2014) and MEXA 1 were moored at Albion Dock (since 2014) as shown in the pictures taken during site visit. Figure 1 below refers.



MEXA 1



MEXA 1-Exposure to Damage and Vandalism and Damaged Canopy

Figure 1 Boats Moored at Albion Dock, Port Louis exposed to Damage

FIT reported that these moored boats were without insurance cover and surveillance. They were exposed to damage through continuous exposure to weather, rocking against the wharf due to absence of boat fenders, non-operation and were subject to vandalism during the past three years.

FIT spent some Rs 5.9 million on the boats, but was unsuccessful in supporting artisanal fishermen to operate off lagoon and on FADs. In addition, there was incremental loss in value of these assets over the past four years.

3.2.2 Floating Cages Culture Projects

This paragraph examined whether lessons learned during the two initial pilot projects were properly implemented to run several and larger cages successfully, and this would eventually encourage more fishermen to be involved in a profitable and sustainable aquaculture business in the longer term.

3.2.2.1 Pilot Floating Cages Donated by Japanese International Corporation Agency

In 2012, the Ministry allocated two cages worth some Rs 600,000 donated by JICA to two Fishermen Cooperative Societies - one at Trou d'Eau Douce and the other one at Grand Gaube. After setting up the cages in the respective locations, the AFRC provided fingerlings and support to the Cooperative Societies. Details on the cages are as per Table 3 below.

Table 3: Fingerlings and Harvest under JICA Project

Cooperative Society	Date of Handing over	No of Fingerlings stocked in both cages	Amount Harvested
No.1 Trou D. Douce	13.06.12	Year 2012 - 4,000 'Berri Rouge'	Year 2012 -Not available
No. 2 Grand Gaube	30.08.12	Year 2012 - 10,000 'Cordonnier'	
		Year 2013 – 10,150 'Cordonnier'	Year 2013 - 200 kg
		Year 2014 – Not available	Year 2014 -Not available

Source: Ministry's Records

As shown in Table 3, only 200 kg of 'Cordonnier' were harvested in 2013 from 10,000 fingerlings, and data on the harvest in respect of the remaining 14,150 fingerlings was not available.

According to AFRC, the societies abandoned the two cages in 2014, and since then, they were in a deplorable state and represented navigation hazard. Subsequently, they were dismantled and kept on the premises of AFRC. The Ministry did not investigate into the factors that led to the abandonment of the cages.

3.2.2.2 Floating Cages under Indian Ocean Commission - SmartFish Programme

In April 2013, the Project 'Support for Sustainable Aquaculture Development through the Promotion of Small-Scale Cage Culture in the Lagoon of Mauritius' was developed through a collaboration between the FIT and the Indian Ocean Commission (SmartFish Programme). The main objectives of the Project were to train beneficiaries, academics and AFRC Technicians on the construction of small farming cages and their settling at sea, as well as technical and financial management of a small aquaculture farm. Six floating cages costing some US \$ 61,000 (some Rs 1.8 million) were set up. The AFRC provided technical support, installed the cages and supplied the fingerlings. Three Fishermen Cooperative Societies benefited the cages under a contract signed with FIT. A harvest of some eight tonnes of fish was expected and FIT was entitled to 15 per cent of the harvest value.

According to technical reports on the SmartFish Programme, the beneficiaries actively participated in the assembly and installation of the six aquaculture cages during implementation of the project in 2013. Day to day management of these cages was carried out by the beneficiaries with the technical assistance of AFRC. Training on management practices to better arm beneficiaries to enable them to conduct farming independently was held in January 2014. Initially, management of the cages was complementary to their fishing activities, and once the business would become profitable, aquaculture would be carried out as a full-time occupation. It was also expected that with the success of the initial pilot phase of the project and results obtained, more fishermen would in the longer term be involved in a profitable and sustainable aquaculture business. This would reduce fishing pressure on the lagoon environment and thereby help to preserve the vulnerable lagoon ecosystem.

By the end of 2014, FIT ceased operation. It received a sum of Rs 4,000 from the sale of 227 kg of ‘Cordonnier’, harvested in July 2014. In December 2017, the personnel of FIT reported that no monitoring on the project was carried out, except communication from one of the beneficiaries, who reported hardship in managing the project.

During a site visit at Bambous Virieux Fisheries Post in March 2018, information received from cage culture operators in that region indicated that the four cages installed at Quatre Soeurs were abandoned and were lying as debris in the lagoon, which was confirmed by the FPS Officers. As for the other two cages installed at Poste de Flacq, farming had stopped due to problem of poaching and lack of interest of the beneficiaries.

As at April 2018, the Ministry could not confirm the outcome of this Project.

3.2.2.3 Floating Cages Financed by Ministry

The contract for ‘Supply, Mounting and Floating of Cage Structures’ in respect of 10 floating cage structures and cage nets was awarded to a Contractor in April 2014. In May 2015, 10 potential cage culture sites in lagoons around Mauritius for small scale aquaculture farming were proclaimed. In November 2016, the Ministry started allocation of the cages to selected Fishermen Cooperative Societies following an expression of interest. All cages were mounted and placed at designated locations at sea by February 2017, at a total cost of some Rs 11 million. The AFRC provided technical guidance and fish fingerlings to the beneficiaries. During period December 2016 to June 2017, some 56,700 ‘Cordonnier’ fingerlings were provided to the 10 beneficiaries. Some 25 tonnes of fish harvest were expected by December 2017.

Issues on this project were as follows:

- (a) It took some three years from acquisition to setting up of the cages;
- (b) During the period November 2016 to February 2017, the cages were mounted and placed at designated locations. Two cages were allotted in December 2016, two in February 2017 and the remaining six cages in March 2017. The first batch of fingerlings was provided to two beneficiaries in December 2016, and the remaining eight received fingerlings in March 2017. In cases where there were time lags of several months between installations of the cages at sea and onset of cultures, the nets of the cages were clogged with growing marine organisms. According to the Ministry, clogging of these nets impacted on good water circulation, which in turn, affected negatively the fish culture;

- (c) Agreements in respect of the handing over of the floating cages to the individual Fishermen Associations/ Cooperative Societies, incorporating the terms and conditions of the allocations, were prepared by the Ministry in April 2017 and vetted by the Office of the Solicitor General. Thereafter, the Ministry did not proceed with the signatures of these agreements, resulting in no contract terms and conditions enforceable in cases of breaches of the terms and conditions of the allocation of these floating cages;
- (d) According to the Ministry, harvest of fish had to be carried out in the presence of its officers. Beneficiaries asserted during meetings at the Ministry that their fish stock had already reached maturity date by December 2017 (the maturity period of ‘Cordonnier’ is six to eight months and fingerlings were supplied during period December 2016 to June 2017). However, harvesting was not carried out in December 2017. Bad weather in January 2018 damaged some of the cages and led to loss of fish, potentially ready for harvest;
- (e) Abandoned cages, inadequate maintenance and damaged cages were among the main problems identified by AFRC during survey carried out in January/ February 2018. As for the fish culture, there were few and even no fish at seven locations. Two cages located at Bambous Virieux were damaged with holes in the net and the polyethylene pipe structure damaged by debris. This was due to run-off carried to the cages from the nearby river into the sea during heavy rain;
- (f) Only a partial harvest of some 200 kg was reported to have been carried out at Quatre Soeurs 2 and Grande Riviere Sud Est 2 in January 2018;
- (g) As regards monitoring activities on the project, except for underwater ecological surveys carried out in August and September 2017, there were no other reports on how management of the cages and follow up of the growth stages of the fingerlings were being exercised by the Ministry;
- (h) At a follow up meeting in August 2016, prior to the allocation of the floating cages, beneficiaries of the previous two pilot projects raised problems as listed below which had adversely affected the projects:
- Poor cage construction and cages too small and water depth not appropriate at some regions;
 - Stocking undersized or poor quality fingerlings and too many per cage and poor quality feeds;
 - High maintenance cost of the fish cages and theft at sea due to inadequate security;
 - Need for appropriate training and awareness on fish feeding, fishing techniques and better maintenance of cage;
 - Proposal to catch their own fingerlings for stocking their cages under proper supervision instead of relying on AFRC hatchery;
 - Clustering to carry out farming in one or two specific regions to minimise cost and sharing of tasks.

The Ministry confirmed that the cages installed in 2017 were larger and of better quality and the assistance of Beach Authority and National Coast Guard could be sought for regular patrol to prevent theft and that the beneficiaries were provided half-day training on management of floating cages by the Ministry in June 2017;

- (i) Some 700,000 fingerlings which were being reared at AFRC hatchery died in December 2017. No fingerlings were available to stock cages found empty during January/ February 2018 survey;
- (j) During a site visit to Poudre d'Or Fishery Post, it was reported by one member of a Fishermen Cooperative Society, who was a beneficiary of Poudre d'Or 1 Floating Cage Project, that fish which were ready for harvest were stolen and the Society had incurred heavy losses. The Society members resided at Grand Gaube and they had to travel twice daily to Poudre d'Or to feed the fish. This significant expenditure on transport and other costs incurred, such as fish feed, mortality rate and stunted growth of the fingerlings were not conducive to make the farming profitable for the Society.

This project which was expected to generate some 25 tonnes of harvest by December 2017 yielded only some 0.2 tonne at March 2018. Cages which were expected to sustain harsh sea conditions were damaged leading to loss of fish, and subsequently, left in an abandoned state. Monitoring and follow up on cage maintenance and fish growth were not adequate as evidenced by records kept. Lessons learned on the two pilot projects had not been embedded in the design, implementation, monitoring and follow up on this project. Actual outcome as at March 2018 did not indicate that this floating cage project was supporting the switch to small scale fish farming.

3.2.3 Management of Fish Aggregating Device Project

A FAD is a set of buoys deployed in the off lagoon to attract migratory fish, like tuna and tuna-like species. In November 2017, there were 28 dedicated sites where such FADs had been set up. The aim was to increase and diversify the income of fishermen, and concurrently divert fishing effort from the exploited lagoon. As at November 2017, 453 fishermen were trained in off lagoon and FAD Fishery, and some 350 registered fishermen were reported to be active in that Fishery. The Catch per Fisherman Day was some 25 to 30 kg, when compared to less than 5 kg for lagoon fishery.

A data collection system was put in place at FiTEC since 2007, whereby data was collected weekly at four randomly selected Fish Landing Stations out of 61 located around the island. The data collected by the enumerators was processed and analysed to provide statistics for publications.

Issues in respect of FAD fishery were as follows:

- FADs are vulnerable and prone to wear and tear due to the dynamic and rough sea conditions, heavy fishing pressure and damage by navigation vessels. The FADs loss per year has increased from 35 to 50 per cent. The Ministry was replacing annually at least 20 FADs at a cost of some Rs 100,000 each;

- In 2012, the data collection system was affected following the transfer of enumerators within the Fisheries Division. Since then, minimum data, excluding catch of amateur, sports fishing and FAD fishery, was collected at Fish Landing Stations and processed by the AFRC;
- In a Consultancy Report³ in 2016, shortcomings in the methodology and software used to process the data were identified. In 2017, FiTEC considered the data collection system inappropriate and it could not be extrapolated to calculate total catch landed from FAD fishery;
- As at March 2018, only 110 out of the 1,900 artisanal fishermen were registered as FAD fishermen. The officers of the FPS did not collect data in respect of FAD fishery, whilst recording daily catch for artisanal fishermen at the 61 Fish Landing Stations;
- Though 350 fishermen were reported to be involved in FAD fishery, the Ministry did not keep record of the other 240 fishermen and their catch. In October 2017, attention was drawn to observed decline in recorded fishing effort in off lagoon fishery in a World Bank Report⁴. This was attributed to poor economic performance of the fishermen. They had difficulties in repayment of their loans contracted to finance fishing equipment, had little or no support to develop their financial management or accounting skills, and some had poor understanding of their loan obligations.

Though the Ministry was maintaining FADs to promote off lagoon fishery at a cost of some Rs 2 million annually, the number of beneficiaries who was effectively engaged in that fishery was not ascertained, and the benefits achieved were not assessed.

3.3 Effectiveness of Conservation, Protection and Enforcement Activities to Promote Sustainable Artisanal Fishery

Overfishing, illegal fishing, habitat destruction, increased demand for fish and population growth are negatively impacting on the sustainability of artisanal fishery. If these challenges are not properly addressed through measures, like conservation and protection, artisanal fishery may be unsustainable in the long run.

Marine Protected Areas (MPAs), Fishing Reserves and marine ranching are part of conservation strategies needed to conserve marine biodiversity and replenish fish stock. MPAs are associated with No-Take Zones where fishermen are prohibited from fishing in certain areas (core zone) which usually have an abundance of fish. An MPA provides a positive effect on biomass and fish stock, with a spillover of fish improving the yield of nearby fisheries. Marine ranching attempts to replenish stock by releasing juveniles in depleted lagoons. Equally important are protection and enforcement of laws and regulations to prevent damage to the parks, reserves and lagoons through illegal and destructive fishing activities.

³ Improvement of Artisanal Fisheries Data Collection and Statistics in Mauritius – Mission Report of June 2016.

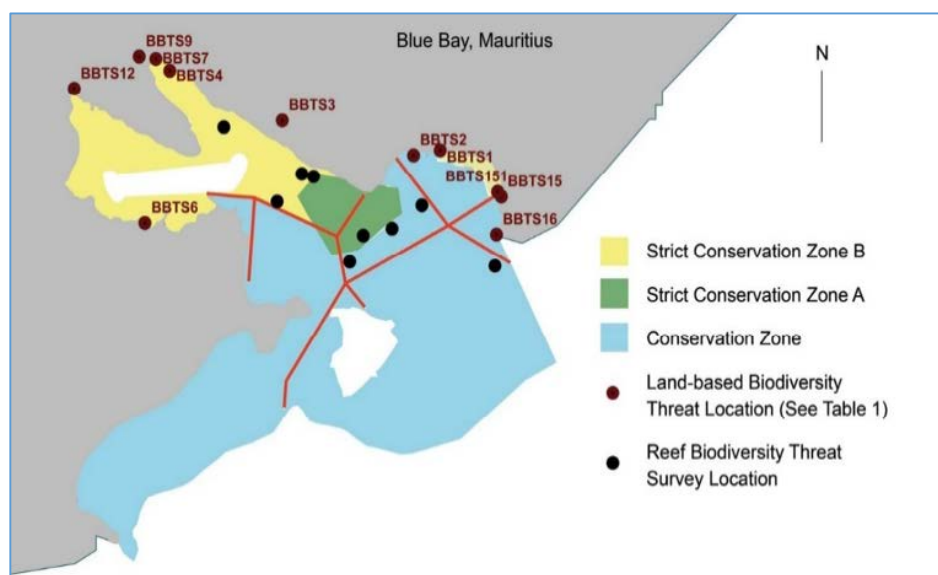
⁴ ‘The Ocean Economy in Mauritius: making it happen, make it last’

This Section examined whether conservation activities in parks, reserves and lagoons and the interventions of the FPS were adequate and effective.

3.3.1 Conservation Activities at Blue Bay Marine Park and Balaclava Marine Park.

In 2012, Management Plans for both Marine Parks were prepared which addressed several key areas, namely governance, biodiversity conservation, sustainable livelihoods, and environmental awareness and sustainable financing. Also, a Carrying Capacity Assessment was carried out in 2012 in both Parks to ascertain whether activities therein were within limits of sustainability.

Blue Bay Marine Park had clearly demarcated management zones as per Figure 2, with a mechanism for enforcement of regulations in place.

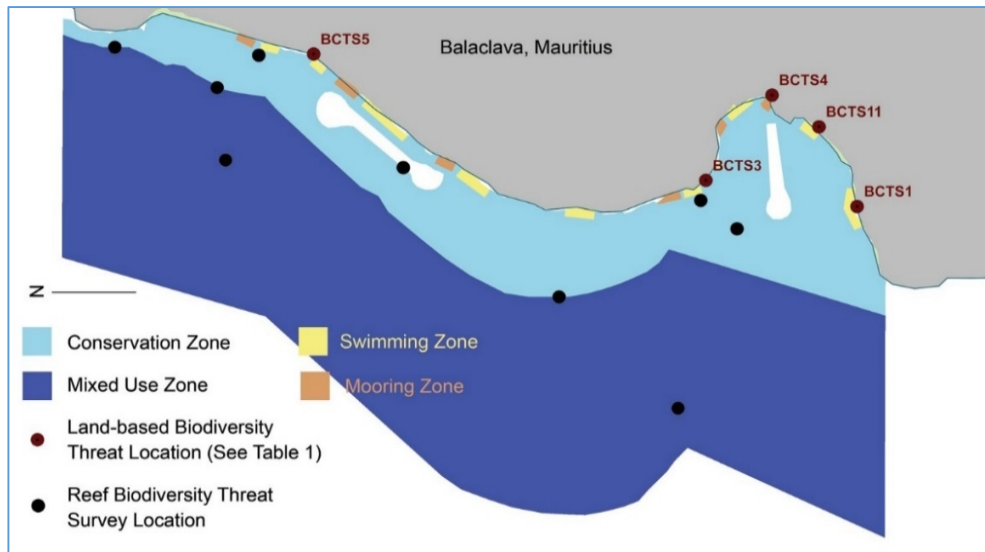


Source: Ministry's Records

Figure 2 Demarcated Zones at Blue Bay Marine Park

In contrast, though Balaclava had been designated as a Marine Park, the conservation zones had not yet been demarcated. These conservation zones largely comprise a long, shallow lagoon flat which has a shoreline filled with hotels and beaches on one side, and a reef crest with breaking waves on the other. The demarcation zones as prescribed in the Regulations are as per Figure 3.

The absence of demarcated zones did not enable FPS Officers to enforce regulations effectively when compared to Blue Bay Marine Park.



Source: Ministry's Records

Figure 3 Demarcated Zones at Balaclava Marine Park

In the Carrying Capacity Assessment Report of 2012, emphasis was laid on the fact that the ecological carrying capacity for diverse and abundant wildlife had been severely reduced. This had been caused by coral mortality, sedimentation, and algae proliferation that suggested significant changes in water quality, including nutrient pollution that might have occurred in both Marine Parks. Reduction in the ecological capacity of this Park required attention of all stakeholders.

The conservation and protection measures in the two Parks were examined and issues are described in the paragraphs below.

3.3.1.1 Implementation of Management Plans of Marine Protected Areas

Management Plans for Blue Bay and Balaclava Marine Parks were prepared under a project sponsored by UNDP and GEF. This project 'Partnerships for Marine Protected Areas in Mauritius and Rodrigues' started in 2006 and ended in 2012. Under a cost-sharing contribution, the then Ministry of Fisheries disbursed US \$ 350,000 (some Rs 10.5 million) for the total project value of US \$ 4,365,260 during that period. The project included the following deliverables:

- Policy and legal review of co-management of Protected Areas in Mauritius and Rodrigues;
- Management plans for both Marine Parks;
- A comprehensive inventory of the Marine Parks, and monitoring framework and guidelines to update the inventory;
- Presentation of results of the inventory exercise;
- Communication and awareness campaign of the two Marine Parks;
- Carrying capacity of the two Parks.

The management plans included an implementation schedule over a five-year period (2012-13 to 2016-17). Five main management programmes were identified, each with set of objectives as follows:

- Governance through Co-Management;
- Biodiversity Conservation;
- Sustainable Livelihoods;
- Environmental Awareness;
- Sustainable Financing

As at March 2018, the management plans were not yet approved by Government, resulting in no Action Plan developed and resources committed for their implementation. However, a Management Committee for the two MPAs, as recommended in the Plan, was set up. Two sub-committees (one for Blue Bay Marine Park and the second one to update and review publications and reports) were also set up. Meetings for the sub-committee on Blue Bay Marine Park were occasionally held during 2013-2017, and the last being that of April 2014. Issues discussed were related on how to implement the Management Plan of Blue Bay and setting up of Balaclava Marine Parks.

Two meetings were held by the Ministry in December 2016 and January 2017, to revive the process of implementation of the management plan. A status report as at April 2017 indicated that actions taken for the implementation of the management plan were minimal when compared to its implementation schedule. Actions taken included the following:

- Installation of 20 basal coral tables in February and March 2017;
- Setting up of the underwater trails;
- Marine ranching/restocking of lagoon by the release of 158,150 fingerlings of ‘Cordonnier’, sea bream and mud crab;
- Sensitisation programme to publicise the Blue Bay Marine Park.

However, these actions were inadequate to provide the required overview and assurance on governance, conservation, sustainable financing and livelihoods and environmental awareness in respect of the Parks.

3.3.1.2 Review of the Management of Marine Protected Areas in 2018

Under a new UNDP/GEF funded Project ‘Mainstreaming Biodiversity in the Management of the Coastal Zone in the Republic of Mauritius’, a Request for Proposal for ‘Strengthening Marine Protected Area Management’ was launched in May 2018 by the UNDP Local Office. The Project’s goal was to contribute to the integration of biodiversity and ecosystem management into physical development planning and tourism sector activities to safeguard biodiversity and maintain ecosystem services that sustain human wellbeing. It had a budget allocation of US \$ 4,664,521, and was of five years’ duration.

It included ‘Strengthening of Marine Protected Area Management’ as one of its three components. This component was to revamp part of expectations not achieved under the Management Plans referred to at paragraph 3.3.1.1 above. A comparison of the outcomes and deliverables of the two projects is at Appendix IV. In its Projected Budget Plan, Rs 1,089,500 had been earmarked for the Blue Bay Marine Park (including surveillance equipment Rs 755,000 and IT equipment Rs 205,000). Also, a Technical Committee would be set up to review and update the previous Blue Bay Marine Park management plan.

However, as at March 2018, the roadmap and deliverables of this Technical Committee had not been time framed and no mechanism put in place to review and eventually approve the revised management plan.

3.3.1.3 Management of Marine Parks

➤ Awareness of Conservation in Marine Parks

The construction of the Blue Bay Marine Park and Visitor’s Centre was completed in 2016 at a cost of some Rs 33 million, mainly to ensure the effective management and monitoring of the Blue Bay Marine Park, as well as the provision for an ecological observation room for the conservation and preservation of the marine biodiversity assets.

During a site visit at the Marine Park in March 2018, the ecological observation room (for carrying out tests and demonstration to visitors) was not yet functional.

➤ Licensing of Activities in Marine Parks

The licences granted for different activities as at March 2018 were as per Table 4 and annual fees of some Rs 800,000 were collected.

Table 4: Number and Types of Permits Issued

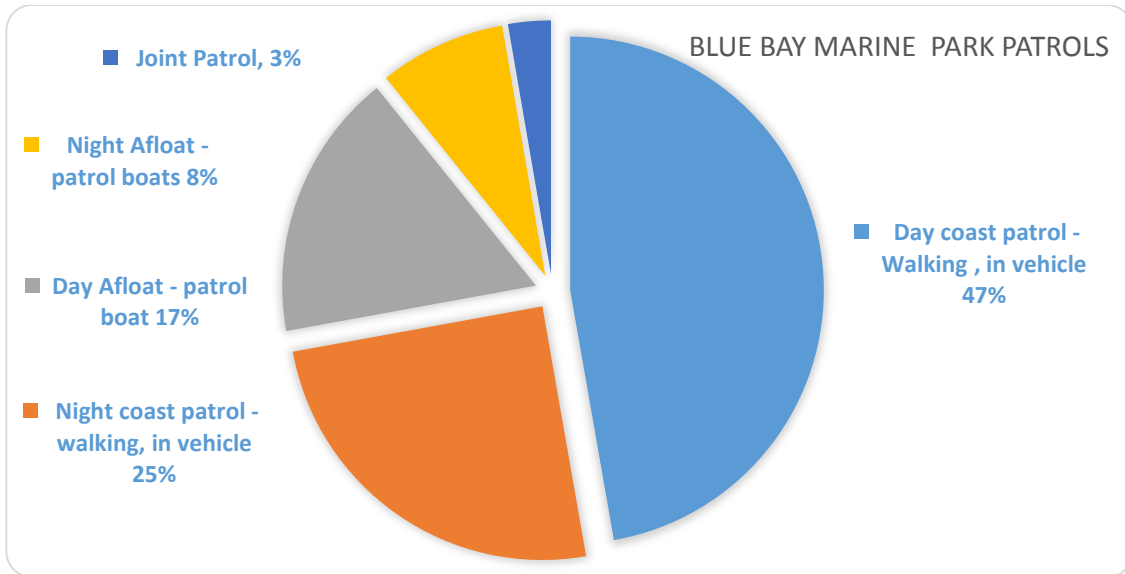
Type of Permit	Number Issued (Units)
Boat and Vessel	100
Commercial Activity	53
Line Fishing permit	6
Recreational Fishing	81
Temporary Interference	6
Basket Trap	10
Total	256

Source: Ministry’s Records

Monitoring of these licensed activities, protection and enforcement in the Zones required interventions of the FPS. The level of interventions is described and assessed in the following paragraphs.

➤ *Enforcement in Blue Bay Marine Park*

Enforcement and protection services were provided by nine Fisheries Protection Officers. 1,177 patrols were effected over a 12-month period ending 28 February 2018. The breakdown according to type and timing of the patrols is represented in Figure 4.



Source: Ministry's Records

Figure 4 Analysis of Types of Patrols carried out at Blue Bay Marine Park

According to the analysis

- Some 72 per cent of the patrols were done ashore and 25 per cent were boat patrols;
- Only eight per cent of the total patrols were done in boat at night, that is night patrols were effected only twice per week;
- In 2017, nine contraventions were established against illegal activities or non-compliance with licensing conditions in the Park. This represented less than one contravention per month. Six of the nine contraventions were established during boat patrols.

The licensed activities required relatively more boat patrols than ashore ones. However, our analysis showed that FPS was focusing more on ashore patrols.

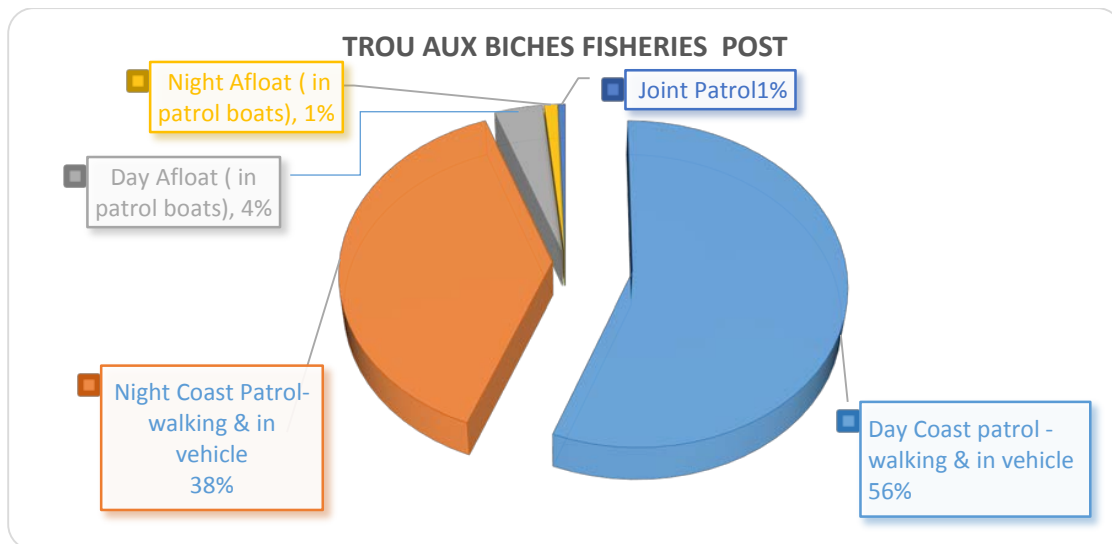
Also, to enforce effectively these regulations, FPS Officers need to be provided with the necessary equipment. This was not the case in respect of monitoring of boat speed and observation activities. Legally, boats operating in the Park were not allowed to exceed a speed of three knots in order not to disturb or damage the underwater flora and fauna. However, FPS Officers were not provided with the necessary equipment to measure boat speed to ascertain compliance with that limit. Similarly, night vision binoculars were not provided for more effective surveillance.

➤ *Enforcement in Balaclava Marine Park*

In the 2012 Carrying Capacity Assessment, the following in respect of Balaclava Marine Park were reported:

- Fishermen were operating in the Balaclava Marine Park on a daily basis, concentrating efforts in the shallow lagoon;
- Hook and line fishing was commonly observed for people on foot. Net fishing was reported by Tour Operators to commonly occur at night;
- Boat fishermen used cage traps made of wire among their methods, and these were often observed in various stages of dereliction among coral stands and reef bottom;
- In addition to the pressure fishermen applied to reef fish populations, they were also observed to walk and pole in lagoon areas containing branching coral colonies. This was commonly reported to be a source of habitat destruction by stakeholders and Tour Operators.

Surveillance of Balaclava Marine Park was under the responsibility of two FPS officers, accommodated several kilometres away at Trou aux Biches Fisheries Post. During site visit in March 2018, it was ascertained that they were supported by nine Trou aux Biches Post FPS staff and were provided with logistics, like patrol boats and vehicles. The surveillance area of the Fishing Post spans over several kilometres starting from Balaclava up to Grand Bay, including four Fish Landing Stations. In the absence of specific information on the number of patrols in the Marine Park, the 1,223 patrols carried out over a 12 month period ending 28 February 2018 by the Fishing Post were analysed, and are represented in Figure 5.



Source: Ministry's Records

Figure 5 Analysis of Types of Patrols Carried Out at Trou aux Biches Fishing Post

According to the analysis of the types of patrols

- Some 94 per cent of the patrols were carried out ashore. Only five per cent of the patrols were executed in boats, and this represented one day boat patrol weekly, and one night boat patrol monthly.
- Also, a Flying Squad was reported to have been carrying patrols in the Marine Park Region, on an average of twice monthly.
- In 2017, no contravention was recorded at Balaclava Marine Park in respect of these patrols.

Though the Balaclava Marine Park had the threat profile identified in the Carrying Capacity Assessment, especially at night, the type and timing of patrols being carried out were not effective in identifying illegal activities in the Marine Park area.

Furthermore at the Park, the zones had not yet been demarcated. A Marine Park Centre which ought to have been constructed to accommodate the FPS and AFRC staff to manage this Park, and support activities as per the Management Plan were still outstanding at March 2018. These were impacting negatively on the management of this Park.

Overall, the efforts of the Ministry were insufficient to provide the required overview and assurance on the proper management of both Parks.

3.3.2 Protection of Fishing Reserves

Fishing Reserves were declared under the Fisheries Act. Generally, Fishing Reserves are areas where net fishing is prohibited. As compared to Marine Parks, there is no zoning and they are primarily aimed at protection of natural fish breeding and nursery areas. There are six Fishing Reserves declared in Mauritius (Port Louis, Poudre d'Or, Poste Lafayette, Trou d'Eau Douce, Grand Port Zone A and B and Black River). These Reserves are protected by Regulations. Part IV, Section 6 of the Fisheries and Marine Resources (Marine Protected Areas) Regulations 2001 deals with 'Prohibition within Fishing Reserves'. The prohibitions relate to fishing with a net, and requirement of a licence for fishing with bait gear and basket trap.

The GEF Management Effective Tracking Tool (METT) was used in the course of UNDP/GEF Partnerships for MPAs project to assess the effectiveness of management in relation to conservation and protection. The above Regulations were not well enforced. In 2012, the METT score for the Fishing Reserves was 29 per cent, which was below the targeted level of a minimum of 50 per cent.

A site visit was carried out at Poudre d'Or Fisheries Post in March 2018. This Fisheries Post has the Poudre d'Or Fishing Reserve under its surveillance. The Reserve is the largest in Mauritius with an area of some 25 km². The Fisheries Post was manned by 10 officers and had some 10 kilometres of coastline (Bain de Rosnay near Grand Gaube to Roches Noires) to patrol, and four Fish Landing Stations to supervise. It did not have a vehicle assigned to it since several years. Patrol in the lagoon was carried out in an old 15 feet wooden boat, depicted at paragraph 3.3.4.3. Beach patrols were carried out on foot and in vehicle shared from Grand Gaube

Fisheries Post. On a monthly average, a maximum of three boat patrols and a maximum of four night beach patrols were effected by the Post. As per the Flying Squad Unit, it carried out a monthly average of two patrols in the Fishing Reserve to complement those of the Fisheries Post. As regards daytime beach patrols on foot, the distance covered by one officer is less than one kilometre from the Post. Five contraventions were established in the Fishing Reserve in 2017, all during boat patrols.

Under the “Mainstreaming Biodiversity in the Management of the Coastal Zone in the Republic of Mauritius’ Project, the importance of Fishing Reserves was identified and an exercise was in progress to develop a Management Plan for all Fishing Reserves. The previous low score obtained under the METT indicated the need to improve enforcement measures in the Reserves. With a combined monthly average of nine night beach/ boat patrols during 2017, the enforcement activities in this Reserve were still relatively low, when compared to Blue Bay Marine Park where the monthly average was 42.

3.3.3 Marine Ranching and Ban on Fishing of Some Species

Two methods of conservation and promoting sustainable fishery that are being practised by the Ministry are the banning of octopus fishing during specific seasons and marine ranching.

In 2016 and 2017, octopus fishery was closed during winter seasons. This closure preserved the octopus population by allowing female octopuses to spawn (produce eggs and enable young ones to survive). This was a success as testified by the recorded increase in both the size of octopuses caught and the weight of total catch during summer.

In 2012, the Ministry embarked on a project whereby fish fry⁵ were collected in the lagoons and then reared in the AFRC hatchery up to fingerling stage. These fingerlings were then released in other lagoon areas in view of replenishing the lagoon for their eventual capture at marketable size by local fishermen. During 2012-2017, some 2.1 million fingerlings were released in Marine Parks, Fishing Reserves and lagoon areas costing some Rs 4.2 million. Details are as per Table 5.

⁵ refers to a recently hatched fish that has reached the stage point where the fish can now actively feed for itself.

Table 5: Number and Type of Fingerlings Released in Lagoons

Year	Species Released (Units) and Sites of Release		
	Sea Bream	'Cordonnier'	Mud Crab
2012	50,000 released in Blue Bay Marine Park	150,000 released in six lagoons areas	-
2013	400,000 in six lagoon areas	1,000,000 in Blue Bay and Balaclava Marine Parks, Black River Fishing Reserve and 3 lagoon areas	250 in Pointe d'Esny
2014	200,000 in Blue Bay and Balaclava Marine Parks, and Albion Lagoon	-	-
2015	185,641 in 10 lagoon areas	-	-
2016	128,000 in two barachois and seven lagoon areas	-	-
2017	10,000 in Albion Lagoon	-	350 in Blue Bay Marine Park

Source: Ministry's Records

Studies under the aegis of the FAO have demonstrated that marine ranching can clearly work in some cases to increase fishery landings, but its economic success also depends on several factors, such as the management of the ranching process, survival of the fingerlings, the culture costs and how the fish resources being ranches are valued.

During the implementation of this project, the Ministry did not assess whether there was an increase in catch recorded at Fish Landing Stations in those areas where the 2.1 million fingerlings were released involving some Rs 4.2 million as associated cost. This would have provided feedback to confirm whether the objectives were being met and whether adjustments were needed to enhance the process.

3.3.4 Protection and Enforcement Activities of the Fisheries Protection Service

Protection and enforcement activities play a pivotal role in ensuring sustainability of artisanal fishery. Among the core duties of FPS Officers are the protection of fisheries resources and enforcement of fisheries legislations, regulations and related legislations. Protection and enforcement activities comprise four basic components, namely surveillance through patrols, interceptions and arrest, prosecutions and sanctions. These duties are carried out on land and at sea and, involve executing enquiries, preparing case files, deposing in court and assisting in the execution of Search Warrants. Driving official vehicles for coast patrol and operating patrol boats during afloat patrol are also their key tasks. Other duties include collecting and processing of data and dealing with all matters relating to fishermen, fisheries management, marine resources and marine conservation and keeping records thereof.

Execution of the core duties of officers at Fisheries Posts, Flying Squad and Prosecution Unit was examined.

3.3.4.1 Protection and Enforcement Activities at Fisheries Posts Level

Each Fishery Post is manned through a shift system on a 24-hour basis, with two shifts, one from 8 00 - 16 00 hours (day) and the other one from 16 00 – 08 00 hours (night). On each shift, there is a minimum of two officers of grades Fisheries Protection Officer/ Senior Fisheries Protection Officer, and one Principal Fisheries Protection Officer on duty. A weekly programme of work is prepared by the latter of the Post and submitted for approval to the Assistant Controller, FPS. The actual work performed is then recorded on a 'Weekly Outcome' Sheet and submitted to the Controller, FPS. These 'Weekly Outcomes' for all the Posts are consolidated and information on monthly patrols effected/ contraventions established are submitted to senior management of the Ministry.

3.3.4.2 Analysis of Patrols

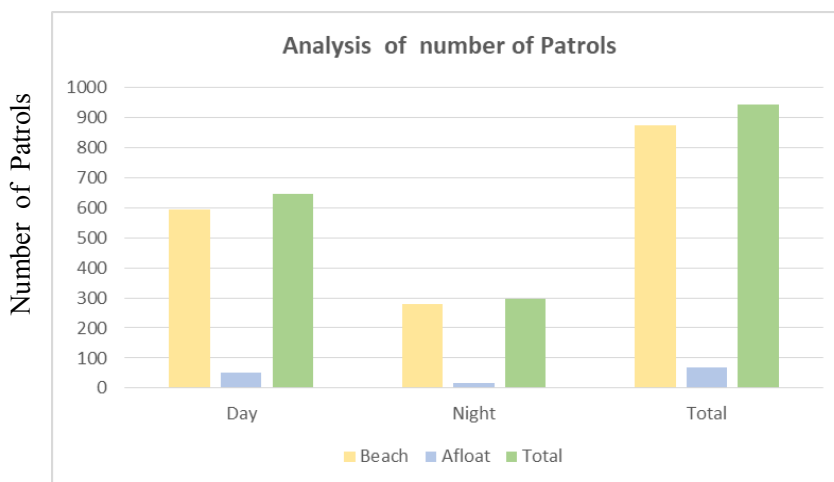
The 'Weekly Outcome' for all the Fisheries Posts over a period of six months ending first week of June 2017 were examined and analysed. Details are as follows:

The patrols carried out ashore (Beach Patrol in vehicle and on foot) and afloat patrol (in patrol boats) on day and night shifts are as per Appendix V. Most of the joint patrols related to La Preneuse and Case Noyale Fisheries Posts⁶. Other joint patrols involved neighbouring Fisheries Posts, National Coast Guards and Flying Squads, and were carried out at night, ashore and afloat.

⁶ A new Fisheries Post for Case Noyale is under construction and operations are being carried out from La Preneuse Fisheries Post.

➤ *Analysis of Night/Day and Beach/Boat Patrols*

Figure 6 illustrates the analysis of patrols during night / day shifts and between beach and boat patrols.



Source: Ministry's Records

Figure 6 Patrols during Night and Day on the Beach and Afloat

A summary is as follows:

- For all the Fisheries Posts combined during day and night, 12 times more beach patrols were done than afloat ones;
- During daytime, twice the number of beach patrols were done than at night time;
- In respect of boat patrols, two times more were done during day time than night time.

➤ *Boat Patrols - Night/Day*

Results of a further analysis of the average monthly boat patrols carried out at the 13⁷ Fisheries Posts are as follows:

- Only four Fisheries Posts carried out at least one boat patrol weekly during day time;
- As regards night boat patrols, only one of these 13 Posts carried out at least one weekly;
- Three Fisheries Posts did not carry any night boat patrol.

⁷ Excluding Riambel Fisheries Post. As per FPS, this Fisheries Post did not have a patrol boat because sea conditions did not permit use of same.

➤ *Night Beach Patrol*

Beach patrols were not carried out every night at the 14 Fisheries Posts. At five of them, not more than two night beach patrols were carried out per week. Out of the five Posts, during the six month period ending 30 June 2017, Grande Riviere Sud Est carried out a total of 10 night beach patrols, and Grand Gaube only two. For the latter, this represented one night beach patrol every three months.

3.3.4.3 Surveillance Level

Overall, during the day, most of the time, only one of the three officers in Fisheries Posts were involved in surveillance duties. Surveillance on beach or in patrol boats was even more reduced during night time. The main reasons for the low level of surveillance during day and night or through boat patrols were:

- Weekly Programmes of Work were prepared at Post levels. There was no guidance from management for a specific number or type of patrols to be carried out. During day shifts on weekdays, of the three officers on duty, one was allocated the surveillance and capture of data on catches at fish landing stations, and for the other two, their time was spent mainly on administrative duties as mentioned at paragraph 3.1.1.1 above.
- On most night shifts, there were only two officers on duty. As per the FPS, one had to remain permanently in the Post, because same could not be left unattended, and for security reasons, patrols could not be effected alone by the other officer on shift. As and when reinforcements were available from other Posts or Flying Squads, patrols were jointly carried out involving this officer. Such joint patrols were not frequent and were effected on average a maximum of six monthly (Appendix V refers).
- Not all Fisheries Posts had the same logistics available in terms of quality and quantity. Seven Fisheries Posts did not have vehicles allocated, and this called for sharing among neighbouring Posts. For example, Poudre d'Or was sharing the vehicle of Grand Gaube Fisheries Post as reported at paragraph 3.3.3 above. This Post had an old 15 feet wooden boat (Figure 7 below refers) which, according to the FPS, posed security and convenience problems and was not conducive for effecting patrols, particularly at night and during inclement weather. In contrast, Grand Gaube Fisheries Post had two patrol boats which included a fast patrol boat already repaired lying on a trailer (Figure 8 below refers) and requiring a new outboard motor, since November 2017. This boat was found capsized due to bad weather in February 2016, and was sent for repairs after more than one year. It was only in March 2018 that quotation procedure for the purchase of the motor was initiated.



Figure 7 Old Wooden Patrol Boat of Poudre d'Or Fisheries Post



Figure 8 Repaired Patrol Boat, requiring an Outboard Motor lying on a Trailer at Grand Gaube Fisheries Post

These issues relating to staffing and logistics were of recurrent nature which impacted negatively on the core activities of the FPS, namely enforcement of licensing and conservation regulations.

3.3.4.4 Correlation between Patrols and Contraventions

The number and types of contraventions established per Fisheries Post during 2017 are as per Appendix VI. Only two Fisheries Posts (Trou aux Biches and Mahebourg) were establishing, on average, one contravention monthly (including in possession or picked up cases) during 2017. This represented the highest monthly average number of contraventions established among all the Posts. In contrast, Grand Gaube Fisheries Post did not establish any contravention for the whole year, whereas Riambel Fisheries Post recorded only one. Both of them were each effecting some 70 patrols monthly.

Mahebourg and Grand Gaube Fisheries Posts had the same number of personnel in post and about the same number of registered fishermen. The latter was performing an average of 10 more patrols monthly. However, Mahebourg Fisheries Post was performing some 70 times more night time beach patrols than and twice the number of joint patrols as Grand Gaube Fisheries Post. Table 6 refers

Table 6: Average Monthly Number of Patrols of Grand Gaube and Mahebourg Fisheries Posts

Fisheries Post	Monthly Average						Joint Patrol	Grand Total
	Day Beach	Night Beach	Total Beach	Day Afloat	Night Afloat	Total Afloat		
Grand Gaube	73.3	0.3	73.6	2.5	0.7	3.2	3.3	80.1
Mahebourg	40.3	20.7	61.0	3.2	0.2	3.4	6.2	70.6

Source: Ministry's Records

A further analysis was carried out on all boat patrols by the two Fisheries Post during the 12 month period ending 31 December 2017. The patrols were analysed in terms of number of day time and night time, number of officers per patrol and duration. This included joint patrols with Flying Squads and other neighbouring Posts. The results are summarised as per Table 7.

Table 7: Number of Day Time and Night Time Boat Patrols Carried Out during 2017

Post	Total No. of Patrols	No.	Day Time Boat Patrol		Night Time Boat Patrol		
			Average No of Officers	Average Patrol Time (hours)	No.	Average No. of Officers	Average patrol time (hours)
Grand Gaube	39	31	2.3	4.3	8	3.5	6
Mahebourg	126	105	2.9	5.6	21	3.5	6

Source: Ministry's Records

Comparatively, Mahebourg Fisheries Post performed two times more boat patrols, with patrol time, on average 1.3 hours more and larger number of officers involved. Of the 15 contraventions established by Mahebourg Fisheries Post during 2017, six were through boat patrols and 13 were during night time. There was a positive correlation between number of contraventions established and number of boat patrols. This was also confirmed in the cases of Poudre d'Or Fisheries Post and Blue Bay Marine Park, where 50 per cent of the contraventions were established through boat patrols, and 45 per cent during night time.

The 'Weekly Outcome' referred to at paragraph 3.3.4.1 submitted by Fisheries Posts to the FPS's management did not include details, such as time spent and number of personnel involved during patrols. As such, management oversight through this reporting mechanism, in the absence of any other additional one, did not provide for an effective assessment on the performance of the Fisheries Posts.

3.3.4.5 Surveillance Activities of Flying Squads and Contraventions Established

The organisation and surveillance operations of the five Flying Squads were different from those of Fisheries Posts. Each Squad comprised five officers and was allocated a vehicle to patrol a specific area. The Squads reported to the FPS's management which monitored their output through an approved weekly Programme of Work. As from January 2017, in order to

exercise better control on their work, on a weekly basis, a minimum of one-night patrol, two boat patrols, and one crackdown patrol were expected from each Squad.

➤ *Average Weekly Patrols*

The average number of weekly patrols over the six month period ended 30 June 2017 was analysed and the details are as per Table 8.

Table 8: Average Weekly Number of Patrols Carried Out by Flying Squads

Flying Squad	Total Patrols for six months*	Average Weekly Patrols						
		Beach Day	Beach Night	Afloat Day	Afloat Night	Joint	Total Night Patrol	Total Afloat Patrol
FS 1	178	3.81	1.12	0.77	0.27	0.88	1.39	1.04
FS 2	155	3.88	1.42	0.19	0.27	0.19	1.69	0.46
FS 3	209	4.35	1.62	1.12	0.19	0.77	1.81	1.31
FS 4	158	3.65	1.27	0.58	0.27	0.31	1.54	0.85
FS 5	171	3.81	1.38	0.81	0.38	0.19	1.76	1.19
	871							

Source: Ministry's Records

** ending 30 June 2017*

As regards night patrols, all the five Flying Squads were performing at least one per week as required. With regard to boat patrol, none of the Flying Squads were complying with the minimum requirement of performing two weekly. FS 1, FS 3 and FS 5 were doing on average more than one weekly. FS 2 and FS4 were performing less than one afloat patrol weekly.

A crackdown patrol is usually a joint patrol involving other teams (other Flying Squads or Fisheries Posts Officers or National Coast Guards) where an intervention area is cordoned in such a way that any contravener cannot escape easily. During period January 2017 to February 2018, a maximum of five crackdowns were carried out by each Flying Squad. FS 2 carried out five crackdowns jointly with other Flying Squads and intercepted three illegal activities during three of these interventions. FS 1 carried out only one and established one contravention.

➤ *Contraventions Established*

Though the Flying Squads carried out some six times less patrols than Fisheries Posts, they established three times more contraventions during the 12 month period ending 31 December 2017. Details of contraventions established by the five Flying Squads in 2016 and 2017 are as per Table 9 below.

Table 9: Contraventions Established by Flying Squads in 2016 and 2017

Flying Squads	In Possession / Fishing		Picked up		Total		Net seized (metres)	
	2016	2017	2016	2017	2016	2017	2016	2017
FS 1	2	2	25	22	27	24	680	476
FS 2	39	42	29	70	68	112	3,935	3,167
FS 3	0	20	28	45	28	65	2,001	979
FS 4 ¹	0	11	0	30	0	41	0	289
FS 5	1	5	12	70	13	75	382	1,203
Total	42	80	94	237	136	317	6,998	6,114

Source: Ministry's Records

¹: FS 4 was involved at Port Area in 2016

During 2017, the number of patrols carried out by each Flying Squad, and the number of contraventions established and length of nets seized varied largely. There was also an increase in the total number of contraventions established from 136 in 2016 to 317 in 2017. The increase was due to FS 4 performing patrols during 2017 after being involved in Port Area in 2016, and greater number of contraventions established by FS 2, FS 3 and FS 5. However, the performance of FS 1 staggered in 2017.

3.3.4.6 Intelligence-led Planning of Patrols

As budgetary constraints and inadequate resources were regularly reported to prevail at the FPS by the Ministry, it is important to prioritise its protection and enforcement activities and allocate resources accordingly. This will ensure that use of resources is optimised and the core activities are carried out effectively and efficiently.

At the FPS, there was no documented system to capture and process information from different sources that would have allowed targeting areas where illegal fishing activities were more likely to occur. The Weekly Programme of Work prepared by each Flying Squad was linked to only a few documented requests from management. In most of the cases, each Flying Squad did not indicate in their Programmes why specific patrols were being planned in specific parts of their surveillance areas or how these patrols were complementing to those effected by the Fisheries Posts in their respective areas. Moreover, co-ordinations between Flying Squads and Fisheries Posts would have contributed to plan patrols to ensure better coverage in terms of time, area and risk profiles. However, records at Fisheries Posts indicated few cases of such co-ordinations.

Furthermore, since 2013 the FPS was operating a Hotline 8001011 with some 30 complaints received annually, averaging some three monthly. In 2017, while attending to complaints, several illegal fishing activities were confirmed by the FPS. As the Hotline had proved to be a potentially effective tool in reporting illegal activities, its increased use would have helped to crowdsource the detection and reporting of illegal fishing by local communities. However, since its inception, no awareness campaign to encourage reporting of illegal fishing activities was carried out. The Ministry did not follow up on the outcome of the calls received in respect of illegal fishing.

Overall, the linkage to an intelligence-led planning, based on public complaints through correspondences or this Hotline, could not be established.

3.3.4.7 Enforcement by Prosecution Unit

An effective law enforcement system should dissuade potential lawbreakers from committing illegal activities as the consequences will outweigh the economic gain⁸. Through its enforcement activities, the FPS has to ensure compliance with fisheries laws and regulations through monitoring, control and surveillance and build a case for prosecution. Effective compliance systems are important to avoid delays and lost trials, which ultimately cause economic losses in terms of wasted patrol resources and loss of natural capital.

➤ *Offenders Unknown*

On average for every one offender prosecuted during the past years, there were at least some three offences being committed where only exhibits were picked up, and the offenders being unknown. In these cases, the FPS recorded these picked up exhibits, such as fishing gears and nets. Still, picked up cases were considered as contraventions, though the offenders were unknown. In such cases, offenders (284 cases in 2014, 250 in 2015, 188 in 2016 and 237 in 2017) might engaged in illegal fishing again as most of the gears picked up were of artisanal make and readily available on the market (for example locally manufactured harpoons and mosquito nets).

The number of picked up cases annually indicated that illegal fishing activities were ongoing over the years, and the low level of surveillance reported above, contributed towards offenders not being intercepted and prosecuted.

➤ *Definition of Destructive Fishing Gears*

The Fisheries and Marine Act defines the different types of nets according to their specific mesh sizes and lengths. Fishing with same without a permit is an offence. The definition needs to be sufficiently broad to recognise a maximum number of destructive fishing gears, and their use considered as illegal. At April 2018, destructive gears were used for illegal fishing which were not prohibited by the Act. In August 2017, Court dismissed a case whereby one accused was fishing with a net not defined in the Act. Lawfully, in that case, the accused did not commit any offence and the Court instructed that the net produced as exhibit be returned to him. Since then, the Prosecution Unit has stayed action on similar cases already lodged in Court, as there was no basis for prosecution. Every year, several kilometres of nets were seized (20 km in 2014, 16.6 km in 2015, 8 km in 2016 and 7.1 km in 2017) which included nets not defined in the Act. Such nets are termed as unauthorised fishing gear. Consequently, any person fishing or in possession of such unauthorised fishing gear could not be intercepted and prosecuted, even though such gears were destructive to lagoon fishery. This loophole in the Act undermined the protection and enforcement activities as a significant proportion of illegal fishing activities (in possession or picked up) related to such unauthorised gears.

As at April 2018, no regulation has been enacted to assign offence for fishing with or in possession of such unauthorised gears.

⁸ www.reefresilience.org/fisheries-surveillance-and-enforcement/

CHAPTER FOUR

CONCLUSION

This Chapter concludes against the audit objective based upon analysis and findings supported by audit evidence as elaborated in the previous Chapter.

The Ministry has taken laudable initiatives in devising and maintaining a wide a range of interventions targeting artisanal fishermen individually, collectively at community and at national level through preservation and protection of lagoon ecosystems. All these interventions are aligned to SDG 14B and the FAO Code of Conduct for Responsible Fisheries which promote sustainable artisanal fishery.

The Ministry has the resources, mechanism, legal framework, and exercises either control or strong influence on key factors required to implement measures effectively. However, it has missed out opportunities to maximise effectiveness in most of its interventions. This is due to important issues in design, implementation, monitoring and follow up in these interventions which are not properly addressed.

BWA is no longer linked to compensation for fishing revenues foregone during bad weather days. Some Rs 60 million as BWA are paid annually, irrespective of whether the registered fishermen are complying with established criteria. This allowance is attracting additional fishermen to seek registration, even though the livelihood of only a minority of them is considered to be genuinely dependent on fishing. The decision to issue new Fishing Cards without revising the existing criteria will lead to additional payments of BWA to those not eligible for such allowance. The monthly processing of BWA and monitoring of new applicants are diluting attention of the officers of the FPS from their core duties of protection and enforcement. The ‘Canotte’ Scheme, as a direct support to fish off lagoon, is not properly designed, implemented and monitored to ensure that benefits are derived from the grants and loans allocated.

The FIT realised little benefit through projects designed for the community of registered fishermen. FAD fishery is not appropriately followed up to quantify the number of beneficiaries and the benefits being derived. Lessons learned while implementing pilot cage culture projects were not embedded in the design and management of a new floating cage fish farming project costing some Rs 11 million. Actual outcome does not indicate that fishermen can switch to small scale fish farming successfully.

Ban on octopus fishing during winter seasons is being successfully implemented. Marine ranching activities to stock the depleted lagoons are not assessed to identify the outcome. Conservation projects in marine parks and fishing reserves have the appropriate legislations and technical support, but are inadequately implemented to ensure that the objectives are met.

At Fisheries Posts, tasks are not focused on core activities of protection and enforcement. Flying Squads are more effective in establishing contraventions during patrols than those effected by the Fisheries Posts. Patrols are not usually linked to an intelligence-led planning. Although boat patrols and night time patrols are positively correlated to the number of illegal fishing activities detected, the monthly average number of boat patrols and night patrols carried by the FPS is proportionately less.

CHAPTER FIVE

RECOMMENDATIONS

This Chapter presents the recommendations based on the findings and conclusions.

5.0 General

The Ministry had the resources, mechanism, legal framework, and exercised either control or strong influence on all key factors required to support its interventions towards sustainable fisheries effectively and efficiently. The audit findings of Chapter 3 described which areas of interventions contributed effectively towards achieving sustainability in artisanal fishery and those which did not yield the expected results, and how opportunities to maximise effectiveness in most of the interventions were missed out. Overall, the Ministry needs to focus more on issues not properly addressed relating to design, implementation, monitoring and follow up at its three levels of interventions, namely individual, community and national.

In light of the above, hereunder are the specific recommendations.

5.1 Incentives and Support to Individual Artisanal Fishermen

5.1.1 *Income Support through the Bad Weather Allowance*

- *Impact on the Core Duties of FPS Officers.* The Ministry needs to examine how administrative works relating to processing of BWA, renewal of licences and permits (fishing gears, fishmongers), new applications and registration of boats are impacting on the core duties of Officers of the FPS. Thereafter, it should reorganise the work at the Fisheries Post to have more man-hours available for enforcement and protection duties. For example, FPS may consider scheduling the administrative tasks by allocating specific time slots for executing same during the day;
- *Criteria for Payment of Bad Weather Allowance.* The criteria for the payment of BWA need to be reviewed in order to fit the context which will ensure effective and efficient allocation of resources and sustain livelihood of artisanal fishermen. Such review may include identifying the causes and effects related to cases of registered fishermen who are medically fit but are not actually engaged in fishing. In cases of those found unfit on medical grounds or old age, the Ministry may consider the payment of a compensation on surrender of their Fishermen Cards;
- *Alignment of the Bad Weather Allowance with Policy to Fish Off-Lagoon.* The Ministry needs to introduce safeguards in the BWA Scheme in order to prevent a fisherman, who has benefited from grants targeting off lagoon fishing and be in receipt of higher number of Bad Weather Days, to fish in the depleted lagoon. One of the safeguards is to carry out more patrols in the lagoon and to prevent those registered as off lagoon fishermen from fishing inside the lagoon by excluding them for the payment of BWA;
- *Registration of New Artisanal Fishermen.* As the decision for the granting of Fishermen Cards to those who had a minimum of 10 instead of 50 per cent attendance during the

monitoring period of six months will involve additional financial resources and departure from already established criteria, the Ministry should confirm approval of Government.

5.1.2 Effectiveness of the ‘Canotte’ Scheme

- *Design of the Scheme.* For the next phases of the ‘Canotte’ Scheme, the Ministry should ensure that the grants are effectively allocated to fishermen with the expressed intentions to leave lagoon fishery, and to those already involved in off lagoon fishery, but are in need of funds to renew their boats, engine and equipment. Consultations or surveys to target such fishermen can be carried out at design stage;
- *Implementation and Monitoring of the Scheme.* The Ministry should be more pro-actively involved in monitoring of the Scheme to ensure that grants and loans allocated are used to meet its objectives. It should also follow up on all certification process to satisfy itself that the constructions are timely, and the ‘Canottes’ are seaworthy and properly equipped;
- *Evaluation of the Scheme.* Evaluation of the Scheme is important, as the outcomes can be used to enhance its efficiency and effectiveness. Hence, the Scheme needs to be evaluated to help the Ministry among others to:
 - Ascertain to what extent the objectives have been achieved, and what improvements are required;
 - Identify and address causes that prevented its successful implementation;
 - Use the valuable information from the evaluation exercise when implementing future phases of the Scheme.

5.2 Effectiveness of Projects to Relocate Artisanal Fishermen at Community Level

5.2.1 The Fishermen Investment Trust and Provision of Multipurpose Fishing Boats

The Ministry should finalise whether FIT should be wound up or re-organised to pursue its objective relating to sustainability of artisanal fishery. Meanwhile, the three moored boats should be protected against further damage and vandalism so that they can eventually be put to beneficial use.

5.2.2 Floating Cages Culture Projects

The Ministry should follow up the 10 floating cages more closely, and evaluate whether the output is likely to support the switch to small scale fish farming. Lessons learned on the design, implementation, monitoring and follow up of the three projects already implemented, need to be embedded in new fish farming projects to boost confidence of all stakeholders.

5.2.3 Fish Aggregating Device Project

The Ministry should collect the relevant information on FAD fishery in order to ascertain what issues are impacting on the reported reduction of fishing efforts and productivity, and the associated initiatives to shift artisanal fishermen outside the depleted lagoons. For example the data collected by FPS on fishermen involved in FAD fishery and their related catch can be fed

to the AFRC to compile relevant statistics. The issues identified need to be addressed to provide the expected benefits out of investments in the new FADs and their maintenance.

5.3 Effectiveness of Conservation, Protection and Enforcement Activities

5.3.1 Conservation Activities at Blue Bay Marine Park and Balaclava Marine Park

Conservation plays an important role in sustainability of artisanal fishery. Hence, the Ministry needs to revive the management plans of both Parks and prioritise the activities based on resources to ensure their efficient and effective implementation. This will enable the Ministry to provide the required overview and assurance on governance, conservation, sustainable financing and livelihoods and environmental awareness in the Marine Parks.

5.3.2 Protection of Fishing Reserves

Protection and enforcement measures need improvement through increased surveillance pending the development of a Management Plan for all Fishing Reserves.

5.3.3 Marine Ranching

The Ministry needs to evaluate the Marine Ranching Project to ascertain to what extent the objective has been achieved, and what changes are needed to improve its benefits to lagoon ecosystem. The evaluation will require an assessment of the increase in fishery landings, the survival rate of fingerlings released, the associated culture costs and the value of the fish ranches.

5.3.4 Protection and Enforcement Activities of the Fisheries Protection Service

The current low level of surveillance by the FPS needs to be addressed to intercept illegal fishing activities more effectively. This may include the following:

- (a) More man hours allocated to surveillance following a reorganisation of activities relating to administrative works carried out by Fisheries Posts personnel;
- (b) The 'Weekly Outcome' needs to include details, such as time spent and number of personnel involved during patrols instead of focussing on number of patrols only. This will enable management to assess the extent to which manpower is utilised for surveillance, and hence, optimum use of same;
- (c) As there are positive correlations between number of contraventions established and number of boat and night patrols, the FPS should focus more on such type of patrols. This will address more effectively ongoing illegal fishing activities as evidenced by the relatively high number of 'picked up cases' where offenders are not being intercepted and prosecuted;
- (d) The Flying Squads, comprising 25 officers, established three times more contraventions than all the 14 Fisheries Posts with thrice the number of officers on duty on a daily basis. Neighbouring posts can pool up available resources in the individual posts and carry out more frequent joint patrols similar to Flying Squads. This will be more effective than

personnel patrolling on foot over limited patrol areas or where patrolling alone is not performed due to security reasons;

- (e) Patrols need to be planned based on an intelligence-led approach in order to be more effective and compensate for the reported budgetary constraints and inadequate resources;
- (f) Awareness campaigns to encourage reporting of illegal fishing activities, for example through the Hotline, need to be carried out in order to support gathering information for risk based surveillance;
- (g) Appropriate Regulations need to be enacted to assign offence for fishing with or in possession of unauthorised gears which are destructive to lagoon fishery.

Ministry's Response

Following discussion of the draft Report with the Ministry, necessary amendments were made. The amended Report was submitted to the Ministry for comments and any additional information deemed necessary for its finalisation.

The Ministry took note of the amended Report and confirmed its finalisation.

Appendix I

Audit Questions and Sub-Questions

Three audit questions and related sub-questions were set, as described below, to answer the audit objective of whether measures implemented by the Ministry were adequate and effective to support sustainable artisanal fishery.

Audit Question 1: Were incentives and direct support to artisanal fishermen effectively contributing to reduce pressure on lagoon fishery?

- Sub-Question 1: Was the Bad Weather Allowance criteria properly applied and was it conducive to support livelihood of fishermen and promote off lagoon fishery?
- Sub-Question 2: Was the 'Canotte' Scheme properly designed, implemented and followed up to ensure that its objectives were met?

Audit Question 2: Had projects implemented to relocate artisanal fishermen met their objectives?

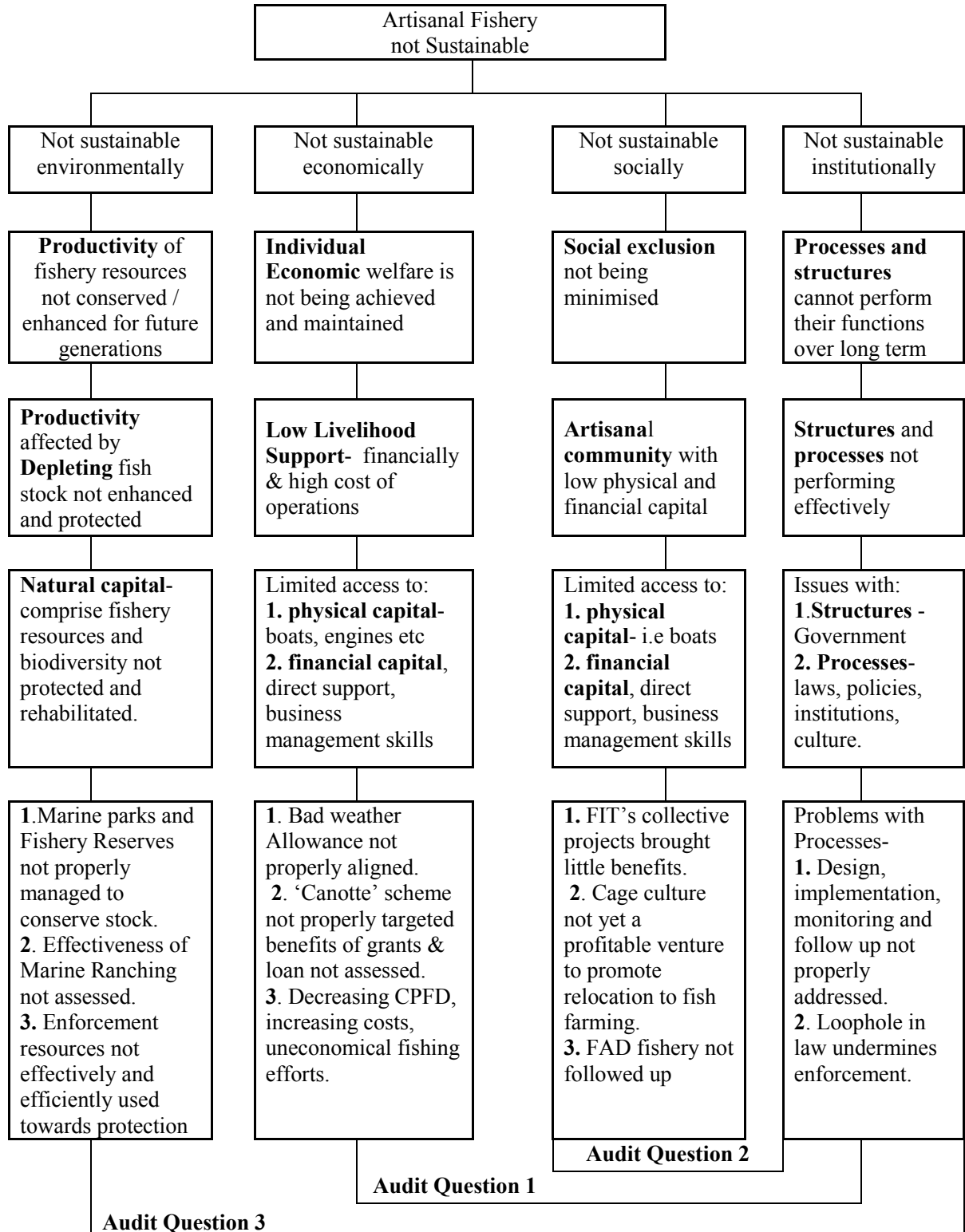
- Sub-Question 1: Did investments in diversified fisheries projects under the Fishermen Investment Trust bring benefits to the community of registered artisanal fishermen?
- Sub-Question 2: Was the floating cage projects conducive to switch artisanal fishermen to small scale fish farming?
- Sub-Question 3: Were the benefits of Fish Aggregating Device fishery ascertained whilst maintaining related devices to promote off lagoon fishery?

Audit Question 3: Were conservation, protection and enforcement activities adequate and effective to promote sustainable artisanal fishery?

- Sub-Question 1: Were conservation and protection activities in Marine Parks properly implemented and managed?
- Sub-Question 2: Were conservation and protection activities in Fisheries Reserves properly implemented and managed?
- Sub-Question 3: Were marine ranching activities properly assessed to identify the outcomes?
- Sub-Question 4: Were protection and enforcement activities of the Fisheries Protection Service adequate and effective?

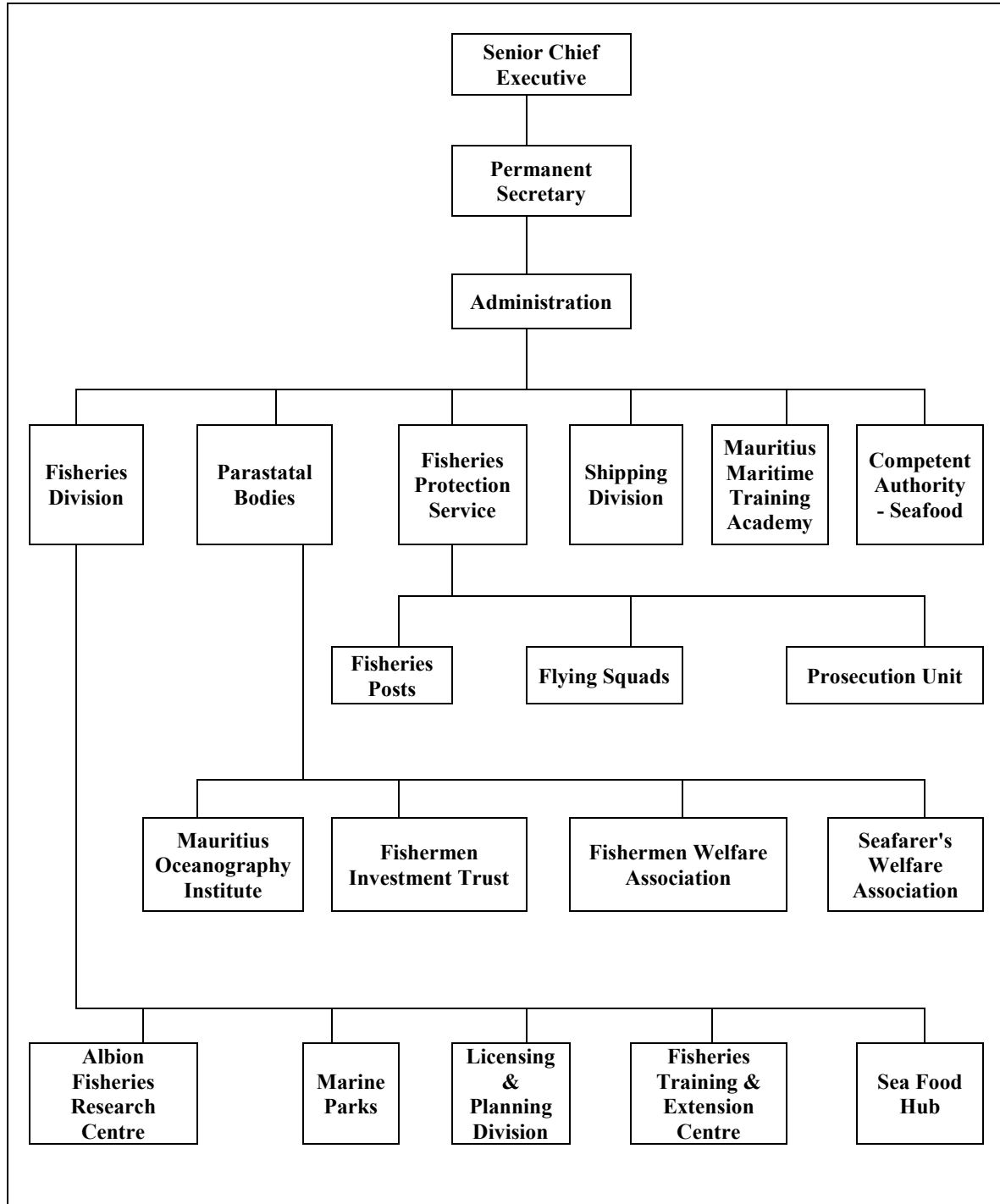
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TREE DIAGRAM- SUSTAINABLE ARTISANAL FISHERY



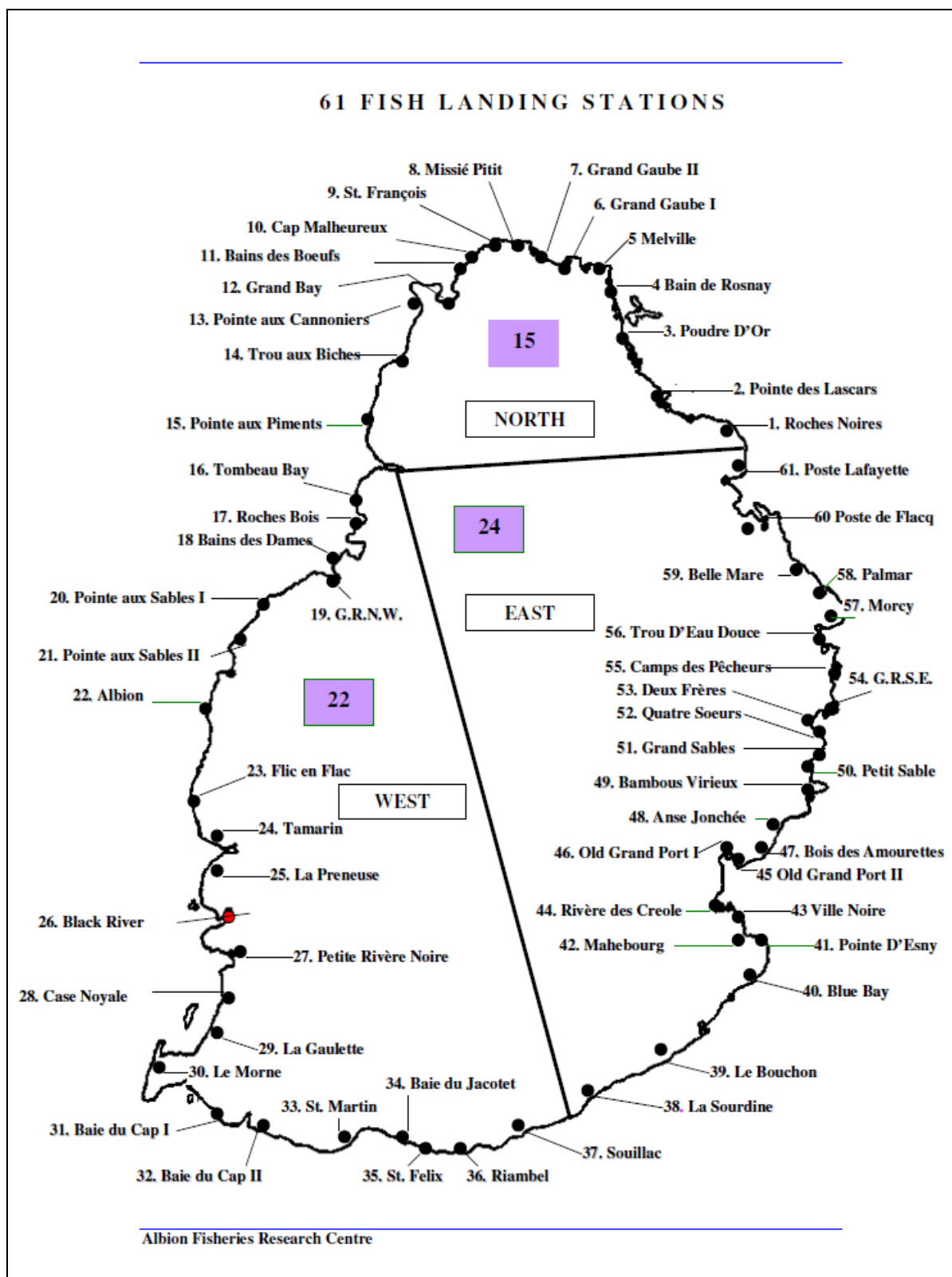
Appendix II

Set Up of Entities and Units under the purview of Ministry



Appendix III

FISHERIES POSTS AND LANDING STATIONS



Appendix IV

Comparison of Outcomes and Deliverables

Outcomes and Deliverables of Projects		
	Partnership for MPAs in Mauritius and Rodrigues	Mainstreaming Biodiversity in the Management of the Coastal Zone in the Republic of Mauritius
1	<p>Develop an enabling policy and institutional framework for sustainably co-managed MPAs throughout the Republic of Mauritius, including Rodrigues.</p> <p><i>Output 1.1:</i> Policy and legislation for the management and sustainability of marine resources strengthened.</p> <p><i>Output 1.2:</i> Tools and codes of practice are developed to facilitate the practical application of existing policies.</p> <p><i>Output 1.3:</i> Mechanisms for strengthening institutional arrangements for the management and sustainability of marine resources identified and promoted at pilot sites.</p> <p><i>Output 1.4:</i> National Responsible Tourism Marine Management Principles developed and operationalised.</p> <p><i>Output 1.5:</i> Awareness increased in fishery sector and of the fishery productivity benefits derived from sound MPA Management.</p> <p><i>Output 1.6:</i> Increase in marine conservation awareness within key sectors of the society.</p>	<p>To mainstream the conservation and sustainable use of biodiversity and ecosystem services into coastal zone management and into the operations and policies of the tourism and physical development sectors in Mauritius through a ‘land and seascape wide’ integrated management approach based on the Environment Sensitive Areas (ESAs) inventory and assessment.</p> <p><i>Deliverables in respect of MPAs</i></p> <ul style="list-style-type: none"> • Improve skills and competencies of staff responsible for MPAs by providing training on all aspects of management of MPA; • Economic evaluations of coastal and marine ecosystems; • Implementing the management plans of the Blue Bay, Balaclava Marine Parks and South East Marine Park Area; • Producing management plans through a consultative process for the six fishing reserves of Mauritius; • Improve the management effectiveness of MPAs in Mauritius and Rodrigues and also to acquire equipment for transport, contributing for the purchase of surveillance equipment; • Development of an investment framework and financing strategy to realise the values and benefits of MPAs, and increase the financing flows to MPAs. This measure will assist in making MPAs financially self-sustainable; • A potential increase in the size and effectiveness of the MPA; • Develop livelihood opportunities for local in local communities in Mauritius and Rodrigues to reduce pressure on lagoon resources and demonstrate the benefits of MPAs.
2	<p>Develop and adapt innovative co-management arrangements for MPAs at a representative demonstration site.</p> <p><i>Output 2.1:</i> Integrated MPA Management board and infrastructure established.</p> <p><i>Output 2.2:</i> Integrated MPA management plan developed.</p> <p><i>Output 2.3:</i> Capacity developed and Integrated MPA Plan implemented.</p> <p><i>Output 2.4:</i> Marine conservation awareness increased.</p>	

Appendix V

Monthly Average Number of Patrols carried out by Fisheries Posts

Fisheries Post	No of Patrols for 6 months*	Monthly Average			Day Afloat	Night Afloat	Total Afloat	Joint Patrol
		Day Beach	Night Beach	Total Beach				
Riambel	423	58.5	12.0	70.5	-	-	-	-
T D Douce	600	46.0	50.2	96.2	-	0.2	0.2	3.7
B Virieux	248	33.8	5.2	39.0	0.2	-	0.2	2.2
Tombeau Bay	281	34.0	12.3	46.3	0.2	-	0.2	0.3
P L Fayette	496	42.3	38.2	80.5	0.8	0.5	1.3	0.8
P aux Sables	476	36.7	39.3	76.0	0.8	1.0	1.8	1.5
G Gaube	481	73.3	0.3	73.7	2.5	0.7	3.2	3.3
P d'Or	293	41.7	3.5	45.2	2.8	-	2.8	0.8
Mahebourg	423	40.3	20.7	61.0	3.2	0.2	3.3	6.2
T A Biches	600	53.7	41.5	95.2	3.8	0.2	4.0	0.8
B du Cap	279	31.7	7.2	38.8	5.3	0.5	5.8	1.8
C Noyale / La Preneuse	586	35.3	24.7	60.0	8.5	3.2	11.7	26.0
GRSE	238	22.2	1.7	23.8	11.2	2.0	13.2	2.7
Blue Bay Marine Park	539	43.2	21.8	65.0	13.5	7.2	20.7	4.2
	5,963							

* ending 30 June 2017

Appendix VI

Contraventions Established during 2017

	F Posts	Nets		U/Water		Explosives		U/sized		Other		Total		Grand Total	Net Seized (Metres)
		P1	P2	P1	P2	P1	P2	P1	P2	P1	P2	P1	P2		
1	G Gaube	0	0	0	0	0	0	0	0	0	0	0	0	0	-
2	Riambel	0	1	0	0	0	0	0	0	0	0	0	1	1	25
3	T D Douce	0	1	0	1	0	0	0	0	0	0	0	2	2	1
4	C Noyale	0	2	0	0	0	0	0	0	0	0	0	2	2	81
5	T Bay	0	2	0	1	0	0	0	0	0	0	0	3	3	5
6	P L Fayette	0	1	0	1	0	0	0	0	0	1	0	3	3	3
7	B Virieux	0	5	0	0	0	0	0	0	0	0	0	5	5	227
8	G.R.S.E	0	1	0	5	0	0	0	0	0	2	0	8	8	4
9	B du Cap	0	7	0	2	0	0	0	0	0	0	0	9	9	224
10	T A Biches	0	5	0	4	0	0	0	1	0	3	0	13	13	57
11	P d'Or	0	3	0	0	0	0	0	0	1	1	1	4	5	8
12	Preneuse	0	1	0	3	0	0	0	0	1	0	1	4	5	6
13	P Sables	0	5	1	1	0	0	0	0	0	2	1	8	9	170
14	Mahebourg	0	7	2	3	0	0	0	0	0	3	2	13	15	219
	Total	0	41	3	21	0	0	0	1	2	12	5	75	80	1,030
	F Squads														
1	FS 1	0	12	0	10	0	0	0	0	2	0	2	22	24	476
2	FS 2	19	34	13	32	0	0	0	0	10	4	42	70	112	3,167
3	FS 3	2	35	6	9	0	0	0	1	12	0	20	45	65	979
4	FS 4	1	14	1	12	0	0	1	2	8	2	11	30	41	289
5	FS 5	1	23	3	47	0	0	0	0	1	0	5	70	75	1,203
	Total	23	159	26	131	0	0	1	4	35	18	80	237	317	6,113

P1: In Possession or Caught Fishing P2: Picked Up, Accused Unknown
 U/ W : Under Water Fishing U/ F: Under Sized Fish

National Audit Office

Air Mauritius Centre, John Kennedy Street, Port Louis, Mauritius
Tel: (230) 212 2096 Fax: (230) 211 0880 Web: <http://nao.govmu.org>

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