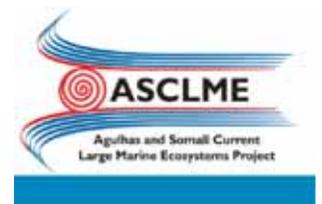




Policy and Governance Assessment for Marine and Coastal Resources for the Republic of Mauritius

National Report

August 2011



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- f. Ministry of Fisheries and Rodrigues
- g. Ministry of Tourism and Leisure
- h. Ministry of Finance and Economic Development
- i. Central Statistics Office
- j. Rodrigues Regional Assembly
- k. Mauritius Meteorological Services
- l. Agricultural Research and Extension Unit
- m. Mauritius Sugar Industry Research Institute, and last but not least,
- n. Mauritian Wildlife Foundation

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List of Abbreviations and Acronyms

AMESD	African Monitoring of Environment for Sustainable Development
AREU	Agricultural Research Extension Unit
CBD	Convention on Biological Diversity
CBO	Community Based Organisation
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CMA	Conservation Management Area
COMESA	Common Market for Eastern and Southern Africa
CoP	Conference of Parties
CSO	Central Statistics Office
EPA	Environment Protection Act 2002
EIA	Environmental Impact Assessment
ESA	Environmentally Sensitive Area
FDI	Foreign Direct Investment
FS	Forestry Services
FARC	Food and Agricultural Research Council
GDP	Gross Domestic Product
GEF	Global Environment Facility
ICZM	Integrated Coastal Zone Management
IOC	Indian Ocean Commission
IOR-ARC	Indian Ocean Rim- Association for Regional Cooperation
IOSEA	Indian Ocean and South East Asia
IPCC	Intergovernmental Panel on Climate Change
IRS	Integrated Resort Scheme
IUU	Illegal, Unreported and Unregulated
MID	Maurice Ile Durable

MoAIFS	Ministry of Agro Industry and Food Security
MoESD	Ministry of Environment and Sustainable Development
MoHL	Ministry of Housing and Lands
MOI	Mauritius Oceanography Institute
MPA	Marine Protected Area
MSIRI	Mauritius Sugar Industry Research Institute
MZA	Maritime Zone Act
NBSAP	National Biodiversity Strategy and Action Plan
NEP	National Environmental Policy
NES	National Environmental Strategy
NGO	Non-Governmental Organisation
NPCS	National Parks and Conservation Service
PAN	Protected Area Network
RRA	Rodrigues Regional Assembly
SADC	Southern African Development Community
UNCLOS	United Nations Convention on the Law of the Sea
UNEP	United Nations Environment Programme
UOM	University of Mauritius

Part 1

Chapter 1: Country Profile

1.1 General Profile

The Republic of Mauritius consists of a group of islands situated in the South West Indian Ocean at latitude of 20.17°S and a longitude of 57.33°E. It comprises mainland Mauritius, Rodrigues and Saint Brandon, Agalega and several outer islands. It enjoys a subtropical climate.

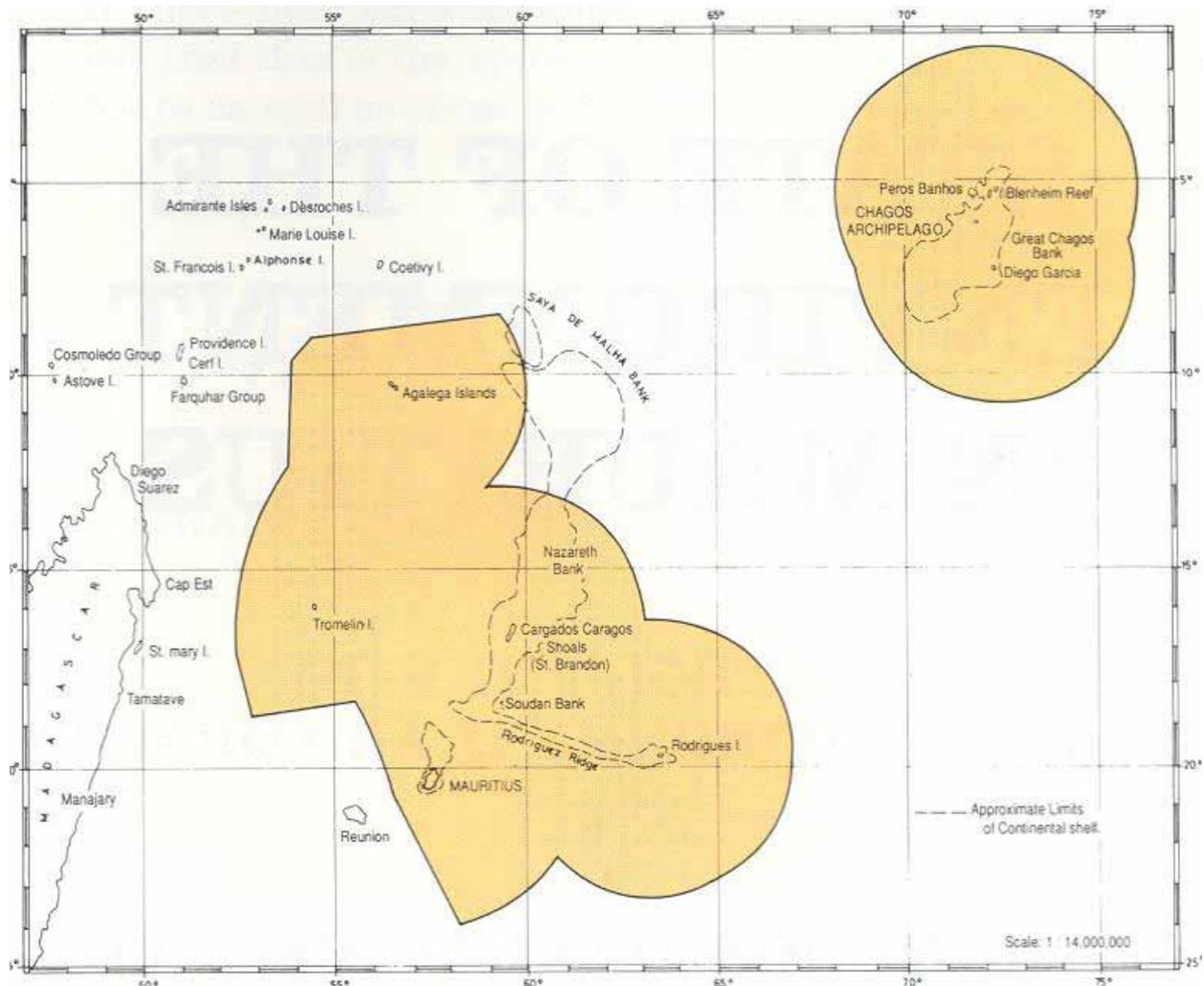


Figure 1: Republic of Mauritius and its Economic Exclusive Zones (Source: Mauritius Environment Outlook, 2010)

It has a total area of 2040 km² and an economic exclusive zone of 1.9 million km². About 43% of the land area is under to agriculture, 25% is occupied by built-up areas, 2% by public roads; and

the remaining 30% consists of abandoned cane fields, forests, scrub land, grasslands/grazing lands, reservoirs and ponds, swamps and rocks.

Its population is estimated to be around 1.3 million (CSO, 2010). Mauritius was classified as a Middle Income Country in 1995. In 2009, its GDP was USD 6836; the Human Development Index was 0.804; the Human Poverty Index value was 9.5%, ranked 57th on the Global Competitive Index and 17th country in terms of overall regulatory ease of doing business. The Environmental Performance Index (Yale and Columbia Universities) released at the World Economic Forum in January 2010, ranked Mauritius 6th out of 163 countries.

1.2 Political Profile

Mauritius has been successively a Dutch, French and British colony. It became independent of on 12th March 1968 and acceded to the status of Republic on the 12th March 1992. The official language is English. French is widely spoken while Creole is the mother tongue.

Since its independence, Mauritius has a parliamentary democracy based on the Westminster system. The Prime Minister is the Head of Government with all executive powers whilst the President is the Head of State. General election is held every five years and the National Assembly comprises of 70 elected members. The separation of the legislative, the executive and the judiciary powers is built in the Constitution. The legal system is a composite of English laws and the French Code Napoleon. The highest Court of Appeal is the British Privy Council.

Mauritius inherited a written constitution which is inspired from both English law and the European convention for protection of human rights and fundamental freedoms. The constitutional law embodies 3 fundamental concepts: (1) Rule of law, (2) Parliamentary Sovereignty, (3) Separation of powers. The Constitution being the supreme Law of Mauritius, any law inconsistent with it would be declared void. Chapter II of the Constitution outlines the fundamental rights and freedoms of the individual covering the mechanisms for protection of people such as the right of individual to life, liberty, security of the person and the protection of the law, freedom of conscience, of expression, of assembly or of association as well as extending the right of the individual to protection of his home and other property and its deprivation. However, the Mauritian constitution lacks specific provisions on environmental governance (G Manna Jugessur, 2006).

Since 2002, the island of Rodrigues was granted an autonomy status. It has its own regional assembly. Local elections are held every five years.

1.3 Legislative and Institutional Profile

There is a plethora of laws of direct relevance to coastal and marine environment. These laws provide for a number of organizations involved in administering them.

Over the last 2 decades, the health and well-being of coastal and marine environment have assumed a high prominence. Accordingly, legislations have incorporated the recent international environmental principles and requirements such as the polluter pays principle, precautionary principles, sustainable development public, participation, the establishment of environmental crimes, dispute resolution, key institutions, EIA rules and processes and free access to environment information among others. This is attributed to factors such as enhanced awareness, growing scientific knowledge, gradual demystification and geopolitical realities. The **Table 1** below provides an overview of relevant legislations and the institutions administering them.

Table 1: Coastal and Marine related legislations and Institutions administering them

Legislation	Objects	Implementing Agency
Maritime Zones Act 2005	Provides for the protection and preservation of the maritime environment	Prime Minister's Office
Mauritius Oceanography Institute Act 1999	Formulation, implementation and coordination of scientific programmes relating to the protection, exploration and development of marine living and non-living resources in the maritime zones.	Mauritius Oceanography Institute
Fisheries and Marine Resources Act 2007	Marine resources conservation, fisheries development and management	Ministry of Fisheries and Rodrigues
EPA 2002 (amended 2008)	Environmental protection, management, coordination, policies formulation, EIA, ICZM, pollution prevention	Ministry of Environment and Sustainable Development
Planning and Development Act 2004	Physical planning and development	Ministry of Housing and Lands
Wildlife and National Parks Act 1993	Conservation, protection and management of fauna and flora	National Parks and Conservation Service, Ministry of Agro Industry and Food Security
Beach Authority Act 2000	Public beach management	Beach Authority
Merchant and Shipping Act 1986	Maritime zones and shipping	Ministry of Public Infrastructure , Land Transport and Shipping

Forest and Reserve Act 1983	Management of forests and resources	Forestry Services, Ministry of Agro Industry and Food Security
--------------------------------	-------------------------------------	---

The **Figure 1** given below highlights the linkages of organisations administering coastal and marine related matters



1.4 Economic Highlights

Since early seventies, Mauritius has successfully diversified its economy from a monocrop (sugar-cane) economy into one based on sugar, manufacturing (mainly textiles and garments) and tourism. Global business (offshore) and freeport activities have also been growing continuously. Over the last decade, the financial services and sea food hub have also emerged. Diversification of the economy remains a priority. Emphasis is now being laid on the following:

- Developing the Information and Communication Technology (ICT) sector;
- Framing the right policy mix to consolidate public finances;
- Green industry;
- Enhancing export competitiveness, and
- Modernising the Welfare State

Mauritius has also been implementing wide-ranging reforms and policy measures over the past 5 years with a view to securing transition from trade preferences to global competitiveness and setting the stage for sustaining growth, attracting foreign direct investment, and enhancing the country's competitiveness. The bold reform programme bearing early and prudential measures introduced in the Budget 2006-2007 had a positive impact on GDP, which registered growth rates of 5.1% and 5.4% in 2006 and 2007 respectively. The main drivers of this new growth trajectory were tourism, financial services, construction and manufacturing, including the Export Processing Zone (EPZ). The reform programme aimed at bringing the economy to a higher growth path and making it more competitive, flexible and adaptable by:

- Fiscal consolidation and improving public sector efficiency
- Enhancing trade competitiveness
- Improving the investment climate to rank Mauritius among the Top Ten most investment- and business-friendly locations in the world
- Democratising the economy.

Improvements in the overall business climate, through the removal of bottlenecks in the product and factor markets, and in key infrastructure, have led to a surge in investment and in capital flows. The investment rate, as measured by the gross domestic fixed capital formation, rose from 21.4% in 2005 to 25.1% in 2007, while foreign direct investment (FDI) trebled over that period, reaching Rs 10 billion (USD 330 million) in 2007. Private sector investment increased mostly in such areas as tourism, the Integrated Resort Scheme (IRS) and finance.

The economy registered a growth rate of 5.1% in 2008 in spite of the adverse effects of the financial and economic crisis. Growth rate in 2009 slowed down as expected, mainly because of

the negative growth rates recorded in the following industry groups: textile (-4.0%) and in the hotels and restaurants (-6.4%).

On the overall, the economic growth rate of Mauritius has been positive over the last three decades. The Gross National Income per capita at market prices reached Rs. 217, 541(USD 6836). Most sectors have grown in terms of economy except agriculture and fisheries have been on the decline while textile sector has shown some fluctuation. The share of agriculture in the economy dropped from 3.2% in 2005 to 1.7% in 2009, and textile from 6.7% to 5.3%, that of financial intermediation increased from 10.3% to 11.7%. In 2010, tourist arrival was around 934,000 with a contributing about Rs 39.4 billion, that is, 8.3% of GDP while fishing sector represented 1% to national GDP.

1.5 Economic challenges

Sustaining the growth momentum well into the future is a major challenge because of international pressures such as globalization and liberalization. Furthermore, reforms were required domestically to arrest fiscal decline, achieve growth in labour and total factor productivity and address the issues of pockets of poverty and an ageing population.

Mauritius has embarked on a comprehensive reform programme to move to its next phase of development capitalizing on human resources, Information Technology and higher value-adding activities. This is best achieved by building on its existing strengths of openness, high standards and best practices in the financial sector, an advanced physical and telecommunication infrastructure, an active capital market, competitive communication costs, a relatively reasonable level of human and intellectual capital market, a well-developed social safety network and, above all, good governance.

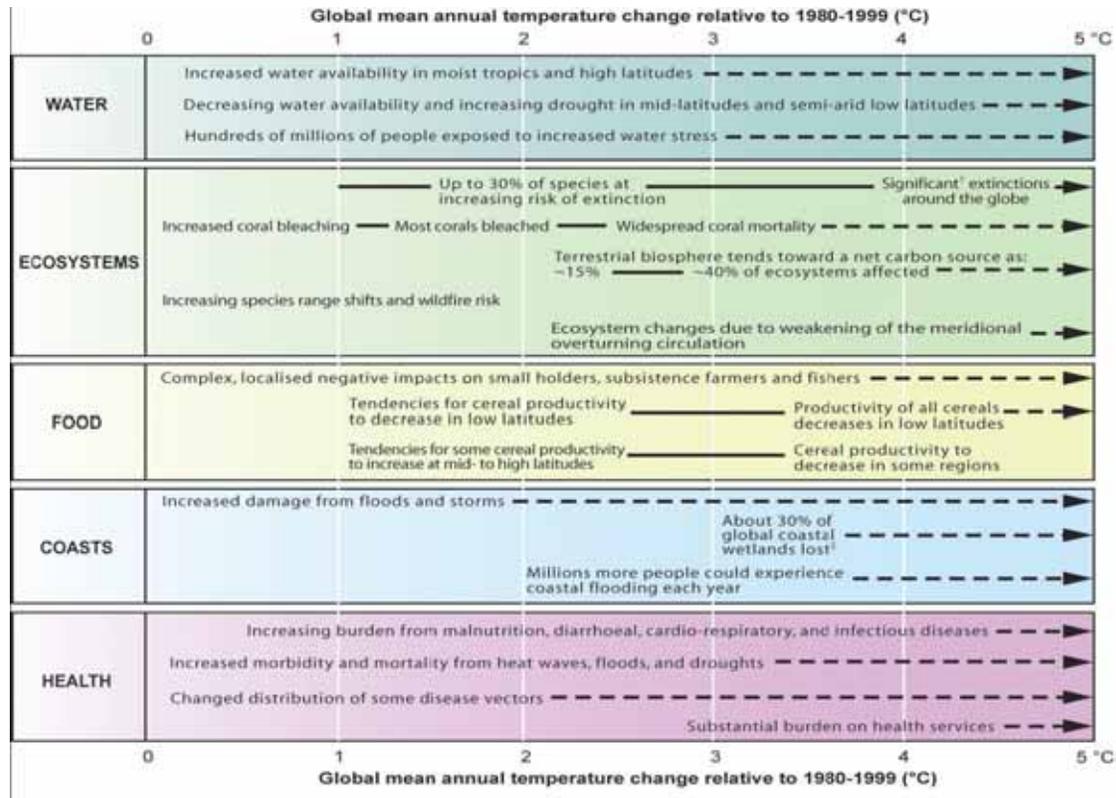
The island's membership of several regional groupings such as the Common Market for Eastern and Southern Africa (COMESA), Southern African Development Community (SADC), Indian Ocean Rim - Association for Regional Cooperation (IOR-ARC) and the Indian Ocean Commission (IOC) positions Mauritius as a key interface between Asia and Southern and Eastern Africa.

1.6 Climate Change

Recent reports from International Energy Agency, UNEP and observations made by NASA confirm that the greenhouse gases emissions have reached record level and that the earth surface temperature was highest in 2010. On a business as usual development path, the global average temperature is expected to increase on average 0.2°C per decade over the next two decades,

meaning that between 1990s and 2010s, average global surface air warming would range from 1.8°C to 4.0°C. This would be accompanied by global average sea level rise of 18 to 59 cm by the end of the 21st century. This forecasted sea level rise does not take into account the melting of glaciers. The level of impacts projected by the IPCC in its 4th Assessment Report on the various relevant ecosystems are indicated in the **Table 2** below.

Table 2: Summary of key impacts of climate change on various socio-economic sectors¹



Source: Climate Change 2007. Impacts, Adaptation and Vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change

1.7 Maurice Ile Durable (MID)

The Prime Minister of Mauritius announced his vision of making Mauritius a Sustainable Island, 'Maurice Ile Durable: MID' in 2008. Initially, the concept meant to enable the country to achieve energy independence and same has gradually expanded in scope. National consultations are underway on the following five themes, namely, energy, environment, employment, education and equity. The process will culminate with the formulation of a MID policy, a ten strategy and a three year Action Plan.

The Maurice Ile Durable Fund was set up in June 2008 with a provision of Rs 1.3 billion (\$40 million) with resources mobilized through taxes, government subsidies, development partners, carbon taxes and the private sector, including airlines offsetting their carbon emissions.

The Fund was set up to finance:

- Schemes for the preservation of local natural resources with a view to achieving sustainable development and adapting to climate change
- Projects to explore and harness all potential for local sources of renewable energy and to reduce dependency on imported fossil fuels
- Programmes to reduce consumption of fossil fuels, achieve greater efficiency in the use of energy
- Projects and programmes to support efforts to protect the environment through recycling of waste, to encourage more efficient use of energy and to increase reliance on renewable energy
- Programmes for research and analysis pertaining to the development of renewable sources of energy and consumption trends and to ensure environmental sustainability.

Part B

Chapter 2: Maritime Zones

The coastal and ocean territory of Mauritius holds an immense potential for its future socio economic development and well being of the country. As such, it remains high in the agenda of Government.

Since its independence in 1968, Mauritius has continuously reasserted its sovereignty over the Chagos Archipelago, including Diego Garcia, and the island of Tromelin. These islands form an integral part of the territory of Mauritius under the Mauritian law. According to the authorities, the Chagos Archipelago was illegally excised by the United Kingdom from the territory of Mauritius prior to Mauritius being granted independence in violation of the UN Charter and UN General Assembly resolutions 1514 (XV) of 14 December 1960 and 2066 (XX) of 16 December 1965. Mauritius has consistently pressed the United Kingdom for the early and unconditional return of the Chagos Archipelago, including Diego Garcia.

As regards the island of Tromelin, since France is also claiming sovereignty over the island, Mauritius and France are holding talks to effectively resolve expeditiously the sovereignty issue. In the meantime, Mauritius and France have agreed on the co-management modality.

2.1 Current Institutional Structure

In view of the importance accorded to the maritime zone in general, the Prime Minister's Office in Mauritius is the highest authority directly concerned with the legislative, policy and management matters. However, with a view to advise Government on the formulation and implementation of policies and programmes in respect of oceanography and related aspects, the Mauritius Oceanography Institute was created in the year 2000. The PMO does consult either directly or through the Mauritius Oceanography Institute with the organisations such as the Mauritius Police Force, Attorney's General Office, Ministries of Foreign Affairs, Environment and Sustainable Development, Housing and Lands, Fisheries and Rodrigues, Mauritius Research Council and others on technical matters.

2.1.1 Mauritius Oceanography Institute (MOI)

The Mauritius Oceanography Institute (MOI) was officially established in January 2000 by the proclamation of the MOI Act (Act 24 of 1999). It is essentially a parastatal research organisation

functioning under the aegis of the Prime Minister's Office. It is responsible for the formulation, implementation and coordination of scientific programmes relating to the protection, exploration and development of marine living and non-living resources in the Maritime Zones of the Republic of Mauritius.

The objects of the MOI as specified in the Mauritius Oceanography Institute Act 1999 are:

- (i) To foster interest in research and development in relation to oceanography;
- (ii) To advise Government on the formulation and implementation of policies and programmes in respect of oceanography and related aspects;
- (iii) To co-ordinate, collaborate and cooperate with other institutions. Agencies and persons on national, regional and global issues within its fields of interest, and to assist any organisation, body or person in creating sustainable research and development programmes in those areas of interest and activity related to oceanography;
- (iv) To demonstrate and communicate to the scientific community and the public at large the results of research and the importance in the conservation, maintenance, management, utilisation and development of resources based on marine and coastal ecosystems, and
- (v) To manage and optimise the use of funds and other resources for the purposes of the MOI Act

The MOI is administered by a Board whose chairperson is appointed by the Prime Minister. The Board comprises of senior officers from a number of public institutions, academia and research organisation and 4 nominees (by the Prime Minister) having knowledge and experience on oceanographic matters. The institutions are Prime Minister's Office, Meteorological Services, Ministry of Foreign Affairs, Ministry of Finance and Economic Development, Ministry of Environment and Sustainable Development, Ministry of Housing and Lands, Ministry and Fisheries and Rodrigues, Mauritius Research Council, University of Mauritius, Mauritius Ports Authority and Outer Islands Development Corporation.

National Initiatives

Since its creation, the Institute has been actively involved in the task of preparing the submission of Mauritius to the United Nations Commission on the Limits of the Continental Shelf (UNCLCS). Following several technical and diplomatic negotiations, Mauritius and Seychelles became the first two Island States to make a joint submission to the UN Commission on the Limits of the Continental Shelf, when they lodged their submission concerning the Mascarene Plateau in December 2008. The Republic of Mauritius and the Republic of Seychelles made an official presentation of their submission to the United Nations Head Quarters in March 2009 for an extended continental shelf of an area of about 400,000 km² in the region of the Mascarene

Plateau. In 2010, the governments of Mauritius and Seychelles signed a Memorandum of Understanding for the setting up of a Joint Management Council.

In May 2009, the Republic of Mauritius made another submission to the United Nations for an Extended Continental Shelf in the region of Rodrigues. Mauritius has also made a submission for an extended continental shelf of an area of about 123,000 km² in the region of Rodrigues Island. A Preliminary Information document for an extended continental shelf in the region of the Chagos Archipelagos was also submitted. **Figure 3** given below depicts the proposed extended areas of continental shelf.

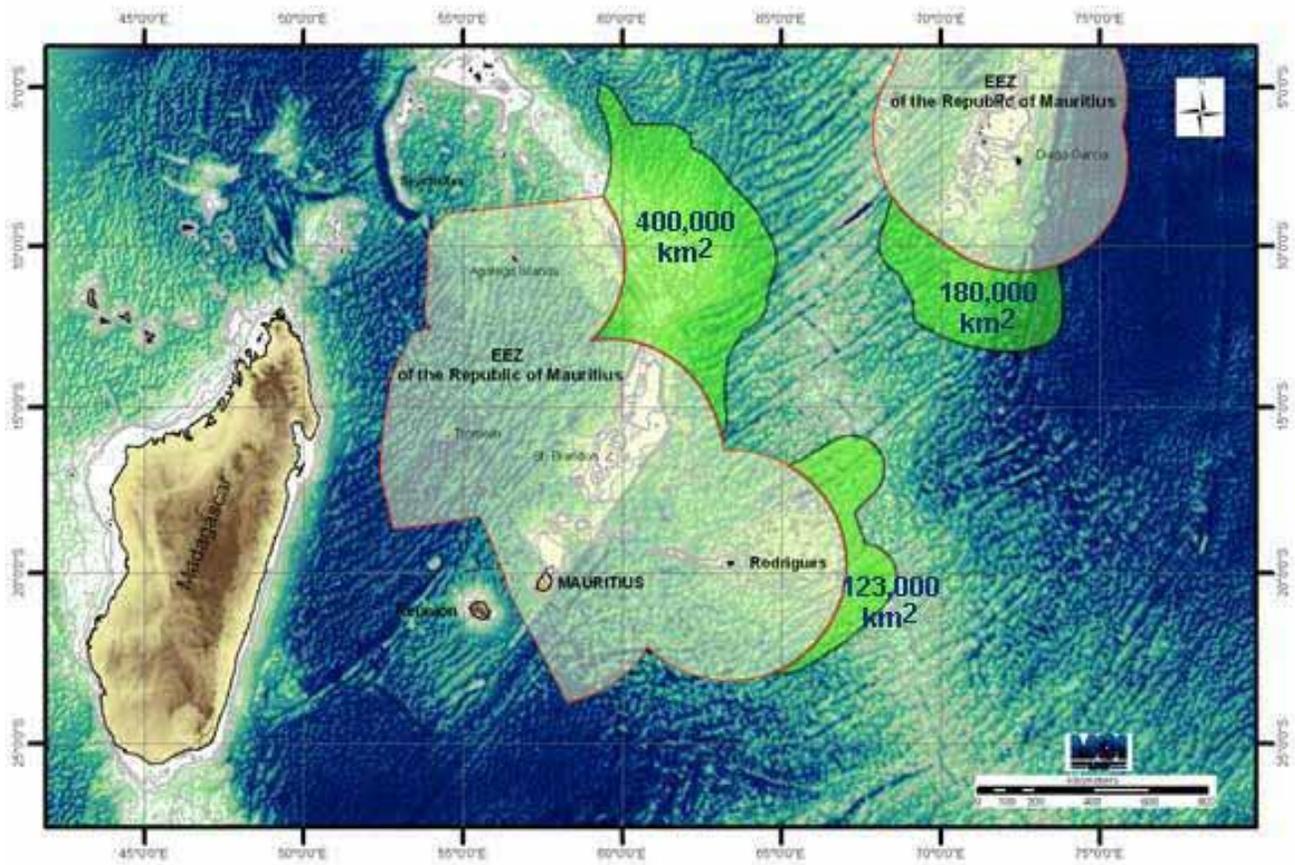


Figure 3: Republic of Mauritius and its EEZ (Light green) and proposed area of continental shelf submitted for extension (bright green)

Other pertinent research activities include:

Bioprospecting in Mauritian Waters

The MOI initiated a four year project in order to evaluate the anti-cancerous properties of marine sponges extract. The compounds isolated from one of the local sponges are new to science, but they show affinity to compounds already proved to possess anti-cancerous properties.

Genetic connectivity

This research aims at investigating the population structure of some specific corals and reef fishes so as to determine their genetic link. It is of significant importance for fisheries management both regionally and nationally.

Coral farming

The MOI has initiated a pilot coral farming project in order to investigate optimal conditions for the growth of coral specimens in land-nurseries. The aim is to maintain an on-land stock of corals for onward propagation at sea. This science involves cutting edge research in coral growth. Coral transplantation may be used in affected/degraded areas following coral bleaching caused by climate change or by pollution from land based sources.

Biological Oceanography

The MOI has initiated a number of projects that relate to biological oceanography in particular, a pilot project that aims at investigating the feasibility of pearl culture. Another project concerns the investigation of the presence of microalgae (*spirulina sp*) in our waters. These are important in the development of food additives and pharmaceuticals. Because the threat from invasive marine species is high on the agenda, the Institute is also investigating sensitive areas like the harbour for the presence of such organisms that could be brought in our territory from ballast discharge.

Works have also been initiated, ongoing and or completed on the following areas:

- geospatial Information System for habitat mapping of south-eastern coast;
- short period sea level oscillations;
- inventory of the coral fauna and recruitment;
- modelling and mapping oceanographic processes;
- characterisation of processes leading to coastal erosion through study beach geomorphology, lagoon hydrodynamics and sediment transport; and
- bathymetric surveys of the shallow lagoons of Mauritius and Rodrigues.

Regional Initiatives

IOC/ UNEP African Monitoring of Environment for Sustainable Development (AMESD)

AMESD is a regional programme aimed at bringing earth observation data closer to the African Communities. These data sets are, in the case of the IOC region, pertinent to the marine

environment. All the partners and stakeholders will gain access to near real-time marine and meteorological data through the acquisition of a satellite receiving station. In the context of the IOC region, the Mauritius Oceanography Institute has been designated as the implementing agency. An agreement to the tune of Euro 1, 231, 000 (grant) was signed with the EU in September 2010 to enable MOI to act as the Regional Implementation Center for the IOC and East Africa region.

The programme has been set-up in such a way that capacity building in satellite data manipulation and associated technologies will be the prime concerns. The ultimate objectives are the development of chart information to the fishing authorities on potential fishing areas. In addition, database on marine meteorology and physical models will be developed so as to help in case of marine hazards and for climate change monitoring.

2.2 Maritime Policies and Legislations

The Maritime Zones Act 2005 (MZA 2005) sets out the legal statutory territorial sea, internal, historic and archipelagic waters which extend to air space over the archipelagic waters. It also provides for regulations for the exercise of controls in contiguous zone. This Act has been amended to enable Mauritius to honour its obligation and to be in conformity with the UNCLOS.

The Maritime Zones Act 2005, states that the sovereignty of Mauritius extends and has always extended to (a) the territorial sea; (b) its internal waters; (c) its archipelagic waters; and (d) its historic waters. ‘Maritime Zone’ is defined as the archipelagic waters; contiguous zone; continental shelf; EEZ; historical water; internal waters; maritime cultural zone; and territorial sea.

Mauritius has in the Exclusive Economic Zone (EEZ) “*sovereign rights to explore and exploit, conserve and manage natural resources*”. The territorial sea of Mauritius is and has always been the sea between the baselines and a line of which every point is at a distance of 12 nautical miles from the nearest point of the baselines.

In accordance with international law and in particular Article 56 of UNCLOS, Mauritius has in the EEZ -

- (a) sovereign rights to explore and exploit, conserve and manage the natural resources, whether living or nonliving of waters superjacent to the seabed and its subsoil;
- (b) jurisdiction to carry out marine scientific research, to protect and preserve the marine environment.

In accordance with the MZA, Mauritius has the exclusive right to regulate, authorize and conduct marine scientific research in its territorial sea, in its EEZ and on its continental shelf. All maritime scientific research in the maritime zone requires the express consent of the Prime Minister. In accordance with Article 56 of UNCLOS, the S.15 (a) (b) of the MZA 2005 provides for the protection and preservation of the maritime environment. The Prime Minister is already empowered to make regulations to regulate installations and structures within the EEZ (section 17(d)) and the continental shelf (section 21(1) (d)).

The Fisheries and Marine Resources Act 2007 (FMRA 2007) also provides in section 69(3) that a written authorisation from the Permanent Secretary responsible for fisheries is required for replacing or construction of any structure within the territorial sea or internal waters. Since there is a PMOs directive that all structures at Sea will be regulated by the Prime Minister in terms of regulations made under the Maritime Zones Act 2005, it is necessary to delete section 69(3) from the FMRA 2007.

2.3 Relevant International Treaties

Mauritius is a Party to UNCLOS, the majority of the IMO Conventions and the Nairobi Convention. It ratified the UNCLOS in 4th November 1994. However, it is not Party to the London Convention or the 1996 Protocol. Mauritius as a party to the UNCLOS commits to adhere to international policy on conservation of living resources of the high seas.

2.4 Funding Level and Sources

Most of the activities in relation to the maritime zones are carried out with local fund, bilateral supports and through regional initiatives such as AMESD and other GEF funded projects. The MOI is funded national appropriation and its annual budget ranged between Rs 21million and 26 million over the last three years whilst its capital grant receipt ranged between Rs 10 million to 16 million. The budget of the organisation has been on the rise over the last years.

2.5 Gaps and Needs for harmonization

(a) There is no written ocean policy

There is presently no ocean management policy developed. However, the MOI has envisaged the formulation of an ocean management policy in the coming 5 years (Draft MOI Strategic Plan 2011-2015).

(b) Legislative gaps

The recent ICZM framework study commissioned by the Ministry of Environment and Sustainable Development has made the following recommendation under the MZA 2005.

Insert a new subsection 6(3) to read as follows:

The Prime Minister may make regulations-

- i. to provide for the authorisation and regulation of the construction, operation and use of any installation or structure within the territorial sea, internal waters, archipelagic waters and historic waters of Mauritius;*
- ii. to require that specified activities may not be carried out within the maritime zones of Mauritius except within an area that has been leased for that purpose and in accordance with that lease;*
- iii. to prescribe offences and penalties in relation to the matters dealt with in the regulations provided that the penalties do not exceed the maximum penalties specified in section 28.*

Consequential amendments

Insert a new section 30(2) (d) to provide for the amendment of the Fisheries and Marine Resources Act as follows:

“(d) in section 69 by deleting subsection (3).

A Marine Pollution Bill is presently being drafted by a legal consultant to incorporate provisions of maritime environment-related conventions of the International Maritime Organisation (IMO).

Regulations pertaining to structures at Sea have been drafted and are consideration at the State Law Office.

© Capacity Building

Sustainability of the ongoing activities will necessitate that there is continuous capacity building at all levels. At the institutional level additional equipment and technologies are needed. A new building next to the Albion Fisheries Research Centre in Albion is still under consideration.

Chapter 3: Fisheries and Mariculture

3.1 Importance of Fisheries and Mariculture in Mauritius

Fisheries have remained one of the key economic sectors for Mauritius over the past decades. It accounted for 1.2% of the GDP in 2009. It presently employs about 12,000 persons, including those involved in fishing, canning and marketing. Some 2,020 active fishermen in the artisanal fishery and 1,591 fishing boats in Mauritius have been registered. Export of fish and fish products accounted for US\$ 267 million in 2008 (CSO 2008). The revenue generated in terms of foreign license fees, import permit license fees and sale of produce amounted to the tune of Rs. 43 million in 2009.

Mauritius is also aiming at becoming a sea food hub in the Western Indian Ocean. The present total supply of fish and fish products for direct consumption stands at around 18,000 tonnes. Around 90,000 tonnes of processed fish and fish products are exported. These are produced mainly from fish harvested in the south west Indian Ocean.

Trends in fisheries stocks

Over the last 20 years, total fish catch (lagoon and off lagoon) has decreased by three folds (Figure 4). The total catch in 1993 was 19,690 tonnes while the figure for 2009 was 6,978 tonnes in 2009. Fresh fish is also landed along the coast of Mauritius at 61 fish landing stations by the artisanal fishers who fish inside the lagoon and in the vicinity of the outer reef. The total fresh fish production from the artisanal fishery was 820 tonnes and the average catch per fisherman-day was 6.4 kg.

It is feared that the total fish catch may decrease over the next 20 years if appropriate management measures are not implemented to use sustainably, conserve and efficiently manage the valuable marine resources for future generations.



Figure 4: Total lagoon and off lagoon fish catch (in tonnes) (1993 – 2009) (Source: Ministry of Fisheries and Rodrigues, Fisheries Division)

Fishing activities in the EEZ

Mauritius depends much on the exploitation of the fisheries resources in its EEZ and participates in the Indian Ocean Tuna Commission where sustainable tuna fisheries management measures are taken. Fishing licences are issued to authorise local and foreign fishing vessels to fish in the EEZ, under the provisions of the Fisheries and Marine Resources Act 2007. In 2009, around ten countries were issued fishing licences. The annual revenue from such licences and fishing agreements was around Rs. 40 million. Mauritius also signed fishing agreements with Seychelles in 2005 and the Japan Tuna Fisheries Cooperative Association in 2007. In the bank fishery, semi-industrial fishery, slope fishery and shrimp fishery for demersal species, a quota system and a limited entry system are imposed to ensure sustainable exploitation of the resources.

Authorities in Mauritius recognize that Illegal, Unreported and Unregulated (IUU) fishing is a global issue with many harmful environmental, economic and social impacts. The need for strengthened fisheries governance at national and regional levels has been increasingly recognized by the international community as one of the main requirements if IUU fishing is to be eliminated. In an effort to combat illegal, unreported and unregulated fishing in Mauritius, a National Plan of Action based on the International Plan of Action, has been developed with the assistance of the Government of Norway to prevent, deter and eliminate illegal, unreported and unregulated fishing.

The Mauritius NPOA-IUU addresses, among others, the following:

- a) All State responsibilities;
- b) Flag State responsibilities including registration of vessels fishing boats and vessels, records of fishing boats and vessels and authorization to fish;
- c) Coastal States responsibilities;
- d) Port State Measures with emphasis on advance notification of vessels, denial of access, cooperation with other States and RFMOs and port inspections;
- e) Trade related measures such as catch documentation, transparency of markets and information dissemination;
- f) Conformity with measures taken by the Regional Fisheries Management Organisations which include party compliance and non-party compliance;
- g) Special requirements of developing States; and
- h) Several supporting actions to enhance measures taken by Mauritius to combat IUU fishing.

Aquaculture

Aquaculture is recognized to have the potential to play a determining role in the fisheries sector of Mauritius. Fish farming has increased from 68.2 tonnes in 1991 to 430 tonnes in 2009. An Aquaculture Master Plan has been prepared and approved by Government in 2007. The 2008-2009 national budget has made provisions for its development. Aquaculture activities are regulated by the Fisheries and Marine Resources Act 2007, as amended in 2008. All marine fish farming projects in the fish farming zones have to comply with operational guidelines for responsible fish farming practices and require an EIA licence. Presently, there are two medium marine and freshwater aquaculture farms. In addition, there are a number of smaller freshwater fish farms.

Fisheries Management

Licences have been issued to foreign fishing vessels over the last five years. **Table 3** shows the total number of licences issued to foreign fishing vessels over the last five years

Table 3: Licences issued to foreign vessels by gear type

Year	Surface Longliner	Purse seiner	Trawler	Banks (handline)	Bottom longliner	Sea cucumber	Total
2005	175	39	0	3	0	0	217
2006	183	43	2	3	0	0	231
2007	141	59	0	3	0	0	203
2008	81	16	0	3	1	1	102
2009	119	61	0	9	1	2	192

Source: Ministry of Fisheries and Rodrigues Annual Report 2009

An increase in the number of foreign licences issued in 2009 is noted as compared to 2008 as a result of the resumption of licensing of European Community fishing vessels.

Under the Fishing Agreements between Mauritius and the Government of Seychelles and the Federation of Japan Tuna Fisheries Co-operative Associations (FJTFCFA), forty-nine licences were issued to tuna fishing vessels and extensions were granted to 9 vessels.

Licences issued to foreign fishing vessels under fishing agreements	Purse seine	Longline
Seychelles	19	6
FJTFCFA	-	24

Source: Ministry of Fisheries and Rodrigues Annual Report

143 fishing licences were issued to individual foreign fishing vessels of various nationalities and 41 licences were extended. Out of the 143 licences, 89 were issued to longliners, 42 to purse

seiners, 9 to foreign bank fishing vessels, 2 to vessel fishing for sea cucumber and one to a bottom longliner. Details are given in the Table 4 below.

Table 4: Number of licences issued by category and nationality.

Licences issued to foreign fishing vessels not falling under fishing agreement	Longline	Purse seine	Banks fishing	Bottom Longline (demersal species)	Sea cucumber
Nationality					
Belize	4	-	-	-	-
China	2	-	-	-	-
Indonesia	3	-	-	-	-
Malaysia	10	-	-	-	-
Philippines	1	-	-	-	-
Oman	2	-	-	-	-
Taiwan (Province of China)	67	-	-	-	-
France	-	15	-	-	-
Mayotte	-	5	-	-	-
Spain	-	20	-	-	-
Italy	-	2	-	-	-
Madagascar	-	-	5	-	-
Comoros	-	-	4	-	-
Cambodia	-	-	-	1	-
Kiribati	-	-	-	-	2
Total	89	42	9	1	2

Source: Ministry of Fisheries and Rodrigues Annual Report 2009

Licensing of Mauritian fishing vessels

20 Mauritian boats/vessels operated in the semi-industrial chilled fish fishery targeting mainly the shallow-water and deep-water demersal species on the Albatross-Nazareth bank and on the slopes of the St. Brandon-Nazareth banks. Two boats from Port Mathurin, Rodrigues, were engaged in the shallow-water demersal fishery off the East bank of Rodrigues. Four vessels operated in the banks fishery for shallow-water demersal species on the Nazareth and Saya de Malha banks.

Transshipment by Tuna Longliners and Carriers

A total of 35 863 tonnes of tuna and tuna-like species was transshipped at Port Louis by tuna fishing vessels and carriers which effected 351 and 29 calls respectively. The volume of fish transshipped by carriers amounted to 12 034 tonnes. The species composition of the fish transshipped is shown in **Table 5**. Albacore tuna constituted 62% of the total catch. A sharp increase in the volume of yellowfin and skipjack tuna transshipped was observed and this was

due to transshipment effected by some European purse seiners which target mostly these species. A considerable rise in the total volume of fish transshipped could also be noted from 17,667 tons in 2005 to 35088 tons in 2009. This could be explained mainly by an increase in the number of calls of carriers at Port Louis.

Table 5: Species Composition of fish Transshipped (t)

Year	Alba-core	Yellow-fin	Bigeye	Skip-jack	Sword-fish	Bluefin	Marlin	Sailfish	Shark	Misc.	Total
2005	4 947	3 887	1 413	-	3 357	-	318	35	2 473	1 237	17 667
2006	20307	1995	359	127	1935	230	243	131	1890	2017	29 234
2007	12 182	3 281	494	134	2 305	8	67	486	1881	3 110	23 948
2008	11 375	1 479	596	133	3 301	34	142	167	1 728	1 972	20 927
2009	21 627	2 003	574	2 363	2 111	11	203	147	1 328	4 721	35 088

Source: Ministry of Fisheries and Rodrigues Annual Report 2009

Vessel Monitoring System

A Vessel Monitoring System (VMS) was installed in Mauritius in 2005. Fishing licenses are issued by the Fisheries Division only to vessels equipped with a functional VMS on board. Accordingly, the Fisheries and Marine Resources (Vessel Monitoring System) Regulations 2005 was promulgated, bringing Mauritian legislation in line with the requirements of the Indian Ocean Tuna Commission (IOTC) with respect to the introduction of VMS programmes by contracting parties.

3.2 Current Institutional structure

The current institutional structure with regard to fisheries management is given in the **Figure 5** below.

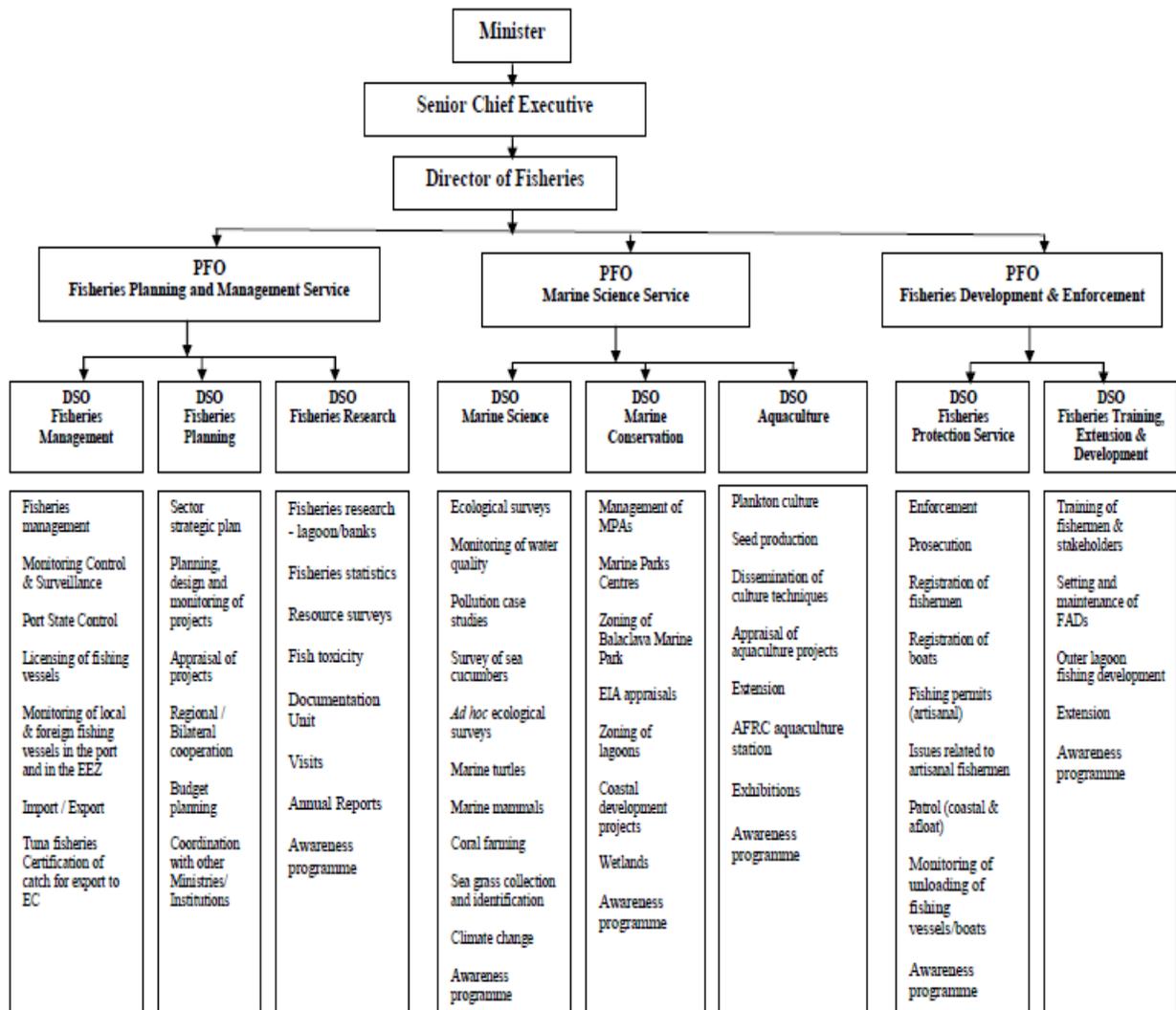


Figure 5: Organisational structure at the Fisheries Division of the Ministry of Fisheries (Source: Annual Report Ministry of Fisheries (2009))

The Fisheries and Marine Resources Act 2007 (FMRA 2007) provides for the setting up of Consultative committees. As per the Section 3 of the FMRA 2007

- (1) *The Minister may set up such Consultative Committees as he thinks fit –*
- (a) *for discussions and advice on matters of general policy relating to fisheries, marine resources, aquaculture and marine conservation;*
 - (b) *for inquiring into matters relating to fisheries and marine resources.*
- (2) *A Consultative Committee shall consist of –*
- (a) *the Minister, who shall be the Chairperson;*
 - (b) *such other persons as the Minister may appoint.*

(3) Where the Minister is unable to attend a meeting of the Consultative Committee, he shall designate a member to chair the meeting.

(4) The Chairperson of a Consultative Committee may co-opt at a meeting any person who, in his opinion, may assist the Committee on the subject under deliberation at that meeting.

(5) No member of the Consultative Committee, other than the representative of a Ministry, shall be deemed to hold a public office by virtue only of his appointment as member.

(6) A member of the Consultative Committee shall be appointed by the Minister on such terms and conditions as he may determine.

The Fishermen Welfare Fund Act 2000 provides for a Board to administer and control of the affairs of the Fishermen Welfare Fund. The Board consists of a Chairman appointed by the Minister; a representative of the Prime Minister's Office; a representative of the Ministry responsible for the subject of Finance; a representative of the Ministry responsible for the subject of Fisheries; a representative of the Ministry responsible for Rodrigues; 2 fishermen, each of whom shall be nominated by one, of the 2 most representative organisations of fishermen; one fisherman from the banks fishermen community; one fisherman from Rodrigues nominated by the fishermen's associations of Rodrigues; and one representative of the organisations of operators from the fishing industry, nominated by the organization the members of which produce the highest tonnage of fish.

The Fisherman Investment Trust Act 2006 provides for a trust fund. The trust fund is administered by a Board of Directors which consist of a chairperson; 2 representatives of fishermen elected by the registered artisanal, bank and semi-industrial fishermen; one representative of fishermen from Rodrigues elected by the registered artisanal, bank and semi-industrial fishermen; a representative of the Ministry responsible for the subject of fisheries; a representative of the Ministry responsible for the subject of finance; a representative of the Ministry responsible for the subject of shipping; a representative of the Outer Islands Development Corporation; and not more than 3 other persons, having experience in administrative, economic, financial or commercial matters or in matters relating to the fishing industry.

3.3 Legislation, Policy and Strategies

3.3.1 Legislations

Fisheries and Marine Resources Act 2007 (amended in 2008)

The Fisheries and Marine Resources Act 2007 (amended in 2008) is the legal tool administered by the Fisheries Division of the Ministry of Fisheries and Rodrigues. It provides a holistic framework ensuring sustainable methods of exploitation of marine resources. The Act consolidates the management, conservation and protection of fisheries and marine resources, and the protection of marine ecosystems within the Republic of Mauritius and its territorial waters.

It incorporates principles contained in the 1993 FAO Compliance Agreement, the 1995 UN Fish Stocks Agreement and the 1995 FAO Code of Conduct for Responsible Fishing.

It gives power to the Minister to prescribe measures for the protection, conservation and management of fisheries and marine resources including the prohibition of fishing by certain means in certain areas and during certain periods, of specific species size and gender of fish. The Minister may prohibit any activity likely to disturb the marine ecosystems and its habitats.

Fishing activities which are controlled and prohibited are:

- (a) fishing with gunny bag, canvas, cloth, creeper, leaf or herb; and
- (b) Fishing with line, poisonous substance, a speargun or an explosive.

Some of the protected species are:

- i. undersized fish,
- ii. any crab, lobster in the berried state,
- iii. turtle, turtle egg or marine mammal.

The Act also provides for the protection of the aquatic ecosystem , as follows:

- (a) No person shall place, throw, discharge or cause to be placed, thrown or discharged into Mauritius waters or into a river, lake, pond, canal, stream or tributary any poisonous substance.
- (b) No person shall cut, remove, damage or exploit a mangrove plant or part of mangrove plant except with the approval of the Permanent Secretary.
- (c) No person shall place, construct or cause to place any structure within Mauritius water except with the written authorization of the Permanent Secretary.

In order to align the Mauritian legislation in line with the requirements of the Indian Ocean Tuna Commission, the Marine Resources (Vessel Monitoring System) Regulations were promulgated and a Vessel Monitoring System was installed in Mauritius in 2005. In this regard, fishing licences are issued only to vessels equipped with a functional Vessel Monitoring System on board.

The Fishermen Welfare Fund Act 2000 (FWFA 2000)

There is a Fishermen Welfare Fund established for the purposes of the Act. The Fund shall be a corporate body. The objects of the Fund are

- (a) to advance and promote the welfare of fishermen and their families;*
- (b) to manage and optimise the financial and other resources of the Fund to further the social and economic welfare of fishermen;*
- (c) to develop schemes and projects for the welfare of fishermen;*
- (d) to set up schemes, including schemes in respect of loan other financial assistance, for the benefit of fishermen;*
- (e.) to do all such things as appear to be necessary and conducive to the promotion of the welfare of fishermen in general.*

The Fishermen Investment Trust Act 2006

There is established a Fishermen Investment Trust which shall be a body corporate. The objects of the Trust *shall be to invest, directly or through a body controlled by it in*

(a) fishing activities; (b) fish processing activities; (c) fish marketing; and (d) such other activities related to the fishing industry as may be approved by the Board.

The Board shall, in carrying out its objects (a) have due regard to the interests of fishermen in general; and (b) operate on a commercial basis and ensure that it earns a reasonable return on its investments.

The Trust shall have such powers as are necessary to enable it to effectively discharge its functions and may

- (a) acquire assets such as fishing vessels and fishing equipment;*
- (b) grant loans to registered fishermen on such terms and conditions as it thinks fit;*
- (c) provide grants or other financial assistance to the eligible children of registered fishermen for the pursuance of their tertiary studies;*
- (d) organise training for its staff and for registered fishermen in collaboration with any institution in Mauritius or elsewhere;*
- (e) impart to registered fishermen the necessary knowledge for the development of appropriate entrepreneurial skill to run a small fishing business;*
- (f) create a hotline or desk service to attend to and give immediate assistance to the fishermen community;*

- (g) advance and promote the welfare of registered fishermen and their families;*
- (h) develop schemes and projects for the promotion of the welfare of registered fishermen;*
- (i) improve the socio-economic condition of registered fishermen; and*
- (j) exercise such other powers as may be necessary to achieve its objects.*

3.3.2 Policies and Strategies

The following key policy measures have been taken by the Ministry of Fisheries and Rodrigues to sustain fishery development over the last 2 decades:

- Banning of underwater fishing and fishing with explosives.
- Closed season for net fishing in the lagoon and regulations on undersized commercial fishes.
- Banning of fishing with cast nets since 1998.
- Reduction of fishing pressures in the lagoon by encouraging artisanal fishers to fish off-lagoon.
- Fishers were encouraged to surrender their large and gill nets against payment of compensation. From 1996 to April 2010, the number of nets operating decreased from 51 to 20.
- Setting up of Fish Aggregating Devices around Mauritius in order to relocate fishing effort to offshore areas.
- Banning of lagoonal sand extraction as from October 2001
- Regulations prescribed in 2006 to prohibit the removal of coral and sea shells.
- Creation of a Fishermen Training and Extension Centre to train fishers to fish off-lagoon.
- Loan facilities at very low interest rates through the Development Bank of Mauritius to registered fishers for purchase of boats for off lagoon fishing.
- Enforcement is effected through patrols by the Fisheries Protection Service in the lagoon and on land followed by legal proceedings.
- Regulations for the collection of sea cucumbers were proclaimed in September 2008 and a two-year moratorium has been set from 1st October 2009 to conserve the stock and allow the sea cucumber population to recuperate.

Strategy and Action Plan for the Fisheries Sector

In 1998 a Ten Year Fisheries Development Plan was formulated. The key finding was that limited potential exists for further development of marine capture fisheries in Mauritius except for the offshore highly migratory pelagic species such as tuna and swordfish and that emphasis should be placed on:

- (i) Sustainable use of existing resources and protection of the marine environment;
- (ii) Maximising returns from existing fisheries through value addition;

- (iii) Limited and cautious development of under-utilised resources and diversification into aquaculture, where feasible; and
- (iv) Training, capacity building and institutional reforms.

In 2005, the government reiterated its intention to pursue the objectives of sustainable fisheries development. It was clearly indicated in the government 2005-2010 programme that the ministry will spare no efforts in the development of fisheries. A 5 year Strategy focusing on 10 key areas was accordingly formulated and adopted. Implementation is underway.

1. Sea Food Hub Development

The strategy of the Seafood Hub is focused on the development of value added fisheries and seafood related sectors including fishing, transshipment, storage and warehousing, light processing (sorting, grading, cleaning, filleting), canning and ancillary services (ship bunkering, vessel husbandry, ship building and repair). A study on the health certification capacity of Mauritius funded by the EU was completed and the system is operational. The construction of a fishing port for the semi-industrial fishery has been envisaged.

2. Promote Fisheries Research, Development and Management.

3. Aquaculture development. An Aquaculture Master Plan has been prepared and approved.

4. Training and Capacity building. Upgrading of skills in fisheries research, development and management have been carried out through the Fisheries Training and Extension Centre at Pointe aux Sables.

5. Upgrading and construction of infrastructures (fish landing stations, slipways, jetties, opening of boat passages) with all basic amenities to facilitate the activities of fishers. Works in connection with a new fish action market is nearing finalization at Fort Williams in Port Louis. New fisheries posts have been planned and existing ones have been upgraded.

6. Establishment of a Fishermen Investment Trust

7. Fisheries Education Programme

8. Security and Welfare of Fishers

9. Promote Regional Cooperation in the Indian Ocean SADC and COMESA members

10. Enhance Bilateral Cooperation with countries such as Australia and South Africa

3.4 Membership to relevant regional and international treaties

Regional and international treaties relevant to marine environment and fisheries sector and to which Mauritius are Party include:

- a. UN Convention on Biological Diversity (CBD) in 1992.
- b. United Nation Framework Convention on climate change. Mauritius ratified the Convention in August 1992.
- c. Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) 1973
- d. Convention on Migratory Species
- e. Convention to Combat Drought and Desertification in those Countries Experiencing Serious Drought and/or Desertification, particularly in Africa, 1995
- f. Convention on Wetlands of International Importance especially as water fowl habitats also known as the RAMSAR Convention. Mauritius ratified the Convention in 2001.
- g. Convention for the Protection, Management and Development of marine and coastal environment in the Eastern African Region and Related Protocol 1985. Mauritius acceded to the Convention in 2000.
- h. IOSEA Turtle MOU
- i. Convention for the Regulation of Whaling 1946
- j. Convention on Fishing and Conservation of the Living Resources of the High Seas 1958
- k. Convention on the Control of Transboundary Movements of Hazardous Wastes and their Disposal (Basel) in 1989
- l. Agreement relating to the Implementation of Part XI of UNCLOS 1996
- m. Convention for the Safety of Life at Sea (SOLAS) 1974
- n. International Convention on Maritime Search and Rescue (SAR) 1979
- o. Agreement on the Organisation for Indian Ocean Marine Affairs
- p. SADC
- q. FAO Committee on Fisheries
- r. COMESA
- s. Indian Ocean Rim Association for Regional Cooperation (IOR-ARC)
- t. Agreement for the Establishment of the Indian Ocean Tuna Commission
- u. Indian Ocean Tuna Commission (IOTC)

- v. The Convention for the Conservation of Antarctic Marine Living Resources, (CCAMLR) and
- w. The South West Indian Ocean Fisheries Commission (SWIOFC).

3.5 Funding Sources and Level

The Ministry of Fisheries generates revenue in terms of foreign license fees, import permit license fees and sale of produce to the tune of Rs. 43 million. However, fisheries have inter-linkages with other sectors of the economy and such contributions to the GDP are reflected either in the manufacturing or in the service sector including tourism. Financial assistance to Mauritius has decreased as the country graduated to middle Income Country in 1995. Funding for most of the activities related to fisheries development and management is sourced from the national budget. The amounts budgeted for the year 2010 was around Rs 276 million and the estimates for 2011 are Rs 373 million. On the overall, there has been a general increase in the amounts of funding obtained through the national appropriation process.

3.6 Key Gaps and needs

The following gaps and needs have been identified

- a. Needs for a Fisheries Master Plan
- b. Development of Fisheries Management Plans for lagoon and off-lagoon
- c. Development of sea cucumber culture and coral farming in the lagoon
- d. Upgrading of infrastructures and facilities
- e. Coming into operation of the Fish Auction Market
- f. Implementation of the National Plan of Action against Illegal Unreported and Unregulated (IUU) fishing.
- g. Efficient and effective delivery (on-line) of export certificates, import permits and fishing licenses and increase of licence fees for fishing vessels
- h. Setting up of a unit for certification of boats less than 24m in length
- i. Construction of Blue Bay Marine Park Centre
- j. Capacity building and training of fishermen and other stakeholders

Major Challenges

- a. Sustaining market exports of fish and fish products in the face of harsher competition, erosion of preferential market access and stringent international sanitary norms/standards and eco-labeling.

- b. Protection and Conservation of fish stocks.
- c. Efforts to conserve stocks and Combating Illegal, Unreported and Unregulated (IUU) fishing and consolidation of the implementation measures under the NPOA-IUU.
- d. Empowerment of artisanal fishermen by encouraging them to fish off-lagoon for higher catch to derive more income.
- e. Adaptation to the impacts of Climate Change

Chapter 4: Tourism

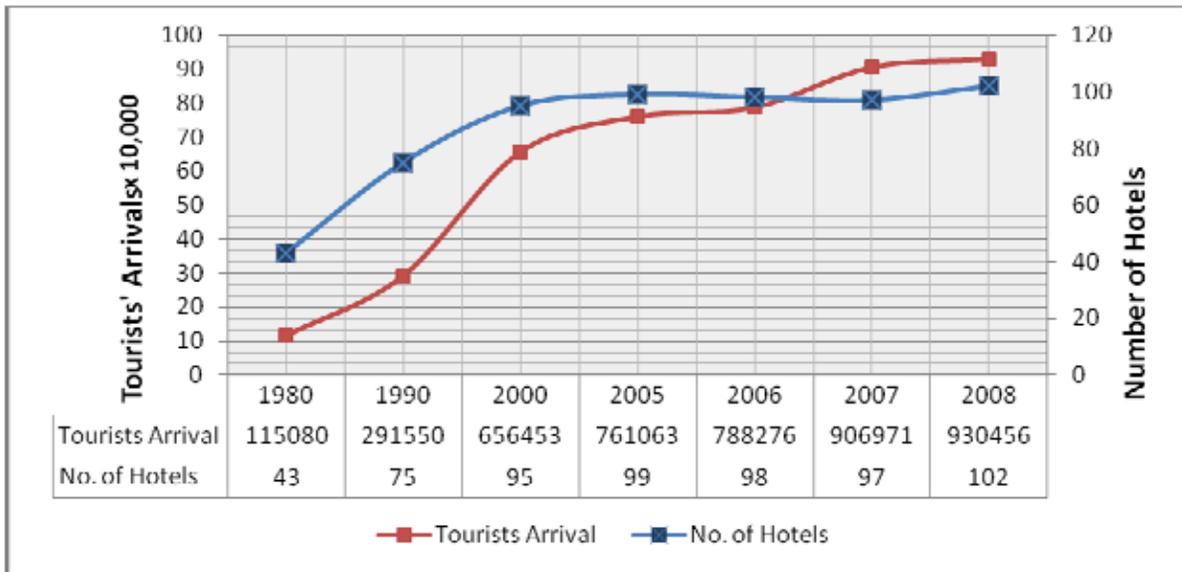
4.1 Importance of the Tourism to Mauritius

Tourism is an important component of the Mauritian economy. Tourism Industry makes substantial contribution to foreign exchange earnings, Gross Domestic Product (GDP) growth and employment creation. It is the third largest sector by contribution to the national income after manufacturing and agriculture. Its contribution to GDP has increased from 3% in 1995 to 8.9% in 2009. As at 2009, the tourism sector accounted for 26,922 direct jobs and generated Rs. 35,693 million (\$1190 million USD) as tourism receipts. The World Economic Forum Travel and Tourism Competitiveness Report for 2009 list Mauritius as the highest-ranked country in Sub-Saharan Africa. Mauritius is also ranked 3rd of all countries worldwide for its affinity for travel and tourism.

After showing signs of weakening in 2006, the sector regained dynamism, with 15.1% growth in arrivals in 2007. However, with the impact of the turmoil experienced in the international financial markets in 2008, the precedent growth rate could not be sustained and the outcome was only 2.6 % increase in tourist arrivals, followed by a negative growth of 6.4% in 2009.

Mauritius has performed well in developing a distinctive form of relatively high-end tourism. Growth in tourist arrivals has outpaced that of many of our competitors. Currently, the aim is to continue that growth with a visitors' target of two million tourists a year by 2015. To achieve the set target, the number of hotels and room capacity has evolved considerably over the years to cater for the ever-increasing tourist arrivals. The evolution in the number of arrivals and the number of Hotels are given in the **Table 6** below.

Table 6: Tourists Arrivals & Number of Hotels



The tourism sector is characterised by the development of large, high quality hotels, which have been sited almost exclusively in the coastal zone of Mauritius. One of the direct impacts of the expanding tourism industry is perpetual demand for scarce and coastal land areas.

Increasingly, over the last 30 years, the coastal zone has experienced very rapid development and growing ecological pressure. In 2000, it was estimated that out of the 323 km of coastline around 13% was occupied by 71 hotels and public beaches occupied around 9%. In 2010, there were 112 hotels in operation. It is estimated that there are no more than some 20-30 future coastal hotel sites that can be made available. According to the Mauritius Sector Strategy Plan on Tourism (2009-2015), some 5,000 rooms are expected to be constructed over the next ten years. On the basis of the current tourism pattern, this suggests that an additional 225,000 tourists can be accommodated and will require construction of some 30 hotels assuming an average size of 250 rooms per hotel and an average stay of 10 days.

The increase in the number of hotels, Integrated Resort Scheme (IRS) / Real Estate Scheme (RES) and bungalows along the coast have also led to land clearing and loss of biodiversity, including loss of mangroves and wetlands. In coastal villages like Flic en Flac and Grand Baie, wetlands have been backfilled to provide additional land for construction of hotels and bungalows. Extensive coastal development is therefore degrading the coastal zone and weakening its protective function. The pressure on the coastal zone is set to increase with development of new hotel/villas. As at end of May 2010, there were 35 hotel projects that had already been approved by the Ministry of Tourism and Leisure. In addition to that, 14 IRS projects and 42 RES projects are also in pipeline (Board of Investment).

4.2 Current Institutional structure

The Ministry of Tourism and Leisure is mandated to promote Mauritius worldwide as a tourist destination and to implement sustainable tourism strategies and policies. Its strategy also includes positioning Mauritius as an attractive tourist, business and leisure destination thus ensuring greater visibility of a unique Mauritian brand worldwide through the Brand Strategy that is presently being implemented. The Promotion of Mauritius is done through the Mauritius Tourism Promotion Authority, a body established under the Mauritius Tourism Promotion Authority Act 1996

A number of bodies including the Ministry of Tourism and Leisure, AHRIM (Association des Hôteliers et Restaurateurs de l'Ile Maurice), Ministry of Environment and Sustainable Development, Board of Investment, Tourism Authority, Beach Authority and Local Authorities work together for policy formulation and management of the tourism sector.

The Tourism Act 2004 also provides for the setting of a Tourism Authority. The Tourism Authority is administered by a Board comprising of a chairperson appointed by the Minister. The Board comprises of Members from the public and private sectors. The Tourism Act also provides for the setting of a Tourism Advisory Committee with a chairperson nominated by the Minister. The Committee includes professional having knowledge in the tourism sector and representative from both public and private sector. The private sector representatives are the Associations des Hoteliers et Restaurateurs de l'Ile Maurice (AHRIM) and representative of Air Mauritius Ltd whilst the parastatal bodies include a representative of Airports of Mauritius Ltd and a representative of Hotel School of Mauritius Ltd;

4.3 Legislation, Policy and strategies

4.3.1 Legislations

Tourism Act 2004

The objective of the Tourism Act 2004 is to make better provision for the regulation of the tourism industry with a view to promoting its development in a sustainable manner.

Tourism Authority Act (2006)

The Tourism Authority Act (2006) has been promulgated to promote sustainable development of the tourism industry. It fosters and encourages the conduct of activities in the tourism industry in a responsible manner.

Environment Protection Act 2002

The EPA 2002 lists hotel development as a scheduled undertaking requiring an Environment Impact Assessment (EIA) Licence. Other activities usually associated with the hotel sector such

as modification of shorelines, construction of breakwaters, jetties and so on also require an EIA Licence.

The Finance and Audit (Tourism Fund) Regulations 2003 (GN no. 195 of 2003)

There is established, for the purposes of the Act, a Fund which shall be known as the Tourism Fund. The object of the Fund shall be to finance the implementation of

- (a) infrastructural works in connection with tourism development projects in Mauritius; and
- (b) such other associated works for the benefit of the inhabitants of the areas in which the projects are being implemented, as the Committee may think fit.

The Fund shall consist of -

- (a) contributions made by promoters of tourism development projects on state lands, where such contributions are imposed under one of the terms and conditions of the lease of the said lands;
- (b) donations and grants; and (c) any other sum which may lawfully accrue to the Fund.

The Tourism Employees Welfare Fund Act 2002

There is also established a Tourism Employees Welfare Fund to provide for the social and economic welfare of employees of tourism enterprises and their families.

4.3.2 Policies and Strategies

Tourism Sector Strategy Plan 2009-2015

To address international and country-specific challenges, a Tourism Sector Strategy Plan 2009-2015 was formulated to achieve sustainable tourism development and to offer a high level of tourism product. The strategy recommended among others, the creation of a High Level National Tourism Council comprising high level decision makers with the authority to drive through necessary change. A 50-points action plan was also put forward for the National Tourism Council to pursue with all relevant stakeholders.

Hotel development strategy

The development of the hotel sector is now being governed by the Hotel Development Strategy, which is being enforced by the Ministry of Tourism and Leisure. Emphasis is more than ever being laid on investment, quality of development, maintaining the tropical cachet, adherence to the Planning Policy Guidance, use of local materials, type of development, preservation of the environment, architectural design, eco-friendly and energy saving practices, preservation of natural integrity, safety and security and community inclusion.

Planning Policy Guidance

Planning Policy Guidance has been developed on various aspects of development design. It includes design guidance on a range of key land uses, including: hotel, ecotourism, golf and marina developments. Design factors include building height, plot coverage and minimum room size and promoters are urged to minimise the harmful visual effects by combining judicious land use principles with environment friendly development. Provision is also made for respecting the appropriate setback distances from the high watermark for beach protection and sustainable management.

Energy Strategy for the Hotel Sector

The Long Term Energy Strategy 2009-2025 has set a well defined plan for the tourism sector and outlines the following actions for ensuring sustainable energy use in the sector as shown in Box 2

Box 2 : Energy strategy for the hotel sector

- Retrofitting of existing hotel with energy efficient technologies
- Use of solar water systems in hotels
- Use of low-energy lighting / appliances / air-conditioning and other devices throughout the hotel industry
- Introduction of low-energy airport transfer of passengers policies
- Provision of facilities to allow tourists offset the carbon impact of their flights by investing in sustainable energy schemes in Mauritius

Integration of Sustainable tourism principles

Sustainable tourism now forms an integral part of the national strategies, policies and action plans of concerned stakeholders. Some of the initiatives are:

1. Energy Management in Small and Medium Hotels and Restaurants & Green Lending Scheme. AHRIM and Enterprise Mauritius have been assisting small and medium hotels and restaurants in the following projects:

- Producing green energy for own and/or sale on the grid.
- Projects to reduce energy consumption.
- Projects that enable protection of natural resource and their sustainable use.
- Consultancy services for a complete energy diagnosis (premises and infrastructure setup).

2. Prevention of environmental degradation through management of tourism activities

As at 2010, the following developments have taken place for the protection of the lagoon and its ecosystems:

- 6
0 Permanent Mooring Buoys have been placed at dive sites to avoid damages to coral reefs through anchoring of boats and 70 Moorings have been installed in the region of Flat Island, Palisade Bay, Trou D'eau Douce and Mon Choisy
- S
peed limit zones have been declared at Trou D'eau Douce, Le Morne, Flic en Flac and Bel Ombre

3. Tourism Environment Charter. In its quest to promote quality tourism, AHRIM launched a Tourism Environment Charter in 2002. The charter is a statement of commitment to environmental protection and sustainable development. It is a voluntary corporate responsibility to achieve sound environmental practices.

4.4 Membership to Relevant International Treaties

Membership to relevant treaties includes tourism related programme of SADC, COMESA and WTO.

4.5 Funding Sources and level

Development and funding in this sector is primarily from private sector. Private investments in hotels and Integrated Resorts Scheme are expected to hover around Rs. 50 billion (\$1.7 billion USD) up to 2013. With the promulgation of the Business Facilitation Act 2006, there has been a boost in investments in tourism.

However, a key aspect of the tourism sector achievement in the past and an equally determining factor for the future development of the sector is the quality infrastructural investments in Mauritius. Government is continuing to act as an enabler and facilitator thereby creating the right environment conducive for investment to take place. Current infrastructural projects comprise the expansion of the Sir Seewoosagur Ramgoolam Airport and other major road improvement works costing over Rs 100 billion over the coming years.

The private sector also contributes through the following avenues:

- a. Coastal Hotels and Boarding Houses (with more than 4 bedrooms) are required to pay an environment protection fee of 0.85% of their annual turnover. This amounts to about Rs230 million a year (2007). All funds are centralised into the Government account. An estimated Rs595,000 is generated from smaller hotels
- b. 2% as CSR

- c. RS 25 million contribution to the Tourism Fund for each new hotel development at the approval stage.

A Tourism Fund was established under the Ministry of Tourism and Leisure to improve tourism products. The Fund is empowered to finance tourism-related projects, tourist sites and attractions. Finances of the Fund are used for the:

- Development and maintenance of tourism-related projects, including but not limited to ecotourism and cultural tourism.
- Protection and rehabilitation of scenic landscapes, lagoon, rivers and islets and control and eradication of pests and other nuisances.
- Cleaning and maintaining of the environment in any area of importance to the tourism industry.

4.6 Gaps and need for harmonization

- Assessment of carrying capacities.
- Monitoring the impacts of tourism development.
- Needs for focusing on regional tourism by marketing Mauritius as a stop-over destination
- Capacity to implement ecotourism along with the required certification processes involved
- Legislation for regulating additional tourist activities, for example, Dolphin Watching, Kitesurf, Windsurf and Undersea Walk; and
- Regulating and monitoring of the non-formal tourism sector.
- Need to establish Environment Management Systems, audits and verification in hotels and IRS. Industry operators should therefore be trained on green certification, environmental sustainability and reporting for the adoption of eco-labelling schemes.
- Need to develop an ecotourism strategy to promote inland tourism and ease pressure on the coastal zone.
- Harmonisation and climate proofing long term strategy by offering zero-carbon-footprint holidays, thereby mitigating the risk of losing market share to other countries for environmental reasons. The tourism industry should also be encouraged to adopt Carbon-offset programmes by paying for carbon emissions through investments in forest restoration.
- Capacity building for eco-friendly and energy-saving practices by hotel promoters. In the design of new hotel projects, provision should be made for the adoption of energy saving devices, renewable energy supply and eco-friendly practices.

4.7 Challenges

- The global threats of terrorism.
- Impacts of Climate related epidemics (chikungunya, dengue fever) and pandemics (H1N1 Flu).
- Water resources scarcity and impacts on the coastal areas and ecosystem as a result of climate change.
- Taxation of air transport in originating markets. In the context of climate change mitigation, tourists are increasingly concerned about green tourism and are focusing on reducing their carbon footprints.
- Increased competition from destinations offering comparative value for money and with larger marketing budgets.
- Dealing with impacts of International financial and oil crisis
- There is a serious scarcity of beach frontage sites for further hotel development. It is estimated that there are no more than some 20-30 further coastal hotel sites that can be made available. The remaining sites have constraints such as cliffs, muddy/rocky beaches and poor access. Furthermore, for a considerable proportion of these proposed sites, implementation of necessary infrastructural amenities will take some time. The challenge is therefore to release agricultural land for the development of inland Integrated Resort Schemes (IRS) and Real Estate Schemes (RES) projects.
- To maintain a competitive edge over its rival destinations as an up-market destination, it is imperative that Mauritius maintains its attractiveness through improvement and diversification of its tourism product. This requires the involvement of other stakeholders as there is a need for a more concerted effort and coordination among all parties to enable the successful realization.

Chapter 5: Oil and Gas

There is no formal report that indicates that Mauritius has oil and gas within its territory including its EEZ. However, India and Mauritius had signed a Memorandum of Understanding to cooperate in the exploration for oil and gas in Mauritian EEZ. The Indian Navy would also assist in the surveillance of the EEZ. Preliminary report indicates existence of polymetallic nodules in the Mauritian EEZ. The US Geological Survey (2009) reported that Mauritius has polymetallic nodules on the ocean floor at a depth of about 4,000 meters (m) and extending from 400 kilometers (km) to 800 km north of Port Louis. The nodules average more than 15% iron and manganese and more than 0.35% cobalt.

No further info is available.

Chapter 6: Parks and Wildlife Conservation

6.1 General Status and Importance

Biodiversity is one of the national priorities for Mauritius. The flora and fauna of Mauritius has a relatively high level of diversity and endemism as a result of the island's location, age, isolation and varied topography. Mauritius has been identified as a Centre of Plant Diversity by IUCN while the Mascarenes region comprising of Mauritius (including Rodrigues) and France (Réunion) have been included in the list of Indian Ocean islands biodiversity hotspot.

The systematic management and conservation of the threatened biodiversity of Mauritius and its outer islands started in the early 1970s. Rodrigues has its own specificities in biodiversity management while the other outer islands of the Republic of Mauritius, such as Agalega, St Brandon and Chagos have diverse biodiversity of significant conservation value. However, their isolation is preventing Mauritius from effectively managing their flora, fauna and ecosystems.

As at present, the extent of reasonable quality native forest (i.e., with more than 50% native plant canopy cover) is currently estimated at around 2,600 ha, representing less than 2% of the total area of the island. The remaining native terrestrial biodiversity is primarily confined to marginal lands of low suitability to agriculture and urban development such as steep mountain and valley slopes or to marshy and rocky soils where the land is largely undevelopable.

A general status of biodiversity in Mauritius is as follows:

Flora and Fauna

- 685 species of indigenous flowering plant have been recorded in Mauritius, of which 267 are endemic (Mauritius has six endemic plant genera), and 150 endemic to the Mascarene Archipelago.

- 89 % of the Mauritius endemic flora is considered threatened (Mauritius has one of the most threatened island floras in the world). 61 of the country's indigenous species are already classified as extinct. 141 of the flowering Mascarene endemic plant species are classified as Critically Endangered (89 taxa are represented by 10 or fewer known individuals in the wild and 5 taxa are represented by only a single known individual), 55 species are Endangered and 98 are classified as Vulnerable.

- Rodrigues has three endemic genera of plants with 133 indigenous plant species. 123 species remain, including 37 endemics. Nine of the endemic species are comprised of less than 10 mature individuals in the wild, including three species, which are known from just a single individual (*Ramosmania rodriguesii*, *Dombeya rodriguesiana* and *Gouania leguatii*).
- There are about 200 species, subspecies and varieties of pteridophytes, of which 13 species are endemic, and 40 are extinct.
- There are 207 taxa lower plants consisting of 89 genera of mosses and 59 genera of hepatics.
- 24 out of the 52 native species of vertebrates that were known to have occurred on Mauritius and the adjacent islets, are now extinct, including the Dodo (*Raphus cucullatus*), a giant parrot (*Lophopsittacus mauritianus*) and two species of giant tortoise (*Cylindrapsis* spp.)
- Of the three species of fruit bat (*Pteropus niger*, *P. subniger* and *P. rodricensis*) known to have occurred, only one (the Mauritian fruit bat, *P. niger*) remains in Mauritius and is still locally common, but *P. subniger* is extinct. *P. rodricensis* still occurs on Rodrigues.
- Out of 30 species of land birds known/ stated to have been present on Mauritius, 12 of these have escaped extinction. Of these 12, 9 are threatened.
- Of the 17 native reptile species known/ stated to have once inhabited mainland Mauritius, only 12 remain, 11 of which are endemic. Seven of these are restricted to remnant populations on the northern offshore islets. The burrowing boa (*Bolyeria multicarinata*) was last seen in 1975 and it is probably extinct.
- There are 39 native species of butterfly, of which five are endemic, and 125 known native species of land snail of which 43 are already extinct.

Coastal and Marine Biodiversity

- To date, some 1700 marine species have been recorded around Mauritius including 786 fish of which about 5% are of commercial value (42 species). Seven species of shrimps of

the genus Peneid can be found near Mauritian shores and two species inhabit deeper waters. There is one endemic species of oyster (*Crassostrea edulis*).

- Taxonomic studies have been made on forty-nine amphipod (Crustacea) species, 26 melitids and 23 corophiideans. Among these, nineteen new species have been recorded and described and twelve species are new records for the island. A high degree of endemism (38%) is recorded in the melitid and corophiideans of Mauritius.
- 2 species of marine turtles namely *Chelonia midas* and *Eretmochelys imbricata* are found in Mauritius waters.
- In Rodrigues, taxonomic studies and checklists have been published for marine algae, corals, crustaceans (amphipods and isopods), molluscs, echinoderms and coastal fishes.
 - 160 species of coral identified including an endemic species, *Acropora rodriguensis*
 - 494 fish species recorded, 9 new fish species recorded, out of which 2 are endemic species *Pomacentrus rodriguensis* and the dottyback, *Chlidichthys foudioides*.
 - 109 species of bivalve and 74 species of echinoderms
 - Coral reefs in Rodrigues are relatively healthy with up to 70% live coral cover recorded on the reef slopes, with low dead coral and macro-algal cover

Ecosystem conservation, protection and management

- 12 legally proclaimed protected areas on the mainland - one *National Park*, seven *Nature Reserves*, four reserves (three forest reserves and one bird sanctuary) - covering a total area of 7,292 ha.
- 203 coastal wetlands in Mauritius (ESA study, 2009)
- In Rodrigues, Grande Montagne (14 ha), Anse Quitor (10 ha) and two islets, Ile aux Sables (8 ha) and Ile aux Cocos (14.4 ha) have all been declared Nature Reserves (under the Forest and Reserves Act 1983).
- 8 Islets National Park, 7 Nature Reserves and one *Ancient Monument* - covering a total area of 735 ha. The Ile aux Aigrettes Nature Reserve is leased for conservation management purposes to the Mauritian Wildlife Foundation (MWF), one of the active NGOs. Two islets (Flat and Gabriel islands) are leased for tourism activities to a state and private companies respectively.

- The Forestry Service and the Mauritian Wildlife Foundation (MWF) have jointly undertaken significant work in the restoration of Grande Montagne and Anse Quitar reserves where about 80,000 native plants have been planted. There is a private project by Francois Leguat Ltd to recreate 20 hectares of original forest at Anse Quitar. 35,000 native and endemic plants have been planted.
- 6,553 ha of privately owned or administered land is classified as *Mountain Reserve* or *River Reserve* in terms of the Forest and Reserves Act of 1983 and many of these areas have been deforested and/or are void of native plants.
- 635 ha of undeveloped land within the *Pas Géométriques* areas acting as a physical buffer to coastal developments.
- 50% of the state plantation areas (some 6,000 ha of exotic plantations) have been set aside for protection of ecosystem services (water catchments, soil protection, etc.)
- As at December 2009, some 92 endemic gardens have been created in primary and secondary educational institutions
- Marine Protected Areas
 - Marine Protected Areas for mainland Mauritius cover an extent of 7 190 hectares, including six fishing reserves and two marine parks. The Blue Bay Marine Parks has been listed as the second Ramsar site.
 - In Rodrigues, a high percentage of the marine ecosystem is still in pristine state. Among measures being implemented to mitigate factors affecting the marine environment, is the setting up of a marine protected area in Rodrigues, under the South East Marine Protected Area (SEMPA), funded by UNDP/GEF/RRA under the project “Partnerships in Mauritius and Rodrigues for Marine Protected Areas.” The project covers a total area of 43 km².
 - There are 5 designated marine reserves covering an area of 16 km². 4 new marine reserves in the north of the island at Grand Bassin (14.1km²), Passe Demi (7.2km²), Passe Cabri (1.5km²) and Riviere Banane (1.5km²) have been identified following consultations with fishing communities. Creation of new reserves have now been agreed by the Rodrigues Regional Assembly and management regulations have been drafted.

- The lagoon and sea (up to an extent of 1 km from the HWM line) surrounding the 8 declared Islet National Parks also form part of the Islet National Park. This accounts for an area about 36 km².

The Box 3 summarizes the key components of marine biodiversity in Mauritian waters.

Coral Reefs	There are five types of reefs around Mauritius, namely fringing reefs, patch reefs, atolls, reef flats and barrier reefs. About 43 genera of hard corals are found on the reefs of Mauritius and a total of 159 species ¹ of scleractinian ² corals from 16 families have so far been recorded.
Fish	Out of 340 species of fish identified, 42 within the lagoon area are sold commercially. 7 species of <i>Penaeid</i> shrimps have been reported in Mauritian near shore waters as well as two species of deepwater shrimp and several species of sea stars and other echinoderms.
Algae	Over 160 genera of marine algae and a few species of seagrass have been observed in Mauritian waters.
Marine mammals	17 marine mammal species have been recorded in Mauritian waters - mostly as they migrate to and from Antarctica to warm tropical waters for calving. Dolphins and whales are also encountered in Mauritian waters.
Sea turtles	2 species of sea turtles are commonly encountered in the shallow coastal waters of Mauritius, the hawksbill, <i>Eretmochelys imbricata</i> and the green <i>Chelonia mydas</i> .
Shoreline birds	The Rivulet Terre Rouge Estuary Bird Sanctuary located in the north east of the island, near Port Louis Harbour is a tidal mudflat that is used by migrating shorebirds. Around 1,000-1,200 migratory birds visit this site each year.

Source: ICZM Strategy Report, October 2009

6.2 Current Institutional structure

There are a number of institutions dealing with biodiversity related matters. Some are directly involved with the conservation, protection, management and sustainable use while others are involved indirectly through either formulation of policies, enforcement and so on taking on board biodiversity considerations. The key ones are indicated in the **Table 7** given below.

¹ Species is a group of organisms capable of interbreeding and producing fertile offspring of both sexes (except in the case of asexually reproducing species), and separated from other such groups with which interbreeding does not normally happen.

² Scleractinian, also called stony corals, are exclusively marine animals. They are very similar to sea anemones but have a hard skeleton.

Table 7: Institutions dealing with biodiversity in general

Institution(s)	Relevant Functions
Ministry of Environment & Sustainable Development	Development of Policies, Integrated Coastal Zone Management, Issuing of EIA licence, EIS management, Education and Awareness raising, Pollution control. General coordination and National Focal Point for CBD
Ministry of Agro Industry and Food Security (Agricultural Services, Forestry Services, National Parks and Conservation Service, Agricultural Research Extension Unit, Food and Agriculture Research Council, SSRBG, Vallée d'Osterlog Endemic Garden)	Forest and terrestrial biodiversity conservation, protection and management. <i>In-situ</i> and <i>ex-situ</i> conservation works, research and development, all matters pertaining to terrestrial fauna and flora including offshore islets Agricultural policy formulation, food crops and livestock management. (Agro-biodiversity including plants used in agriculture and medicine, and domestic animals)
Ministry of Fisheries and Rodrigues (Rodrigues Regional Assembly, Albion Fisheries Research Centre, Fisheries Protection Service)	Research and conservation ; Enforcement of laws related to fisheries and marine resources, coastal ecosystem monitoring Environmental management in Rodrigues, Management of fisheries and marine resources, management of marine parks and marine protected areas
Mauritius Oceanography Institute	Research and Development on Coastal and Marine Resources
Ministry of Housing & Lands	Physical Land use Planning of the island including coastal zone
Ministry of Tourism	Planning, management and control of tourism development, Zoning of lagoon, Installation of moored buoys
Ministry of Local Government	Solid waste management and public beaches management
Mauritius Police Force [National Coast Guard, Police de L'Environnement]	Enforcement of law relating to the protection of the maritime zones
University of Mauritius (Academic)	Training, Research and Development, , Crop Museum
Mauritius Institute of Education	Teacher Training, Curriculum development (include biodiversity and other environment concepts)
Mauritius Sugar Industry Research Institute (Research Organisation)	Research and Development in sugar cane and other related sectors, Herbarium
Mauritian Wildlife Foundation (NGO)	Terrestrial conservation works
Mauritius Marine Conservation Society (NGO)	Marine conservation works

Coordination within the sector happens through a number of bodies and committees listed in the **Table 8**. Following a Cabinet of Ministers decision, a national committee has been set up under the aegis of the Ministry of Agro Industry and Food Security to oversee and coordinate the implementation of measures elaborated under the approved National Biodiversity Strategy and Action Plan.

Table 8: Bodies directly and indirectly involved in biodiversity coordination

Statutory Committees/ Boards	Key Functions
Nature Reserve Board	Advise the Minister on all matters relating to Nature Reserves
Wildlife and National Parks advisory Council	Advise the Minister on any matter related to wildlife, national parks and other reserved land
National Ramsar Committee	Advise the Minister on all matters relating to wetlands
Beach Authority Board	Advise on Management of public beaches and conservation of ecosystem
Mauritius Oceanography Institute Board	Advise on Policy and Research on Ocean matters
Tourism Authority Board	Advise on measures in relation to use of lagoon for tourism development activities
Environment Coordination Committee	Policy and Coordination of environmental activities (including biodiversity) in Mauritius
Environmental Impact Assessment Committee	Assess and Advise Minister on issuance of EIA licence
Environment Liaison Officers Committee	Coordinate enforcement matters
Plant Genetic Resource Committee	To advise on PGR conservation matters
National Biosafety Committee	Advise on Biosafety matters

6.3 Legislation, Policies and Strategies

6.3.1 Legal/ Regulatory Framework relevant to Biodiversity in Mauritius

A number of legislations have been enacted with regard to the conservation, management and sustainable use of the natural resources in the Republic of Mauritius. Assessment studies

undertaken in the context of the Second National Environment Strategies and UNEP GEF Western Indian Ocean Project entitled, “Addressing Land Based Sources and Activities in the WIO Region” for the prevention of pollution to the coastal and marine environment from land based sources and activities showed Mauritius has integrated the three objectives of CBD through a number of primary and secondary legislations. However, as ecosystem management falls under the responsibility of a number of institutions, certain degree of overlap and shortcomings have been noted in some cases. One typical example is the general management of Nature Reserves which falls under the purview of the Forestry Services while terrestrial biodiversity management is conferred upon the National Parks and Conservation Service through the Wildlife and National Park Act. Similarly, biodiversity management in fresh water bodies is still unclear.

Legislations relating to biodiversity conservation, protection, management as well as its sustainable use under the various thematic areas are the following:

- a. Wildlife and National Park Act 1993
- b. Fisheries and Marine Resources Act 2007
- c. Environment Protection Act 2002
- d. Maritime Zone Act 2005
- e. Female Sea Turtles (Prohibition of Import) Regulations 1950
- f. Fisheries (Gill Net Prohibitions) (Rodrigues) Regulations 1983
- g. Fisheries (Reserved Access) (Rodrigues) Regulations 1984
- h. Maritime Zones (Fishing licences) Regulations 1978
- i. Fisheries and Marine Resources (Toxic Fish) Regulations 2004
- j. Pleasure craft (restricted activity and speed limit) Regulations 1998
- k. GMO Act 2004
- l. Plant Protection Act 2006
- m. Blue Bay Marine Park – Proclamation 15/1997 (declared MPA in 2000 GN61/ 2000)
- n. Balaclava Marine Park – Proclamation 14/1997 (declared MPA in 2000 GN61/ 2000)
- o. Fisheries and Marine Resources (Vessel Monitoring system) Regulations 2005
- p. National Coast Guard Act 1998
- q. Fisheries (Reserved Areas) (Rodrigues) Regulations 1984
- r. Fisheries and Marine Resources (Marine Protected Areas) Regulations 2007
- s. Fisheries and Marine Resources (Fishing of Sea Cucumbers) Regulations 2008
- t. Fisheries and Marine Resources (Undersized Fish) Regulations 2006
- u. Fisheries and Marine Resources (Removal of corals and shells) Regulations 2006

- v. The Beach Authority Act 2002
- w. The Tourism Act 2004
- x. Forest and Reserve Act 1983
- y. Rivers and Canals Act 1863
- z. Regulations related to collection of solid waste

6.3.2 Policies and Strategies

The following policies and strategies have been developed and approved by Government. Implementation has started:

- The National Biodiversity and Action Plan (2006 – 2015)
- The National Strategy and Action Plan for Invasive Alien Species (IAS) (2010- 2019)
- National Forest Policy 2006
- Under the Islet National Park Strategic Plan (2004) for 16 offshore islets, 8 were proclaimed National Parks in June 2006 and are presently being managed through their individual plans. Individual management plans have been prepared for 18 islets, both for Mauritius and Rodrigues

National Biodiversity Strategy and Action Plan (NBSAP)

One of the most crucial steps for the planning of biodiversity conservation in Mauritius has been the preparation of its NBSAP. The Plan covers both Mauritius and Rodrigues, which has a semi-autonomous administration and a distinct biogeography. The vision of this document read as follows: *“That people in Mauritius enjoy a healthy environment and an enhanced quality of life, through the effective conservation and sustainable use of biodiversity in line with national and international commitments, while respecting local values.”*

The NBSAP advocates empowered stakeholder partnership and implementation which is recognised as fundamental to its successful implementation. The NBSAP is structured over three thematic areas:

- Forest and Terrestrial Biodiversity
- Freshwater, Coastal and Marine Biodiversity
- Agricultural Biodiversity, Biotechnology & Biosafety

The 5 strategic objectives of NBSAP

- Establish a Representative and Viable Protected Area Network (PAN)
- Manage Key Components of Biodiversity
- Enable Sustainable Use of Biodiversity
- Maintain Ecosystem Services
- Manage Biotechnology and its Products

In view of the fragmented/ scattered legislative framework for environmental management and the fact that the agency responsible for biodiversity conservation falls under a Ministry which is development oriented, the Plan recommends a separate Biodiversity Act which will bring together all existing legislation related to biodiversity conservation.

Other salient components of the NBSAP include capacity building, education and awareness and enabling activities under GEF funding.

Marine Protected areas – National and Regional Activities

In 2009, a complete biological inventory of the Balaclava Marine Park was carried out under a project funded by the Indian Ocean Commission (IOC) – Network of Marine Protected Areas of the IOC Countries (2006-2010). Local, regional and international experts participated in the project. Besides the project comprises:

- Development of a regional strategy for biodiversity and marine resources management through eco-regional analysis
- Creation of new marine protected areas and supporting existing ones
- Development of a regional forum of MPA managers
- Development of an awareness and communication programme related to the project.

In 2005, a UNDP/GEF project on ‘Partnerships for Marine Protected Areas in Mauritius and Rodrigues’ was started. It aims at improving the management and conservation practices for MPAs within the Republic of Mauritius, including Rodrigues, and the equitable sharing of benefits to the local communities and economic operators on a sustainable basis. Other components of the project include the development of enabling policies and institutional frameworks for the sustainable co-management of the MPAs, and the development of a model co-management for a proposed MPA in Rodrigues.

6.4 Membership of Relevant International Treaties

Mauritius is among the first country to have ratified the CBD in 1992. It is also party to other biodiversity-related conventions, namely, CITES, Ramsar, Bonn Convention on Migratory Species and UNCCD. Other agreements include,

- a. Convention for the Protection, Management and Development of marine and coastal environment in the Eastern African Region and Related Protocol 1985. Mauritius acceded to the Convention in 2000.
- b. SADC
- c. International Plant Protection Convention 1971
- d. IOSEA Turtle MOU
- e. Convention on Fishing and Conservation of the Living Resources of the High Seas 1958
- f. Cartagena Protocol in 2000
- g. African Convention on Conservation of Nature and Natural Resources 1968
- h. Stockholm Convention on Persistent Organic Pollutants 2001
- i. African Eurasian Water bird Agreement (AEWA)

6.5 Funding Sources and Level

In view of the involvement of many actors which deal with overall biodiversity management, the costs estimated in the third national biodiversity report (2006) indicates a sum of 35 million USD/ year is used for overall biodiversity conservation and management. This includes both recurrent and capital measures on fisheries, environmental management, Parks management, agricultural services, waste water management, agricultural research and extension programme, support to NGOs through special fund.

Other sources of financial support to the Biodiversity programme are from the GEF through multilateral implementing entities such as UNDP, UNDP and FAO. The RAF allocation for Mauritius during the fourth GEF cycle was USD 5.35 million and the GEF 5 STAR allocation for Mauritius for biodiversity sector amounts to USD 5.19 million. According to estimates worked out in the Third National Report to CBD, Mauritius benefitted around 270,000 USD on average in a year over the period 1992 to 2006, from GEF under the Biodiversity sector.

Mauritius has also benefited the support from the European Commission as part of the 7th and 8th European Development Funds to the tune of 14.29 m€ and 22.33 m€ respectively. The support was mainly on the waste water sector and environment in general. Under the 9th EDF Country Support Strategy agreed between the EC and the Government of Mauritius, 85% of the funds have been earmarked as sector policy support programme (through budgetary aid) directed to the waste water sector.

A National Parks & Conservation Fund has been established under the Wildlife and National Parks Act 1993. It provides funding for conservation projects carried by NGOS such as the Mauritian Wildlife Foundation in collaboration with the National Parks and Conservation Service. Several extension of management areas have been financed by this fund. The fund is replenished through contributions of USD 50 per head of feral *Macaca fascicularis* exported by authorized firms. Some 6000 heads (monkeys captive bred) per year are exported to research centers. This Act also provides for charging a fee of Rs 100 for every export permit issued. The money received is also credited into the Wildlife Fund.

6.6 Gaps and Needs for harmonization

The key gaps and needs are:

- Limited technical, financial and human resources at the level of institutions dealing with conservation, preservation, protection and management of biodiversity resources. Limited progress noted under certain thematic areas and in the implementation of the NBSAP.
- Need for ongoing capacity building
- Overlapping institutional mandate in the case of Forestry Services and National Parks and Conservation Service
- R&D and Knowledge to deal with IAS

6.7 Challenges

- Potential loss of biodiversity
- Degradation by Invasive alien species and habitat modification for deer ranching
- Pollution from land based sources and activities (mainly non point sources)
- Adverse impacts of climate change. Climate change is gaining prominence as the impacts are increasingly understood.

Chapter 7: Integrated Coastal Management

7.1 Coastal Zone Management in Mauritius

The coastal zone of Mauritius is legally defined in the Environment Protection Act 2002, as any area which is situated within 1 km or such distance as may be prescribed from the high water mark, extending either side into the sea or inland. It includes:

- Coral reefs, the lagoon, beaches, wetlands, hinterlands and all islets within the territorial waters of Mauritius and Rodrigues
- Any estuary or mouth of river
- The island of Agalega and St Brandon and outer islets

However, Mauritius being a SIDS and in view of its small size, it may be considered as a coastal zone. About 20% of the population live near the coast which also supports various economic activities such as: agriculture, recreation and fisheries among others.

Since early 90's, efforts are being made to co-ordinate the activities of stakeholders on the coastal zone. However, development pressures on the coastal and marine resources have been rising. A number of new hotels, luxury villa complexes and other infrastructures have been constructed close to the shoreline.

In 2010, an Integrated Coastal Zone Management (ICZM) strategies, policies and guidelines have been finalised and approved by the Cabinet of Ministers. Implementation is underway. The ICZM approach has contributed towards rallying the stakeholders towards common understanding and goals.

Key issues identified are:

- Beach erosion. According to the Baird Report (2003) some 7km of beach is eroded.
- Degradation of habitat through illegal and unsustainable practices e.g., backfilling of wetlands and marshy areas situated on the private domain
- Nutrient enrichment through discharge of wastewater from non point sources (especially during heavy rainfall in unsewered areas)
- Leaching of nutrient and chemical from agricultural field (during heavy rainfall)
- Impacts of past development near the shoreline
- Climate Change

Some of the Regional ICZM related initiatives are:

■ **RECOMAP project**

The regional programme of the Indian Ocean Commission for the Sustainable Management of the Coastal Zones of the Indian Ocean Countries (RECOMAP) is funded by the European Union with an overall budget of €18 million. It is a five-year programme which began in August 2006. Its aim is to improve the management of the natural coastal and marine resources so as to reduce poverty amongst the coastal population of 7 countries in the South West Indian Ocean region, including Mauritius.

■ **UNEP/GEF WIOLAB project:**

Mauritius participated in the UNEP GEF WIOLAB project 'Addressing land based activities in the western Indian Ocean' under the Nairobi Convention. Training has been imparted to 3 laboratories (Fisheries Division, Wastewater Management Laboratory and National Environmental Laboratory) to undertake analysis of water sediment and biota. Mauritius has also secured \$310 000 as co-funding from the WIOLAB project for the implementation of two demonstration projects on reducing the impact of land based sources of the coastal and marine environment . A number of national assessment reports have also been prepared on:

- Assessment of water quality sediment and biota
- Coastal and marine environment
- Assessment of marine litter problems
- Existing policy legal and institutional frameworks with regards to land based sources and activities (LBSA) management and also the status of ratification of international conventions relevant to the LBSA management
- Municipal wastewater management

■ **GEF Western Indian Ocean Marine Highway Development and Coastal and Marine Contamination Prevention Project (MHP)**

Mauritius has a National Oil Spill Contingency Plan (NOSCP) which provides the organizational structure and procedures for preparedness and response to oils spills. The NOSCP covers the roles, duties and responsibilities of relevant national authorities during and after an oil spill, under the coordination of the Ministry of Environment and Sustainable Development as per Part V of the Environment Protection Act 2002.

Mauritius benefitted from training and equipment under the first part of WB/GEF WIO Regional Contingency Planning Project (1998/ 2003). Mauritius is also receiving technical assistance under the Marine Highway Project to review and update its NOSCP and develop other related plans including a Hazardous and Noxious Substances Contingency Plan.

7.2 Current Institutional Structure

The authorities and organisations involved in ICZM are:

- Ministry of Housing and Lands
- Ministry of Tourism and Leisure
- Ministry of Environment and Sustainable Development (ICZM Division created in the year 2000 following recommendation made under the National Environmental Strategies, 1999)
- Ministry of Local Government and Outer Islands (District Councils/Municipalities and the Beach Authority)
- Ministry of Fisheries and Rodrigues
- Ministry of Public Infrastructure, National Development Unit, Land Transport and Shipping
- Mauritius Police Force (Police de l'Environnement, National Coast Guard and Special Mobile Force)
- Mauritius Ports Authority
- Wastewater Management Authority
- Mauritius Oceanography Institute (Research Organisation)
- AHRIM (Hotels Association)
- Academia (University of Mauritius and University of Technology)
- NGOs such as Mauritius Marine Conservation Society, Association de Developpement Durable, Mauritian Wildlife Foundation and others.

An ICZM Committee was established in the year 2002

7.3 Legislation, Policy and Strategies

7.3.1 Legislation

The legal framework for the management of the coastal zone is dispersed over many laws and regulations. The principal laws concerned with the management of the coastal zone are

- Fisheries and Marine Resources Act 2007
- Environment Protection Act 2002, as amended in 2008
- Beach Authority Act 2002
- Tourism Act 2006
- Maritime Zones Act 2005
- Building Act 1919
- Town and Country Planning Act 1954
- Local Government Act 2003
- Planning and Development Act 2004

An analysis of the legal framework for the management of the coastal zone was carried out as part of the ICZM Framework project. It showed that the existing legal framework is sufficiently comprehensive to cope with current legal issues, but recognizes the crucial role of the EIA

mechanism and the need to improve monitoring, evaluation and enforcement regimes currently in place.

The management tool for regulating large scale development in the coastal zone is already in effect. Many coastal activities are regulated through the EIA and PER mechanism under the Environment Protection Act, while District Councils and Municipal Councils are responsible for issuing the Building and Land Use Permit. The EIA licence and PER approval as well as the Building and Land Use Permit requirements take into consideration the provisions of the Planning and Policy Guidelines as well as the Outline Schemes on setbacks, plot coverage and development density of coastal development.

Environment Protection Act 2002

The EPA 2002 provides for the setting up of an Integrated Coastal Zone Management Committee under the Chair of the Director of Environment (7th Schedule, EPA 2002). It officially comprises a list of 22 organisations from the public and private sector, academic, research organisation and NGOs. However, all the 10 local authorities (representing the 4 District Councils, 5 Municipalities and also the Rodrigues Regional Assembly) are invited. Often other stakeholders are co opted to the meetings. In general, the number of issues addressed as well as the number of stakeholders involved often renders the process less efficient.

The mandates of the Committee are:-

- (a) to develop an integrated management plan;*
- (b) to coordinate regional and international projects;*
- (c) to monitor coastal water quality and coastal resources including wetland;*
- (d) to conduct and recommend studies on beach erosion and propose measures for its control;*
- (e) to make recommendations for the upgrading of recreational facilities;*
- (f) to coordinate the management of islets and outer islands;*
- (g) to make recommendations on guidelines for coastal constructions; and*
- (h) to propose oil spill contingency planning and sensitivity mapping.*

The ICZM study (2010) has recommended that the ICZM Committee structure be reviewed. The recommended structure consists of:

- A strategic level ICZM Executive Panel (ICZMEP), responsible for sector policy and programme integration, chaired by the Permanent Secretary of the Ministry of Environment and Sustainable Development and made up the permanent secretaries, or their representatives from the other key stakeholder institutions, namely: Ministry of Agro Industry and Food Security, Ministry of Fisheries and Rodrigues, Ministry of Local Government, Ministry of Housing and Lands, and Ministry of Tourism and Leisure;

- A programme level sector planning group, responsible for the development and implementation of sector programmes, the lead agency of which would depend on the issue being addressed; and
- A district level coordination of project implementation would be the responsibility of a Plan Implementation Management Group, made up of representatives from central government (the lead agency and other relevant sector agencies), the district planning office and the Local Area Planning Group, and other key local stakeholders with respect to the project. The Local Area Planning Group will also be responsible for the development of Local Area Action Plans, which would integrate central government project activities into a planning that incorporates local concerns.

The three levels would be serviced by the ICZM Secretariat and various advisory groups at the different levels.

The ICZMEP would also consult with the ICZM Advisory Committee made up of representatives of key agencies, civil society and the private sector.

The programme level sector planning group would receive advice, with respect to coastal management technical issues, from a Scientific and Technical Advisory Committee.

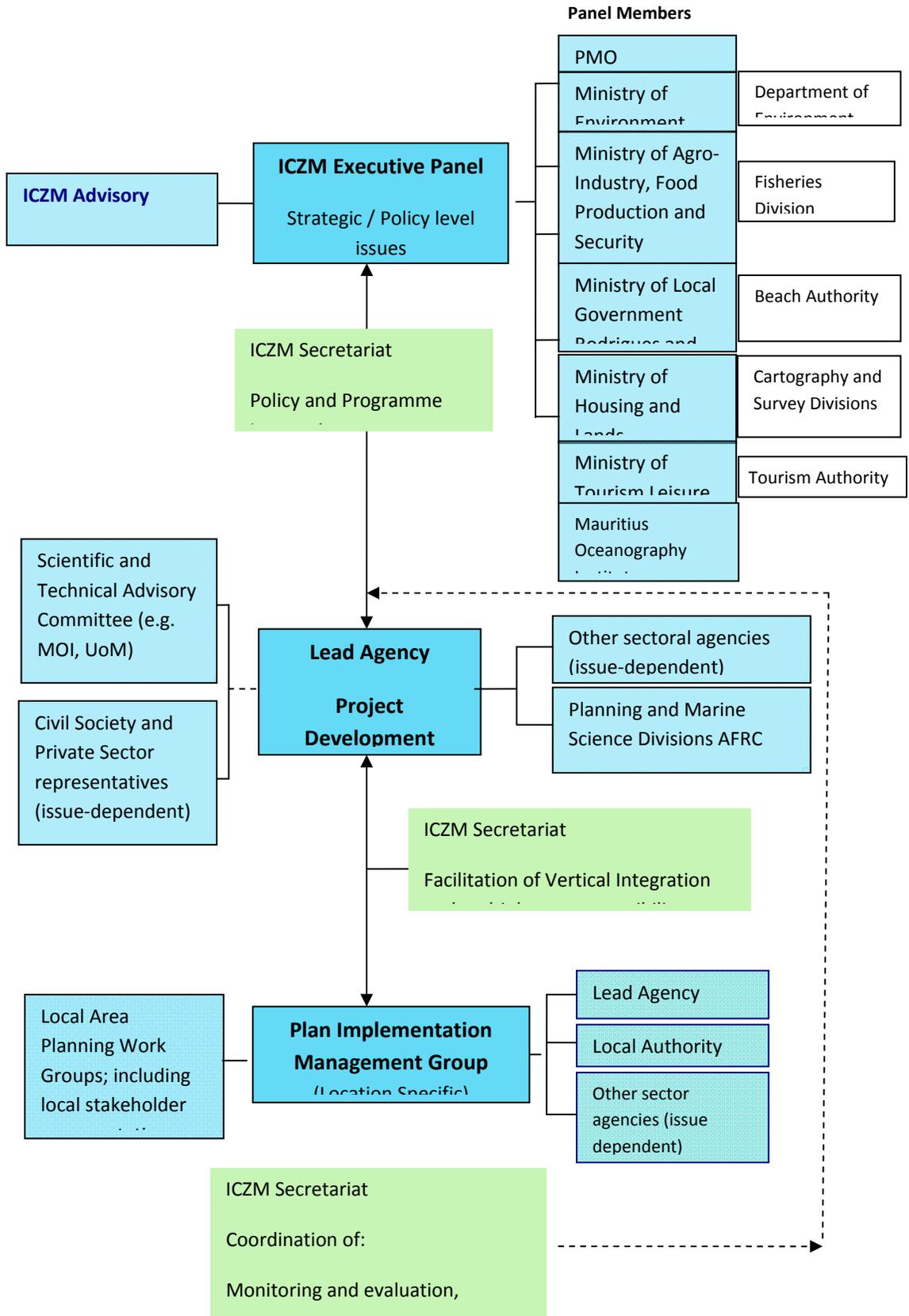
The recommended ICZM Committee structure is given at the **Figure 6** below.

The EPA also makes it an offence for any person to release or cause to release into the coastal zone any pollutant, waste or other noxious substance from or through the atmosphere or by dumping.

The Minister is given power to make regulations for -

- the management, protection and enhancement of the environment in the zone, the implementation of obligations under international or regional agreement.*
- taking measures to ensure that activities in the zone are so conducted as not to cause damage by pollution to the natural environment.*
- the control and prevention of pollution from installation and devices used in the exploration or exploitation of the natural resources of the sea bed and subsoil of the maritime zone.*
- the control and prevention of pollution of the marine environment from land based sources, including rivers, estuaries, pipelines and outfall structures.*

Figure 6: Recommended ICZM Committee Structure as per the ICZM Framework Study



7.3.2 Policies and Strategies

The need for an ICZM Framework was identified in the 1999 National Environmental Strategies. To enable a proper ICZM consideration, several important and related projects have been commissioned, namely:

- Bathymetry Maps and Habitat Resource Atlas for the Lagoon of Mauritius, 2004
- Study of Coastal Erosion in Mauritius, 2003
- Strategic Environmental Impact Assessment (SEA) for Identification of Potential Sites for Marinas, Ski Lanes and Bathing Areas for Mauritius (2005)
- Mapping of Environmentally Sensitive Areas (ESAs) in Mauritius and Rodrigues (2008/9)
It involved the demarcation of ESAs and a comprehensive policy and legislative framework for their protection and sustainable development. The ESA study has classified seven coastal ESAs among fourteen types, assessed their relative importance and developed a comprehensive framework for protecting, managing and monitoring ESAs integrity in the long term. A series of management measures namely: buffer zones, access, improvement, mitigation, development design, information and public awareness are prescribed to deliver effective action. Implementation of the recommendations of the ESA study is linked to a three-tier system of categorising relative ESA-value to policy, legal and management instrument. The final report was approved by Cabinet in early 2010 for implementation.

The ICZM framework for the Republic of Mauritius to effectively manage the valuable and pressurised resources was completed and the ICZM framework has been adopted by Government in August 2010 for implementation. The deliverables include:

- ICZM Strategy Part I (Stocktake) and ICZM Strategy Part II (Implementation)
- ICZM Strategy for Rodrigues
- ICZM National Policy and Legislative frameworks
- Institutional Strengthening and Capacity Building Plan
- Financial Strategies for ICZM implementation
- MOU for sharing of Geographical Information
- Good Practice Guidance For Coastal Activities
- Environmental Monitoring plan
- Action and Area plan for 6 pressure zones (5 mainland and 1 Rod)
- Final Report with major project recommendations

The strategy for the ICZM has been elaborated along the following five axes:

- a. Loss of Coastal Environment and Ecosystem function and integrity
- b. Improvement of Institutional effectiveness
- c. Stakeholder's participation
- d. Compliance and Enforcement of legal instruments

- e. Cross cutting issues for implementation of ICZM

7.4 Membership to relevant International Treaties

Relevant treaties include: the Convention on Biological Diversity, Ramsar, UNCCD, OPRC, and Convention for the Protection, Management and Development of marine and coastal environment in the Eastern African Region and Related Protocol 1985.

7.5 Funding Sources and Level

Funding for coastal zone management is sourced mainly from the local funding. As there are a number of stakeholders implementing ICZM related activities and in view of the importance of coastal to Mauritius, the amount of investments are on the rise. The expenditure incurred on the coastal zone from local fund amounts to Rs 1.49 billion. The amounts as computed during the ICZM study are shown on the below.

Relevant Ministry	Ministerial Budget	% for CZM	CZM Expenditure
Ministry of Environment	588,000,000	35.0%	205,600,000
Ministry of Agro-Industry, Food Production and Security	1,321,392,000	9.2%	121,813,650
Services under the Prime Minister (PM)	3,357,798,010	5.8%	193,438,050
Deputy PM's Office - Ministry of Public Infrastructure, Land Transport & Shipping	69,282,000	50.0%	34,641,000
Deputy PM's Office - Ministry of Tourism, Leisure and External Communications,	556,982,010	67.1%	373,826,201
Ministry of Renewable Energy and Public Utilities ³	1,882,582,020	20.0%	376,516,404
Ministry of Local Government, Rodrigues and Outer Islands	2,497,182,000	12.9%	322,978,200
Ministry of Housing and Lands	543,822,000	26.6%	144,509,401
Total Budget of GoM	61,544,000,170*	2.4%	1,491,383,656

Source: MOESD/ ICZM 2010 - Calculations based on Government of Mauritius Budget, 2007. *The total GoM is greater than the sum of the listed Ministries because some Ministries do not appear to have coastal zone interests. Their budget therefore is zero for this sector.

³ Over the past 12 years, over Rs12 billion has been spent on implementing the Sewerage Masterplan. Though primarily built for public health and safety considerations, a "by-product" has been a decrease in the amount of polluted water discharged or leached into the coastal waters. Thus a proportion of this (say 10% of the annualised expenditure; R\$100 million, could be added to Ministerial expenditure. However, this would make little difference to the total annual figure, which is in the order of 61 billion.

The ICZM study also concluded that that revenue generated from the coast is in the order of Rs 47.6 billion or about equivalent to 23% of GDP. The details are given below.

Sector	Rupees	% of TR
Total Revenue from Tourism	42,863,543,980	90.01%
Total Revenue from Fisheries	350,236,000	0.74%
AFRC and the Marine Park	8,143,319	0.02%
Total Rent for Houses in Coastal Zone (20% occupancy)	2,520,000,000	5.29%
Revenue from Small Businesses (proportion attributable to the coast based on population)	1,773,983,850	3.73%
Leasehold Annual Rent for <i>Campements</i>	106,331,161	0.22%
Total Revenue (TR) from coast	47,622,238,310	100.00%

Source: ICZM Financial Analysis (2010)

7.6 Key Gaps and needs for harmonization

- Absence of systematic monitoring programme for the coastal zone
- Knowledge gaps in certain aspects pertaining to Coastal Zone Management, e.g., nutrient enrichment and chemical (pesticides) runoff
- CZM data management
- Capacity limitation to undertake vulnerability assessment and adaptation to Climate Change

7.7 Key Challenges

- Managing pressure on coastal and marine resources from both sea and land based activities. Factors such as population growth and economic development put pressure on these resources, which if not adequately managed, can result in their depletion or degradation.
- Adaptation to Climate Change. Impacts due to extreme event such as cyclones, climate variability, surges and sea level rise are likely to increase.

Chapter 8: Port State Control for Fishing Boats and Vessels

The movement of local fishing boats/vessels is monitored by the Fisheries Division of the Ministry of Fisheries and Rodrigues for fishery management purposes. All licensed fishing boats/vessels leaving for fishing campaigns have to obtain a departure clearance from the Fisheries Division. Prior to departure, an inspection is carried out to ensure that the boat/vessel has obtained its seaworthiness certificate and has their insurance cover, safety equipment onboard and the required fishing licence.

In 2009, 86 clearances were issued to fishing boats/vessels involved in the demersal chilled/frozen fish fisheries, 64 to carrier vessels from St Brandon, and 8 to banks fishing vessels. On return of the boat/vessel from a fishing campaign, boarding is carried out by enforcement officers to collect the logbook, to check the quality of the fish and to ensure that no toxic fish is on board prior to granting authorisation for unloading of the catch.

604 foreign fishing vessels called at Port Louis for loading/unloading of fish and fish products, transshipment, bunkering, change of crew, provisions, repairs and other ancillary activities. Their different types and nationalities are shown in **Table 9**.

Table 9: Details of calls of foreign fishing vessels

Type of vessel	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
Reefers	8	3	3	3	9	12	4	6	6	3	7	8	72
Squid vessels	10	0	0	1	6	1	0	0	0	0	1	1	19
Trawlers	2	1	0	0	1	0	1	2	2	0	2	1	12
Purse seiners	2	2	2	4	8	5	1	1	0	1	3	1	30
Tuna longliners	40	61	27	23	30	21	22	26	88	25	40	42	446
Longliners for patagonian toothfish	0	1	6	1	2	0	3	4	0	0	1	3	21
Longliners used for the collection of sea cucumber	0	0	0	0	1	1	1	0	0	0	1	0	4
Total	62	68	38	32	57	40	31	40	96	29	54	57	604

Ministry of Fisheries and Rodrigues Annual Report 2009

Chapter 9: Coastal Agriculture and Forestry

9.1 Agriculture and Forestry

In view of the size of Mauritius, agriculture in Mauritius may be considered as coastal agriculture. High quality land, particularly close to urban strips and prime coastal areas, is scarce and is sought after by a variety of competing users. Land utilization in the mainland Mauritius is given in the Figure 7.

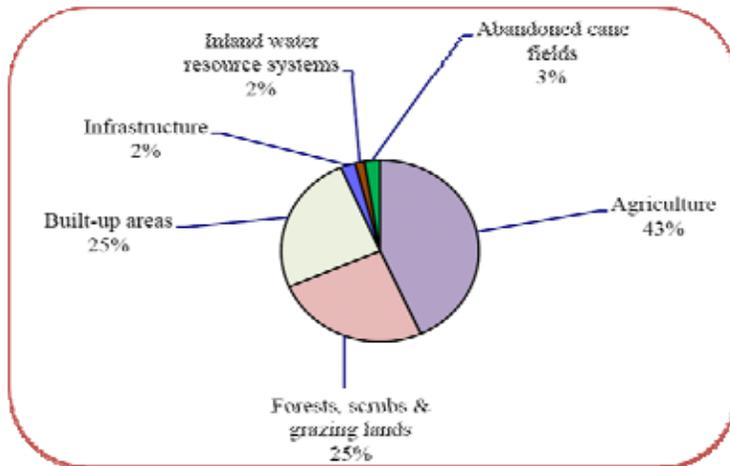


Figure 7: Land utilization – Island of Mauritius
(Source: Digest of Environment Statistics, 2008)

Agriculture uses some 43% of available land. Although Forests and green spaces represent about 25% of total land area, less than 2% consist of endemic forests. The sugar and non-sugar sectors have been under regular review, especially with the recent food crisis and the loss of 36% revenue from sugar prices resulting from the reform of the EU sugar regime. With the reform of the sugar cane sector, some 7,000 ha of land are expected to come out of sugar cane plantation.

According to the CSO 2008, from 1995 to 2005, the proportion of land under sugarcane decreased by 6.5%, tea plantations declined by 81.6% and forestry by 17.2%. Land used for other agricultural activities increased by 33% while built up areas expanded by 27.7%. Despite the reduction in area under sugar cane plantation, the sugar yield has been maintained through improved cane varieties and cultivation techniques. Food crops have witnessed a 33.3% increase, tendency which is picking up significantly after the adoption of the Food Security Strategic Plan 2008 in the global food crisis context.

The recent food crisis and its impacts on Mauritian households have triggered the development of a Food Security Strategic Plan. This plan targets optimisation of agricultural production capacity locally and cross border initiatives with neighbouring countries like Mozambique and Madagascar where land has been leased to Mauritian firms for the production of sugar and food crops. The low share of agriculture in the economy is being relooked from a strategic perspective and a comprehensive support mechanism has been put in place to encourage food production, taking into consideration the impacts of global warming. Trials of rice production as well as large scale production of meat and milk are under way.

The sugar industry is being called to avoid burning trash, in line with world trends, and to use the trash as mulch for more effective conservation of water (humidity), conversion into organic matter (and weed suppression), thus also addressing climate change by reducing heat and CO₂ generation. The MSIRI is also carrying out research trials for incorporating leguminous crops in sugarcane fields for enriching the soil and reduce use of inorganic fertilisers, to increase sustainable practices.

The Strategic Environment Assessment of the Multi Annual Adaptation Strategy for the reform of the sugar sector (SEA-MAAS) highlights the environmental impacts of land use change and proposes mitigative measures to minimise the sugar sector reform. Extension services are provided by Government to encourage good agricultural practices, organic and fair trade concepts, regrouping of planters, access to field preparation services (e.g. derocking), sustainable use of pesticides and fertilisers, soil erosion control and efficient irrigation systems. An Irrigation Master Plan is under implementation.

The mainland Mauritius is not affected by desertification per se. However, occasional droughts experienced so far have lead to extremes of acute water shortages in certain areas of Mauritius. However, Mauritius is prone to land degradation and thus ratified the United Nations Convention to Combat Desertification in 1996. Rodrigues is more prone to soil erosion and more severe land degradation than Mauritius. A UNDP/GEF SLM project aiming to build capacities for Sustainable Land Management (SLM) in various user groups in Mauritius and Rodrigues and to mainstream SLM into government planning and strategy development is currently under implementation. It will benefit a land surface area estimated at 50,000 ha.

9.2 Current Institutional Structure

The MAIFPS has several of its Divisions and numerous statutory bodies which are working towards sustainability of the agricultural sector and forest management. The key ones are the Agricultural Services, Mauritius Sugar Authority, Mauritius Sugar Terminal Corporation, Mauritius Meat Authority, Irrigation Authority, Sugar Planters Mechanical Pool Corporation, Tea Board, Tobacco Board, Sugar Investment Trust, Sugar Cane Planters Trust and Agricultural Marketing Board. Also involved in this process are research organisations such as the Mauritius Sugar Industry Research Institute, Food and Research Council, University of Mauritius, Agricultural Research Extension Unit and Association such as Farmers Service Corporation and Association of Small planters, vegetable producers, cooperatives, NGOs such National Young Farmers Club and so on.

9.3 Legislation, Policies and Strategies

9.3.1 Legislations

There are 23 pieces of legislations of direct relevance and aiming at promoting sustainable agriculture. The key ones are Sugar Efficiency Act 2005, Chemical Fertilisers Act 1980, Dangerous Chemical Control Act 2004, Cane Planters and Millers Arbitration and Control Board Act 1973, Board of Agriculture, Natural Resource Act 1977, Agricultural Chemists Act 1979, Genetically Modified Act 2004, Forests and Reserves Act, Plant Protection Act 2006 and so on.

9.3.2 Policies and Strategies

In terms of Policies and Strategies in the agricultural sector, there have been a number of strategies that have been developed. The key one includes a Sugar Sector Strategic Plan, a Non Sugar Strategic Plan, a Sustainable Diversified Agri Food Sector Strategy for Mauritius (2008-2015) and the Food Security Strategic Plan.

The main objectives are:

- (i) addressing the main direct constraints within the sector;
- (ii) optimising productivity by promoting transfer of technology;
- (iii) enhancing quality and providing the appropriate framework through the setting up of a *Food Technology Laboratory* to ensure that all agricultural activities are done in strict conformity with international norms governing food safety and quality;
- (iv) attaining a certain degree of self-sufficiency in sectors in which Mauritius is not already self-sufficient;
- (v) diminishing imports in the sector, in view of the high Food Import Bill;
- (vi) optimising utilisation of resources by fostering a concept of an organised agriculture;
- (vii) reorganising marketing at the local and international market levels, with a view to optimising profitability to stakeholders, based on up-to-date market information through the setting up of a Market Information System that will be operated by a *Market Intelligence Unit*;
- (viii) setting-up of a clustering framework to foster more productive interaction between agricultural stakeholders and a better public/private sector participation in achieving common objectives and accordingly, establishing the necessary mechanism and incentives;

- (viii) developing potential export avenues, with emphasis on promotion of value-addition to primary products and the promulgation of the local agro-processing industry;
- (ix) strengthening infrastructural and human capacity to enhance research and development support to agriculture with *inter alia*, the setting up of the *Mauritius Agricultural Biotechnology Institute*;
- (x) promoting capacity building and training of agricultural stakeholders in new technology with a view to encouraging entrepreneurship;
- (xi) strengthening of administrative, infrastructural and legislative frameworks to achieve the targeted objective of a 'modern agriculture' whilst ensuring biosafety;
- (xii) promoting conservation of natural biodiversity and fostering sustainable utilisation of natural resources;
- (xiii) ensuring a better, demand-driven policy orientation by Government, to optimise utilisation of resources in addressing the needs of the agricultural community and meeting national priorities; and,
- (xiv) revamping agriculture in Rodrigues.

Food Security

Mauritius is compelled to import 77% of its food requirements, namely, cereals, wheat/flour and rice, edible oil, meat and dairy products, spices, fruits as well as a fair proportion of its potato, onion, garlic and ginger needs. Mauritius vulnerability has been further exacerbated by the exponential rise in global food prices over the past years. The net import bill has more than trebled from Rs 8.4 billion in 2001 to Rs 27,485.4 billion in 2008.

Being a Net-Food Importing Developing Country (NFIDC), Mauritius is particularly vulnerable to a rapidly changing global food system due to the challenges of rising and volatile prices of basic food commodities, climate change and bioenergy. Mauritius is simultaneously enduring the effects of trade liberalization policy.

However, 100% of self sufficiency has been achieved for fresh vegetables, 60% for potato and 33% for onion. Fruit production consisting of banana, pineapple and seasonal fruits covers 46 % of Mauritius fruits needs each year. Further agro-industrial diversification is hindered by continuing over-dependence on imported raw materials.

To reduce its food insecurity which may aggravate with climate change, in particular, extreme weather events, warmer spells, erratic rainfall and pest resurgence, the government has set up of a Rs. 1 billion (\$33 million) Food Security Fund for the period 2008-2011. The sum is split between Mauritius and Rodrigues, Rs 813 M and Rs 187 M respectively. The policies are to

- Develop self-sufficiency, with particular emphasis on potatoes, onions, tomatoes (for processing), maize, milk, meat and fish products.
- Develop a modern agricultural sector and a fisheries sector in line with the expansion of other sectors of the Mauritian economy
- Empower the agricultural community, especially the younger skilled generation, by giving them opportunities and appropriate training and support to enable them to emerge as agricultural entrepreneurs.
- The development of seafood hub as the new pillar of its economy to maximize benefits from the fishing activities and processing through value-addition.

This Fund was set up to finance:

- Projects for mobilising land and aquatic resources
- Inputs for production, human resources, technology and financial resources to optimise food and livestock production for domestic consumption
- Projects to promote exports and partnership with countries in the region, to meet local consumption as well as for the regional markets.

Mauritius is actively exploring the concept of Cross-Border Investment Initiatives, using the region as a food production base. Local entrepreneurs are starting to invest in neighbouring countries such as Madagascar and Mozambique.

National Forest Policy

With regard to Forestry, a National Forest Policy was adopted in 2006 and is a statement of Government's intentions for the development of the forest sector. It is designed to protect and enhance the country's natural environment, biodiversity and national heritage, while at the same time promoting recreation and tourism. A National Forest Action Programme is under preparation to implement the national policy. This is expected to include actions to:

- Enhance national efforts in carrying out applied research, forest inventory and assessment as well as international exchange of information on forests.
- Regulate and ensure equitable leasing of state-owned eco-tourism sites to tour operators and train public and private sector personnel in eco-tourism management.
- Contribute to poverty alleviation through developing small-scale forest-based businesses.
- Establish a highly technical, efficient and effective public forestry administration which is capable of promoting the sustainable management of forest resources to meet societal demands for products, forest resource conservation, recreation and environmental services.

9.4 Membership to relevant international treaties

The treaties of direct relevance to agriculture are the International Treaty on Plant Genetic Resources for Food and Agriculture, Agreement with Biodiversity International, Convention on Biological Diversity, International Plant Protection Convention, UNCCD, UNFCCC and SADC. The government also has a number MOUs on a bilateral basis with countries such as Australia, China, Egypt, India, Israel, Japan, Madagascar, Mozambique, Norway, Pakistan, Reunion Island, Seychelles and South Africa.

9.5 Funding Sources and Level

Funding for agricultural and forest management activities are obtained from local Funding. The 2010 budget estimates for the agriculture including forestry was Rs 1.85 billion where as the 2011 estimate is Rs 2.75 billion.

In 2005, there was the abolition of the ACP-EU Sugar Protocol with the consequence of reduction in the price of sugar price by 36% for Mauritius. In line with the Multi Annual Adaptation Strategy of 2006/2015 and the Economic Restructuring and Competitiveness Programme, Mauritius has benefitted from a Global Budget Support from the European Union.

The EU Response strategy for Mauritius is supporting the economic reform programme of the Government of Mauritius, which includes the restructuring of the sugar industry into sugar cane cluster. From 2006 to 2010 Mauritius has been allocated a sum of EUR 141.475 million, out of which EUR 102.366 million have already been disbursed to date. The EU has in November 2010 approved a second envelope of sugar accompanying measures for a total of EUR 139.6 million for the period 2011-2013. These funds will also be disbursed as general budget support.

9.6 Gaps and needs for harmonization

- Capacity to formulate climate resilient policies for agriculture including food crops and livestock.
- Contingency plans for against epidemics.
- Sustaining Research and Development for Integrated Pest Management
- Unsustainable agricultural practices in certain cases. Needs to promote Sustainable Land Management practices

- Marketing of fresh vegetables and fruits: Improvement in the marketing of fresh horticultural produce is a major challenge. The current system is unsatisfactory and does not meet the acceptable standards and norms.
- Availability of tools to render enforcement effective

9.7 Challenges and Constraints

- The sugar sector is facing a major challenge to ensure its viability and sustainability consequent to the drastic reduction in sugar price. This challenge has been recently exacerbated with the falling rate of the Euro. A shift in production from raw sugar to value-added refined white sugar and in production of energy products has become a *sine qua non* condition for the industry's future viability. With the reduction in price of sugar, institutions dependent on cess levied on sugar will be subject to reform so that operating expenses are reduced in line with reduction in cess funding.
- Reduction of cost of production by small planters through de-rocking, land preparation and provision of irrigation facilities, and improved service delivery by institutions.
- Adverse climatic factors: The food production targets can be seriously affected because food-crop production is vulnerable to adverse climatic conditions. The measures proposed in the Food Security Strategy Plan in particular provision of irrigation facilities and protected cultivation (hydroponics) will no doubt mitigate these effects. A crop insurance scheme is also being implemented as well as boost up schemes to increase the country's self-sufficiency in potato and onion.
- Outbreak of livestock diseases
The livestock sector is threatened with outbreaks of new diseases and their rapid spread. Surveillance and vigilance at entry points will need to be enhanced and contingency plans be prepared with the support of international agencies.
- Rising Prices of Agro-Inputs (seeds, fertilizers and feeds). The recent price increases of inputs used for agricultural production have seriously affected the productivity and revenue of planters and breeders. It is feared that with such increases, some farmers may not apply the optimal doses of fertilizers and other inputs, nor breeders will feed animals adequately, and productivity may suffer.

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