Republic of Mauritius

Mauritius Strategy for Implementation National Assessment Report 2010

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Acknowledgements

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List of Abbreviations

ACP	Africa, Caribbean and Pacific
AFRC	Albion Fisheries Research Centre
AFRITAC	Africa Regional Technical Assistance Centre
AGOA	Africa Growth and Opportunity Act
AIMS	Africa, Indian Ocean
AMESD	African Monitoring of Environment for Sustainable Development
APM	Automatic Pricing Mechanism
AR4	Fourth Assessment Report
AREU	Agricultural Research and Extension Unit
ASP	Additional Stimulus Package
BFA	Business Facilitation Act
BOI	Board of Investment
BPO	Business Process Outsourcing
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CEB	Central Electricity Board
CEP	Community Empowerment Programme
CFL	Compact Fluorescent Lamps
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
CPE	Certificate for Primary Education
CRR	Cash Reserve Ratio
CSO	Central Statistics Office
CSP	Country Strategy Paper
CSR	Corporate Social Responsibility
CWA	Central Water Authority
DTAA	Double Taxation Avoidance Agreement
ECSL	Education and Communication for Sustainable Lifestyles
EDS	Education for Sustainable Development
EEZ	Exclusive Economic Zone
EIA	Environment Impact Assessment
EPI	Environmental Performance Index
EPZ	Export Processing Zone
ESA	Environmentally Sensitive Area
EU	European Union

FAO	Food and Agriculture Organization
FDI	Foreign Direct Investment
GCM	Global Climate Model
GDDS	General Data Dissemination System
GDP	Gross Domestic Product
GEF	Global Environment Facility
GHG	Greenhouse gas
GMO	Genetically Modified Organism
GNI	Gross National Income
GWP	Global Warming Potential
HDI	Human Development Index
HZW	Hazardous Wastes
IAEA	International Atomic Energy Agency
IC3	Internet and Computing Core Certification
ICT	Information and Communication Technology
ICZM	Integrated Coastal Zone Management
IFS	Integrated Farming System
IOC	Indian Ocean Commission
IOR-ARC	Indian Ocean Rim Association for Regional Cooperation
IOTC	Indian Ocean Tuna Commission
IPCC	Intergovernmental Panel on Climate Change
IPM	Integrated Pest Management
IPP	Independent Power Producer
IPPA	Investment Promotion and Protection Agreements
IPR	Intellectual Property Rights
IRS	Integrated Resort Scheme
IUCN	International Union for Conservation of Nature
IUU	Illegal, Unregulated and Unreported Fishing
IWRM	Integrated Water Resources Management
LAVIMS	Land Administration, Valuation and Information Management System
LDCs	Least Developed Countries
MAIFPS	Ministry of Agro Industry, Food Production and Security
MBGS	Mauritius Business Growth Scheme
MDGs	Millennium Development Goals
MID	Maurice Ile Durable
MIDF	Maurice Ile Durable Fund
MLTA	Mauritius Land Transport Authority
MMTA	Mauritius Maritime Training Academy
MOI	Mauritius Oceanography Institute

MPA	Mauritius Ports Authority
MRC	Mauritius Research Council
MRL	Maximum residue limit
MSI	Mauritius Strategy for Implementation
MSIRI	Mauritius Sugar Industry Research Institute
MTF	Marrakech Task Force
MWF	Mauritian Wildlife Foundation
NAM	Non Aligned Movement
NBSAP	National Biodiversity Strategy and Action Plan
NDS	National Development Strategy
NDU	National Development Unit
NEPAD	New Partnership for Africa's Development
NFIDC	Net Food Importing Developing Country
NFP	National Forest Policy
NGO	Non-governmental organization
NHF	National Heritage Fund
NNSD	National Network for Sustainable Development
NOSCP	National Oil Spill Contingency Plan
NPCS	National Parks & Conservation Service
NPPO	National Plant Protection Organization
ODA	Official Development Assistance
ODP	Ozone Depleting Potential
OIF	Organisation internationale de la Francophonie
PBB	Programme Based Budgeting
PER	Preliminary Environment Report
PPG	Planning Policy Guidance
PPO	Public Procurement Office
PTA	Preferential Trade Agreement
R&D	Research and Development
RDC	Regional Development Company
RDPC	Regional Development Partners Company
RECOMaP	Regional Programme for the Sustainable Management of the Coastal Zones
RES	Real Estate Scheme
RMCE	Regional Multidisciplinary Centre of Excellence
S&T	Science and Technology
SADC	Southern African Development Community
SCP	Sustainable Consumption and Production
SDDS	Special Data Dissemination Standard
SEGANET	Inter Island Connectivity Project

SIDS	Small Island Developing States
SIPPs	Small Independent Power Producers
SJRF	Saving Jobs and Recovery Fund
SLM	Sustainable Land Management
SMEs	Small and Medium Enterprises
SPP	Sustainable Public Procurement
SPS	Sanitary and Phyto-santiary
SSRIA	Sir Seewoosagur Ramgoolam International Airport
STI	Science, Technology and Innovation
TBT	Technical Barriers to Trade
Toe	Tonnes of oil equivalent
UNCCD	United Nations Convention to Combat Desertification
UNCLOS	United Nations Convention on the Law of the Sea
UNDESA	United Nations Department of Economic and Social Affairs
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
UNFCCC	United Nations Framework Convention on Climate Change
UNFPA	United Nations Population Fund
UNIDO	United Nations Industrial Development Organization
UOM	University of Mauritius
USD	US Dollars
UTM	University of Technology Mauritius
VMS	Vessel Monitoring System
WHO	World Health Organisation
WIOLaB	Addressing Land Based Activities in the Western Indian Ocean
WIPO	World Intellectual Property Organization
WMA	Wastewater Management Authority
WRU	Water Resources Unit
WTO	World Trade Organisation
WUE	Water Use Efficiency

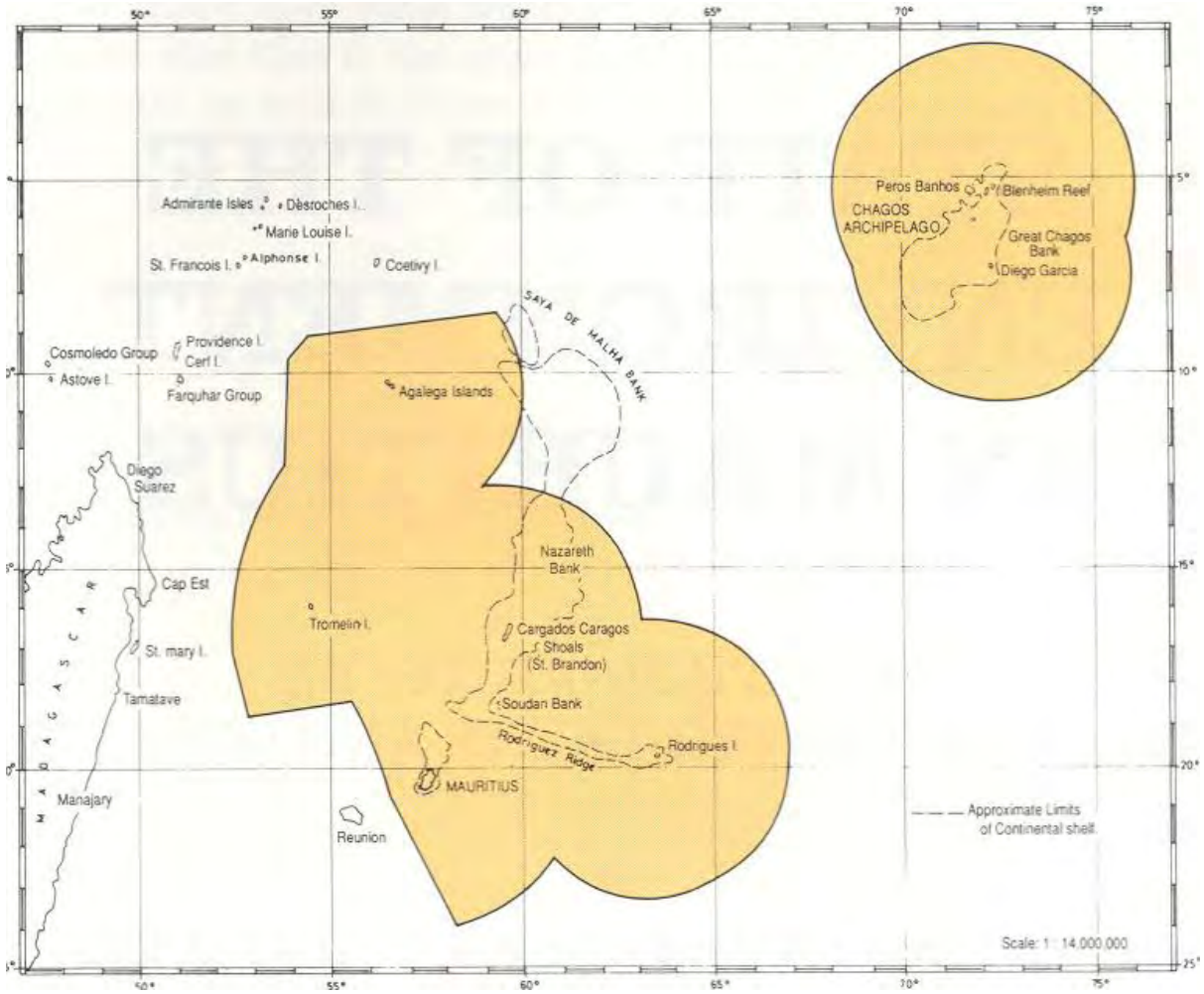
INTRODUCTION

Preamble 1
Mauritius Strategy for Implementation

"The Programme of Action for the Sustainable Development of Small Island Developing States remains the blueprint for small island developing States and the international community to address national and regional sustainable development in small island developing States".

BACKGROUND

The Republic of Mauritius is a group of islands in the South West of the Indian Ocean, consisting of the main island of Mauritius, Rodrigues and several outer islands located at distances greater than 350 km from the main island.



The islands of Mauritius and Rodrigues, with a total area of 1,969 km2, have an overall population density of 644 persons per km2. About 43% of the area is allocated to agriculture, 25% is occupied by built-up areas and 2% by public roads; the remaining consists of abandoned cane fields, forests, scrub land, grasslands/grazing lands, reservoirs and ponds, swamps and rocks.

Mauritius has been successively a Dutch, French and British colony. It became independent of Great Britain on 12th March 1968 and acceded to the status of Republic within the Commonwealth on 12th March 1992. The official language is English, but French is widely spoken. However, creole is the predominant mother tongue and several ancestral languages are still spoken.

The population, estimated at 1.3 million, comprises Hindus, Muslims, General Population, that is, people of mixed European and African origin, and Sino-Mauritians. The climate is sub-tropical. The average mid-

day temperature on the central plateau varies from 22°C in August to 28°C in January. Near the coastal regions, temperatures are about 4-5°C higher.

During the past thirty years, the Mauritian economy has diversified from a sugar-cane monocrop economy in the 1970's to one based on sugar, manufacturing (mainly textiles and garments) and tourism in the 1980's. Global business (offshore) and Freeport activities have also been growing continuously since the mid 1990s.

In 2008, the economy grew by 5.1 % while in 2009, by 2.8%. The Gross National Income per capita at market prices reached Rs. 217, 541($-6836). The inflation rate reached 9.7% in 2008, mainly attributed to shocks to oil and food prices. This has been the highest inflation rate recorded since 1993. However, in 2009, the inflation dropped to 2.5%, the lowest annual inflation rate Mauritius has had in a very long time. The unemployment level remained disappointing, although an increasing number of jobs are being created since 2006. The unemployment rate has maintained an upward trend between 2000 and 2005, reaching a peak of 9.6%. In 2009, it stands at 7.7%.

POLITICAL AND INSTITUTIONAL SITUATION

Since its independence in 1968, Mauritius has a parliamentary democracy based on the Westminster system. A Republic since 2002, its President has no executive powers. Since 2002, the island of Rodrigues enjoys significant autonomy as well as its own regional assembly. National and local elections are held every five years.

Mauritius has agreed to be peer-reviewed under the African Peer Review Mechanism (APRM), an initiative of the New Economic Partnership for Africa's Development (NEPAD). Mauritius has a good track record in respecting human and fundamental rights as well as democratic principles. Civil society is today regularly consulted on national policy formulation and stakeholders are involved in issues of national interest.

SOVEREIGNTY ISSUES

Since our 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 both Mauritian law and international law.

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, and hopes that it will be able to exercise its sovereignty over the Chagos Archipelago in the near future.

As regards 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 of Tromelin.

ECONOMIC DIVERSIFICATION

From a supported monocrop economy, predominantly dependent on sugar, Mauritius has successfully diversified its economic activities by carving out special niches in textile, tourism and financial services. Whilst 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 from10.3% to 11.7%.

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
- ☐ Creating an enabling environment
- ☐ Enhancing export competitiveness
- ☐ Modernising the Welfare State
- ☐ Favouring a participatory approach of all stakeholders.

Mauritius in Figures

2009 MAURITIUS SCORES

✓ Average annual per capita income of Rs. 217, 541($6,836)

✓ HDI of 0.804 (equivalent to 81st out of 182 countries)

✓ Human Poverty Index for developing countries (HPI-1) value of 9.5%: 45th among 135 developing countries

✓ Economies in Doing Business: ranked 17th out of 183 and 1st in Sub-Saharan economy for the second year in a row in terms of overall regulatory ease of doing business.

✓ Global competitiveness index 2009–2010 rankings: 57th out of 133 countries

2008 & 2010

✓ In the Yale and Columbia Universities Environmnetal Peformance Index (EPI) released at the World Economic Forum in January 2010, Mauritius was ranked 6th out of 163 countries. In 2008, Mauritius was 59th .

CHALLENGES AHEAD

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.

An attractive blend of advantages is offered to international investors. These include: political stability, pleasant and peaceful living conditions, efficient telecommunications, pool of qualified professionals conversant in English and French, Investment Promotion and Protection Agreements, International Stock Exchange, Freeport activities and the absence of exchange control.

POVERTY REDUCTION & MDGS

Mauritius ranks among countries of Medium Human Development level, which is largely due to the maintenance of universal free health care and free. Remarkable results have been achieved towards the MDGs, with four out of eight specific goals already achieved, respectively:

- ☐ Universal primary education
- ☐ Reduction of child mortality
- ☐ Improvement of maternal health through the reduction by ¾ of maternal mortality ratio
- ☐ Gender equality through equal enrolment in primary and secondary education

Mauritius is one of the few countries in Africa on track to meet all but one of the Millennium Development Goals (MDGs) by the year 2015. The only MDG that Mauritius is unlikely to meet is the reduction by two - thirds in child mortality. Mauritius' infant mortality rate currently stands at 14 deaths per 1,000 births. Bringing the rate down from 14 to 6 (below the level the USA has today) is considered unlikely given Mauritius' level of income, and in view of the persistence of pockets of poverty.

Mauritius has shown constant progress in its Human Development Index from 0.655 in 1980 to 0.721 in 1990 and 0.791 in 2008 (HDI ranking 65). The Gini Coefficient (a measure of inequality) has increased from 0.371 in 2001/2002 to 0.389 in 2006/07, confirming a rise in income inequality.

The incidence of absolute poverty is relatively low, although pockets still prevail in some suburban and coastal regions in Mauritius and on the island of Rodrigues. Some 12% of the population is estimated to be poor, based on a poverty benchmark calculated at 50% of the median monthly household expenditure. The incidence of poverty is relatively higher among female-headed households (33.8%) than among male-headed households (8%). On the island of Rodrigues, the poverty rate is 30.2%. The incidence of poverty in rural areas is more than three times that of urban areas.

The Empowerment Programme, announced in the 2006/2007 budget, provides comprehensive measures for poverty alleviation, capacity building of the vulnerable segments of the population as well as incentives for employability, entrepreneurship and establishment of SMEs. The shift has been from job creation to employment creation. Social safety nets for the eligible underprivileged have also been reinforced, such as through improved social aid, educational support, free transport for students to attend school, and increased support to specialised NGOs based on clear performance targets.

ECONOMIC REFORM STRATEGY

Mauritius has 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 ($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%).

Against the backdrop of the seriously deteriorating global economic outlook and its repercussions on domestic activity, the balance of payments for 2009 was bleak. Tourism receipts and export proceeds remained under severe pressure owing to persistence of recessionary conditions in almost all advanced economies and the main export markets of Mauritius. Inflows of foreign direct investment are expected to slow down while outflows of portfolio investment persisted in 2009 against the backdrop of heightened risk aversion among global investors, persistent credit strains and lower domestic growth. In sum, risks of continued high trade and current account deficit remained for 2009, implying downward pressures on the exchange rate of the rupee and the level of foreign reserves.

POLICY RESPONSE TO THE CRISIS

Since early May 2008, Mauritius has been taking measures to cushion the economy from the risks of deterioration in the world economy. The main policy measures taken since May 2008 are as given in the table below.

DATE	POLICY MEASURES ADOPTED AND IMPLEMENTED
May 2008	Allocation of Rs. 6 billion [$200 M] for investment in airport expansion & creation of 6 funds to realize the Maurice Ile Durable vision, build food security, boost education and knowledge, eradicate poverty and widen the circle of opportunities, improve local infrastructure, carry social housing commitment & sharpen the competitiveness of domestic oriented industries and SMEs.
June 2008	The 2008/2009 Budget voted an amount of Rs. 1.8 billion [$430 M] for contingencies to cater for any additional injection required to support public spending and demand.
July 2008	Full implementation of the recommendations of the Pay Research Bureau on review of salaries and conditions of employment in the civil service thus injecting an additional amount of Rs 1.5 billion [$50 M] in the economy.
October 2008	☐ Reduction in Repo Rate by 50 basis points from 8.25 to 7.75 ☐ Reduction in Cash Reserve Ratio (CRR) from 5% to 4.5 % ☐ Reduction in the minimum CRR on any particular day from 4% to 3% ☐ Introduction of a Special Foreign Currency Line of Credit by the Bank of Mauritius aggregating $125 M so as to assist banks encountering difficulties due to non-availability or inadequacy of foreign exchange facilities from usual sources. ☐ Review of the Automatic Price Mechanism (APM) to enable monthly, instead of quarterly, review of petroleum prices so that local retail price aligned with international prices of petroleum products.
December 2008	Presentation of Additional Stimulus Package (ASP) amounting to Rs 10.4 billion [$350 M] to be spent through 2009 and 2010, basically on major capital projects with focus on fast-tracking and frontloading of existing public infrastructure projects, new investments in public infrastructure, accelerating private sector investment, improving business climate, building human resource capacity, and supporting vulnerable sectors such as the SMEs, export oriented & manufacturing and tourism. Setting up of Special Committees to fast track implementation of the Additional Stimulus Package and to unlock private investment. Reduction of the Repo Rate by 100 basis points from 7.75 to 6.75
March 2009	Reduction in the Repo Rate by 100 basis points from 6.75 to 5.75
May 2009	Presentation of new budget built on the Additional Stimulus Package to ride out the global crisis. Some measures to enhance competitiveness and focusing on saving jobs, protecting people, and preparing for recovery are as follows: ☐ Injecting an additional Rs 2 billion in the Saving Jobs and Recovery Fund (SJR FUND), to provide for a new micro-enterprise financing scheme for women to be operated by the National Empowerment Foundation in collaboration with the Ministry of Women

DATE	POLICY MEASURES ADOPTED AND IMPLEMENTED
	and the Mauritius Post and Cooperative Bank. ☐ Rescheduling of loans by the Development Bank of Mauritius for SMEs which were servicing their loans prior to the crisis in September 2008 but then faced cash flow problems. ☐ Setting up an Emergency Export Credit Insurance scheme for SMEs as well as large enterprises in all sectors until December 2010 ☐ Operating a scheme to assist small hotels and restaurants to improve, and enhance productivity and competitiveness under the SJR Fund. ☐ Setting up of the Mauritius Business Growth Scheme (MBGS) - to promote business growth in SMEs. Eligible firms will receive financing to support their business growth on a cost-sharing basis ☐ Introducing a mentoring service by National Empowerment Foundation to ensure sustainability of small businesses initiated mostly by women ☐ Under the Food Security Fund, introduction of a Food Crop Insurance Scheme for small food crop planters, a Seed Potato Purchase Scheme to encourage the production of potatoes by small planters and an Onion Seed Purchase Scheme. ☐ Reduction of Ministers' salary by Rs 10, 000 per month (July 2009 to Dec 2010) ☐ Earmarking Rs 100 million from the MID Fund to co-finance a Rs 280 million programme with the CEB, CWA and WMA (utility agencies) to clean up the social housing estates and rehabilitate the water, electricity and wastewater infrastructure ☐ Increase old age, non-contributory pensions and social aid benefits by 5.1 % ☐ Payment of compensation of 5.1% for the lowest income band while at the time broadening the band.
Sept 2009	The key Repo Rate was maintained at 5.75 per cent per annum
November 2009	The Budget 2010 presented on 18 November 2010 provides for policies for shaping recover, consolidating social progress and sustaining green Mauritius. - The measures, inter-alia, include, intensifying efforts to consolidate the traditional and emerging economic pillars, so as to open business opportunities and further stimulate job creation, in particular for women, continue improving the doing business environment to increase investment; investing in human resource development, science, technology and innovation to build the competitive competence that Mauritius needs to be among the fast globalisers; accelerating plan to build the infrastructure of tomorrow. - On the social front, the 2010 budget provides for additional effort towards eradication of absolute poverty, provision for every family with a decent dwelling, delivering more and better health care, giving more social protection to our children and women, preparing for the challenges of an ageing population and ramping up support for our seniors and consolidating the progress made in giving greater access to education, from pre-primary to tertiary levels. - In regard to the Additional Stimulus Package (ASP), Government policies have been instrumental in dealing with the crisis in terms of saving jobs, preventing closures of firms and protecting people. However, given the current international economic context, the exit strategy needs to be carefully managed. Accordingly government has decided to maintain the Additional Stimulus Measures until December 2010 including the funds committed for a

DATE	POLICY MEASURES ADOPTED AND IMPLEMENTED
	stimulus package for Rodrigues.
December 2009	The key Repo Rate was maintained at 5.75 per cent per annum

MAURICE ILE DURABLE (MID)

Since 2007, the Prime Minister has announced his vision of making Mauritius a Sustainable Island – 'Maurice Ile Durable: MID'. Initially, the concept was meant to enable the country to achieve energy independence, but has gradually expanded in scope. National consultations are under way to define its vision so as to enable the development of an MID Policy and Strategy.

Mauritius is highly dependent on imported fossil fuels. The whole of transportation fuel is imported, while only 19% of electricity is produced from renewable sources (81% is produced from coal and heavy oil) . The share of energy imports on national accounts is very significant, especially as fuel prices rises. Imported fossil fuels in 2008 accounted for 81.2% of Mauritius' total primary energy requirement while locally available sources that are renewables, supplied the remaining 18.8%. Due to increases in the prices of petroleum products and coal, the import bill in 2008 went up by 28.0% to reach Rs 27,6 billion from Rs 21,6 billion in 2007. In fact the net cost for the country's imports of fossil fuels has been multiplied by nearly three in five years, from Rs 9.7 billion in 2004 to 27.6 billion in 2008.

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 particularly 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.

FOOD SECURITY

Mauritius, on account of its limited land, absence of economies of scale and agronomic characteristics, is compelled to import most of its essential food items, 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. As a result, Mauritius imports 77% of all its food requirements, a vulnerability which has been further exacerbated by the exponential rise in global food prices these past years. The net import bill for our country has more than trebled between 2001 to 2008, rising from Rs 8.4 billion in 2001 to Rs 27,485.4 billion in 2008.

Being a Net-Food Importing Developing Country (NFIDC) and a Small Island Developing State (SIDS), 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.

In Mauritius, almost 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 the country's needs in total annual supply of fruits. Further agro-industrial diversification is hindered by continuing over-dependence on imported raw materials. Mauritius imports around Rs 18 billion ($ 600 million) worth of food commodities annually, which constitute 18% of our imports. To reduce our dependence on food imports, a series of programmes have been initiated 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.

Mauritius is actively promoting the concept of Cross-Border Investment Initiatives, using the region as a food production base. Local entrepreneurs are starting to invest in neighbouring countries, in Madagascar & Mozambique for the time being. Investors' fora have been organized to promote such investment. Donor support and technical assistance from international organizations can boost this initiative towards regional food security through appropriate financing schemes to fund private sector initiatives.

In a country with 1.9 million km2 of Exclusive Economic Zone (EEZ), fish represents a huge potential to reduce food insecurity for the region. The development of a seafood hub is a new pillar of our economy and would enable Mauritius to maximize benefits from the fishing activities and processing through value-addition.

The setting up of a Rs. 1 billion ($33 million) Food Security Fund for the period 2008-2011 is dictated by our commitment to transform the food crisis into an opportunity for farmers and to build resilience in order to reduce dependency on imports. The sum is split between Mauritius and Rodrigues, Rs 813 M and Rs 187 M respectively.

Such a policy will require heavy investments for a sustained agricultural growth with a view to addressing some immediate food needs of the population. Food insecurity may aggravate with climate change, in

particular with extreme weather events, warmer spells, erratic rainfall and pest resurgence. 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.

CIRCULAR MIGRATION

Circular migration is widening the scope of opportunities for our workers to work abroad, save money and come back to start a small business or invest in other economic activities. This programme will thus enhance capacity-building and impact directly on the development of Mauritius through increased flow of remittances to the families in Mauritius, uplift the standard of living of households and the creation of additional employment opportunities in upcoming SMEs.

To date, some 200 workers have taken employment in Canada under this scheme. In September 2008, the Government of Mauritius signed a Bilateral Agreement on Circular Migration with France. Under this agreement, Mauritian workers will be allowed to go and work in France for a specific period, gain experience, save money before returning to Mauritius to find employment in new sectors of the economy or set up their own SMEs.

BUSINESS FACILITATION

Mauritius through its Business Facilitation strategy, has just recently been ranked 1st in Africa in the World Bank Annual Doing Business Survey for the second year running.

The Business Facilitation (Miscellaneous Provisions) Act 2006 provides for a new legal framework that would allow businesses to start operations on the basis of self-adherence to comprehensive and clear guidelines and for the authorities to exercise ex-post control to check for compliance. It also aims at facilitating entry of foreign investors as well as attracting foreign talents, know how, ideas and technology.

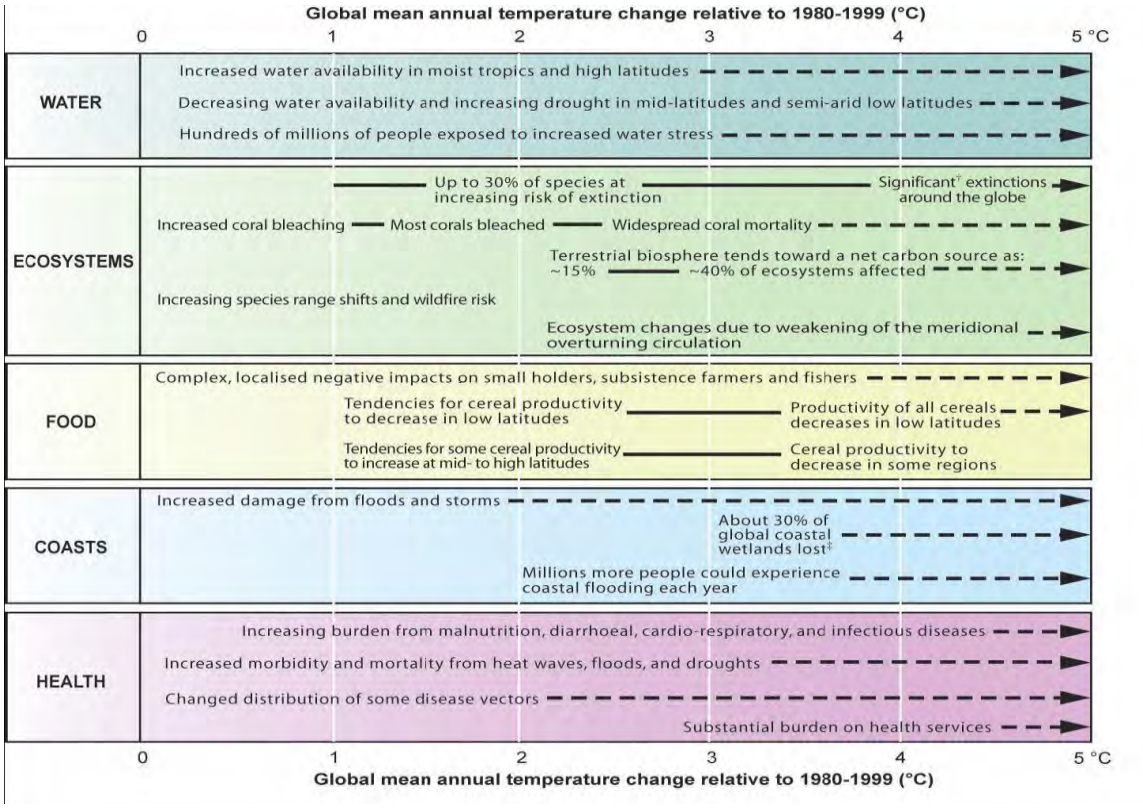
The salient business facilitation measures taken since 2006 are:

Starting a business	• Processing time reduced from 46 to 6 days • Focus on movement of data instead of people
Licences and Permit	• Rationalisation of classified trade • Single Building and Land Use permit introduced • Abolition of Trade Licence
Employing workers	• New labour legislations, increasing the flexibility of the labour market and enhancing the employability of workers
Registering Property	• Reduced registration duty on transfer of immovable property (from 10 to 5%) • Time limit to register title deed set at 15 days
Getting credit	• Setting up of private credit information bureaus as well as credit rating agencies
Paying taxes	• Harmonized 15% corporate and personal tax rate
Enforcing contracts	• Dedicated commercial court for rapid settlement/conclusion of commercial cases
Closing a business	• New Insolvency Act (June 2009), simplifying procedusre whilst safeguarding the rights of parties concerned.
Acquiring Property	• Foreign nationals eligible for business purposes
Import and Export Permits	• Streamlining of processes for granting of permits
Business Licensing Reform	• Simplification of licensing systems in 4 ministries (Finance, Health, Tourism and AgroIndustry)
E-platform	• Currently informatiove function, but expected to allow on line application and processing shortly
Extension of DTA and IPPA networks	• 36 Double Taxation Avoidance Agreements (DTAAs) and 35 Investment Promotion &Protection Agreements (IPPAs) signed with other countries

CLIMATE CHANGE

With the state-of-play in climate change negotiations and the current trend in continuing emissions of greenhouse gases (GHG), the global average temperature is expected to increase by about 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 taken into account the melting of glaciers.

Table 1: Summary of key impacts of climate change on various socio-economic sectors[1]



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

Model simulation for the Indian Ocean gives a temperature increase in the range of 0.51°C to 3.77°C and sea level rise between 18 and 59 cm by 2100. The associated impacts on our agriculture, water availability, food security, energy balance, infrastructure especially coastal ones and all walks of our economy has not yet been assessed. The cost of adaptation measures has also not yet been quantified.

MAURITIUS STRATEGY

The Mauritius Strategy for the Further Implementation of the Barbados Programme of Action for the Sustainable Development of Small Island Developing States (MSI) was negotiated in January 2005 and was adopted by the UN General Assembly.

The MSI recognises the specific vulnerabilities of SIDS and proposes measures to be taken by SIDS, the UN system and Development Partners in order to address the development concerns of SIDS, build their resilience, facilitate their integration into the world economy, reduce poverty and improve the quality of life of their citizens whilst giving due regard to the carrying capacity of their island ecosystems.

Since 2005, Mauritius has been very committed in implementing the MSI at the domestic level as well as in advocating the cause of SIDS in the region and at the wider multilateral level. Whether in the UN, at the level of the WTO or the Bretton Woods institutions, in the Climate Change negotiations, or in bilateral and regional instances, Mauritius has continuously reiterated the case for special vehicles for aid and support to be channelled in a timely and effective manner to SIDS.

The following chapters recapitulate initiatives taken by Mauritius to pursue sustainable development goals, in a thematic perspective. The analysis of progress made, and constraints encountered at the national level, provides an indication of the inadequacy of external support as well as the need for the fulfilment of pledges by developed countries.

CHAPTER 1: CLIMATE CHANGE & SEA LEVEL RISE

Ban Ki-moon – Secretary-General of the United Nations
Climate Change Science Compendium 2009

"The science has become more irrevocable than ever: Climate change is happening. The evidence is all around us. And unless we act, we will see catastrophic consequences including rising sea levels, droughts and famine, and the loss of up to a third of the world's plant and animal species."

Chapter 1: Climate Change & Sea Level Rise

INTRODUCTION:

The present and future detrimental impacts of climate change on Small Island Developing States (SIDS) are now established facts, and the situation seems to be irreversible for a number of SIDS with topographies just above sea level. In Mauritius, meteorological records clearly indicate the increase of average temperatures, rising sea levels, intermittent heavy rainfall causing flash floods and climate variability that deviate from past patterns.

Increasing temperatures and their effects on ecological systems are already palpable. Analyses of temperature trends recorded in Mauritius and its outer islands show a definite warming of 0.74 to 1.2°C when compared to the 1961-1990 long term mean. At some urban stations, temperature has risen by even greater amounts. Similar warming trends have also been observed at the outer islands of Rodrigues, St Brandon and Agalega.

> Mauritius was the first country to sign the United Nations Framework Convention on Climate Change (UNFCCC) on 10 June 1992 and acceded to the Kyoto Protocol on 9 May 2001.

Some other observed impacts of a warming climate include:

- Temperature
  - Increase in the annual number of hot days and warm nights.
  - Slightly greater increase in night minimum temperature than day maximum temperature at various locations over the island.

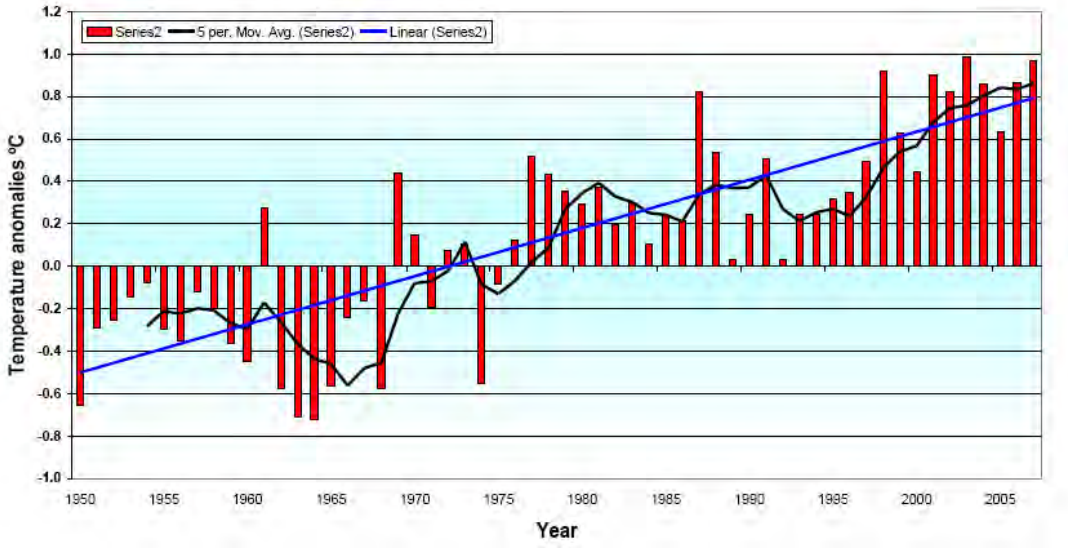


Figure 1.1: Mean annual temperature variation in Plaisance (Source: Meteorological Services, March 2009)

Rainfall

- Decreasing trend in annual rainfall of around 8% over Mauritius since the 1950s.
- Decrease in annual rainfall over the outer islands, but more significant on the mainland.
- Lengthening of the intermediate dry season and shift in the onset of summer rains.
- Increasing number of consecutive dry days and decreasing number of rainy days.

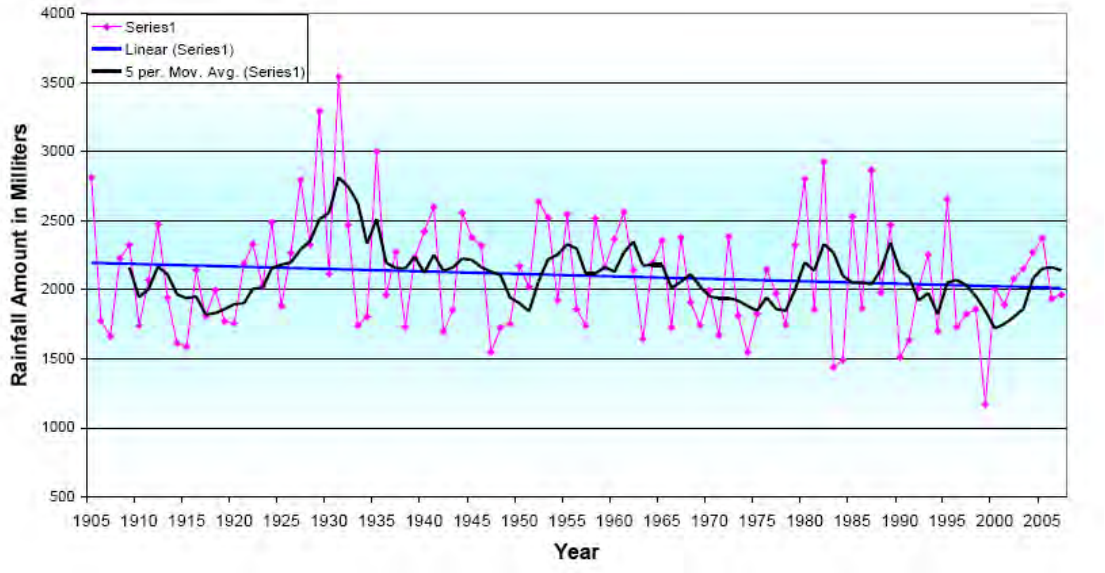


Figure 1.2: Mean annual rainfall over Mauritius (1905 - 2007)
(Source: Meteorological Services, March 2009)

Extreme Weather Events

- Increase in the frequency of extreme weather events, heavy rains and storms.
- Explosive intensification of cyclones.

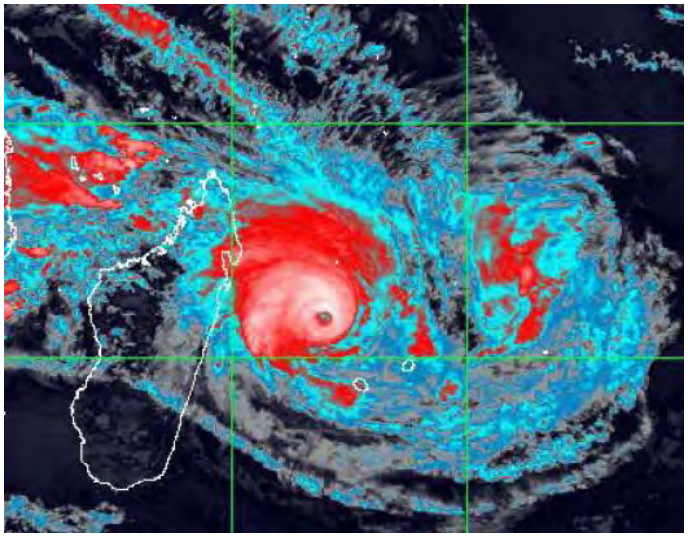


Figure 1.3: Intense Tropical Cyclone on 25 February 2007
(*Source*: Natural Disasters affecting the Republic of Mauritius, Meteorological Services, January 2009)

Sea Level Rise

- Rise in sea levels in the south-west Indian Ocean by around 1.5 mm/yr at Port Louis and 1.3 mm/yr at Rodrigues.
- Sea level has been rising by around 2.1 mm/yr at Port Louis from tide gauge records at Trou Fanfaron over the last 10 years.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Since the Mauritius Meeting in 2005, multisectoral assessments have been conducted to identify appropriate climate change adaptation and mitigation measures. While some are currently being implemented, others are in the pipeline. To meet the objectives under the UNFCCC, the National Capacity Needs Self-Assessment and the Stocktaking and Stakeholder consultation reports have been published. The Second National Communication is well under way.

Furthermore, following the 2008-2009 budget, Government has embarked on the "Maurice Ile Durable" programme. Steered under the aegis Ministry of Renewable Energy and Public Utilities, this programme outlines the vision of Government towards protecting the environment, building energy independency, promoting recycling and hence allowing Mauritius do its share in the fight against global warming and climate change. In the 2008 – 2009 budget, the MID Fund has been established and 1.3 billion rupees (around $4 million USD) has been allocated to stimulate the integration of environmental and climate change considerations into new development strategies. A number of studies, projects, programmes and actions are being undertaken to achieve energy efficiency, optimise energy consumption, minimise Greenhouse gas (GHG) emissions, improve climate change and sea level rise monitoring and sensitise the population.

Monitoring of Climate Change and Sea Level Rise

Climate change and sea level rise monitoring have been enhanced in the following ways:

- The network of automatic weather stations has been increased from 16 stations in 2005 to 21 stations in 2009.
- Two new tide gauges have been installed – one at Blue Bay (in January 2009) and one on the outer island Agalega (in December 2008).
- Sea surface temperature is being monitored in the southeast of the island as well as from ship reports in the Indian Ocean

Reducing GHG Emissions

Energy Efficiency & Conservation

- Government is encouraging innovation by households as well as businesses to produce electricity using renewable energy technologies. For instance, Small Independent Power Producers (SIPPs) with capacity below 400 KW will be allowed to feed into the grid of the national power utility

the Central Electricity Board (CEB). To this end, a new grid code will be prepared to guarantee all SIPPs that CEB will buy their renewable energy at a premium rate.

- The Central Electricity Board (CEB) has phased out less efficient generating units and is planning massive investments in renewable energy sources, namely wind and solar.

- The Maurice Ile Durable Fund is financing the replacement of 15,468 street lightings in rural and urban roads to the tune of 15 million rupees. It is projected that such changes will lead to a monthly saving of 1.4 million rupees on electricity charges. Similarly, all conventional lightings in public buildings, schools and hospitals will be replaced by compact lighting systems in order to achieve energy saving and efficiency.

- 300,000 households have replaced 1 million conventional light bulbs with Compact Fluorescent Lamps (CFL). It is estimated that energy demand will decrease by 12 million KWh per year, save 52 million rupees per year in fossil fuels and reduce CO_2 emission by 26,000 metric tonnes. This project was implemented by the CEB in association with Pioneer Carbon which contributed 50% of the cost from Carbon Credits. The MID Fund also supported the project with an initial grant of up to Rs. 20 million (around $ 660 million).

Investment in Renewable Energy

WIND ENERGY

- Five wind turbines have already been installed in Rodrigues (i.e. 3x60 KWh and 2x275 KWh). Furthermore, two additional 275 KWh turbines will soon be operational, representing more than 10% electricity generation from wind power on Rodrigues Island.
- A wind park of 25 MW at Curepipe Point, representing 3% of total power consumption is concretely scheduled for implementation shortly.
- The private sector has shown interest in the setting up of a wind farm in the south of the island.

HYDROPOWER

- One more hydropower unit is nearing completion at Trente Chutes along the La Nicolière Feeder Canal. The hydro turbine will produce 2 GWh energy per year, allow for the saving of 6 million rupees per year on fossil fuels and reducing CO_2 emissions by 2300 metric tonnes annually.

LANDFILL GAS

- Government has embarked on a project for developing the Landfill Gas potential at Mare Chicose Sanitary Landfill with a view to using the gas for power generation. This project is expected to reduce GHGs, which would enable it to derive carbon credits as provided for under the Clean Development Mechanism of the Kyoto Protocol.

BAGASSE OPTIMIZATION

- Bagasse supplies around 17% of national electricity production in two co-generation power plants.

SOLAR ENERGY

- In 2009, Government introduced a scheme to promote the use of solar water heaters. A grant of 10,000 rupees was provided to households for the purchase solar water heaters. The MID fund disbursed Rs 290 million (about $ 10 million) for the sale of 29,000 solar water heaters. Concurrently, the Development Bank of Mauritius is providing a soft loan for the purchase of solar water heaters. Following the outstanding success of the initial programme, Government is now proposing to provide a subsidy of 5,000 rupees per solar water heater for 50,000 additional households until December 2010.

Adaptation to climate change

AGRICULTURE

- Commissioning of Midlands Dam for irrigation of the northern plains.
- Cultivation of drought resistant cultivars and trash blanketing of sugarcane fields.
- Investment in hydroponics, protected cultures.
- Improved livestock housing.

COASTAL ZONE

- Coral reefs are closely monitored.
- Coral regeneration and artificial coral growth projects are ongoing as well as mangrove plantation in risk areas.
- Coastal protection works (beach erosion, rock revetment, creation of parking spaces to prevent trampling, etc.) are being carried out in areas affected by erosion.
- Some 4000 m of coastal rehabilitation works have been carried out around the island for example at Belle Mare (1000 m), Flic en Flac (700 m), Rivière des Galets (450 m), Bain des Dames (100 m) and Trou aux Biches (125 m).

Coastal Rehabilitation Works at Rivière des Galets

Before

After

LAND USE CHANGE & FORESTRY

- Ongoing reforestation programme by the Forestry Service as well as tree planting campaigns by the Ministry of Environment & NDU.
- New forest policy for sustainable forest management and promoting soil conservation.
- Proclamation of nature reserves.

WATER RESOURCES

- An integrated plan for water resources development up to year 2040 has been prepared.
- Surface water storage has been increased and new projects in pipeline include construction of dams at Bagatelle and Rivière des Anguilles.
- Existing storage dams and feeder/irrigation canals have been rehabilitated to minimize seepage losses.
- Capacity of potable water treatment plants has been extended.
- Ongoing public awareness campaigns on water saving.

Sensitisation and Awareness Raising

- Regular sensitisation and awareness campaigns aimed at various target groups (children, youth, women, businesses, general public, etc.) are carried out. These are supported by the publication of resource materials such as posters, pamphlets and web posts. Additionally, there are regular programmes on television and radio to sensitise the general public.
- Since the past three years, World Environment Day has been celebrated at national level around UNEP's climate change themes. These have been marked by exhibitions, seminars, film shows and island-wide tree planting campaigns.

LESSONS LEARNT AND GOOD PRACTICES:

Climate change is still a relatively new area and its impact on the various socio-economic sectors is being gradually understood now. However, to build resilience in the nation, efforts are being made across all sectors as to its integration in strategies and development plans, as well as in primary, secondary and tertiary curricula amongst others.

Furthermore, the long term vision "Maurice Ile Durable" clearly shows the commitment and willingness of Government to reduce our dependency on fossil fuels, mitigate GHG through the Energy Efficiency policies and adopting renewable sources of energy. Additionally, climate change adaptation projects have been identified, but needs financial resources to their implementation.

In this regard, the Ministry of Environment and NDU is in the process of setting up a Climate Change Unit, which will be responsible for:

- The development of short and long term plans to manage climate change in an integrated manner at the local and national levels;
- The development of a national climate change adaptation programme and will assist in the leveraging of funds for its implementation;
- Building a national and integrated national mitigation policy and an implementation programme;

The new unit will also act as National Implementing Entity for the Adaptation Fund under the Kyoto Protocol in order to enable access to funding from the Fund and will liaise with international organizations for cooperative action in addressing climate change issues.

EFFECTIVENESS OF IMPLEMENTATION:

The major reform programme in which Government embarked includes implementation of Programme Based Budgeting (PBB) as well as the Medium Term Expenditure Framework (MTEF). In doing so, clearly defined targets for climate change will be a requisite. As a result, it is expected that climate change mitigation and adaptation projects will be run in a more efficient manner in a system which focuses on objectives, results and performance.

Furthermore, the MID Fund is providing a new impetus with regard to the global climate challenge, namely through investment in renewable energies, especially local sources of energy; special schemes for small scale electricity production using renewable energy; the provision of energy management programmes via networking with local and international partners as well as by aggressive sensitisation and awareness programmes.

SPECIAL CONSTRAINTS AND CHALLENGES:

The main constraint in the implementation of adaptation and mitigation programmes is the scarcity of financial and trained human resources in addition to efficient coordination between central and local government. Like all SIDS, adaptation to climate change remains a significant challenge, requiring massive investments as well as the adequate capacities to deal with emerging challenges and impacts of climate change.

Other sector specific challenges encountered are as follows:

ENERGY

- Mauritius is heavily dependent on fossil fuel and the currently operational power systems are small.
- Investment in renewable energy is still cost prohibitive
- As an island, there is no interconnection of grid with other countries.

AGRICULTURE

- There is a need for further research to assess the effect of CO_2 on crop production.
- Most of climate change projections are from Global Climate Models (GCM); thus a proper downscaling from GCM models to island scale is essential.

LAND USE AND FORESTRY

- In Mauritius, forests are either state or private owned and there only 1.7% of native forests is left. There is a lack of data on the evolution of these forests, tree densities, species, biomass accumulation, regeneration and degradation with regard to privately owned forests.

COASTAL ZONE

- There is no systematic data collection with respect to the evolution of the coastal zone. The need for quality, long time series of data is imperative for improved coastal zone management. (more details in chapter 4)

WATER RESOURCES

- Mauritius is a water stressed country and up till now, climate change issues have not been fully integrated in water resources development plans. (more details in chapter 5)

RECENT TRENDS AND EMERGING ISSUES:

The recent food, energy and financial crises together with several extreme weather events related to climate change have affected the socio-economic status of the people. However, these crises have also presented opportunities for government to give additional impetus to the renewable energy sector including energy savings, diversification in agriculture, introduction of hybrid and electric cars, the promotion of sustainable consumption and lifestyles and other similar sustainable development projects.

As part of the emerging land based oceanic industry, deep sea water will be used for the providing air-conditioning in data centres to be developed in the west of Mauritius.

CONCLUSION AND WAY FORWARD:

Currently, there is strong political will regarding climate change issues. The "Maurice Ile Durable" vision outlines Government's commitment to making Mauritius less dependent on fossil fuels. The general public and businesses are also gradually becoming more aware of the impacts of climate change and climate variability.

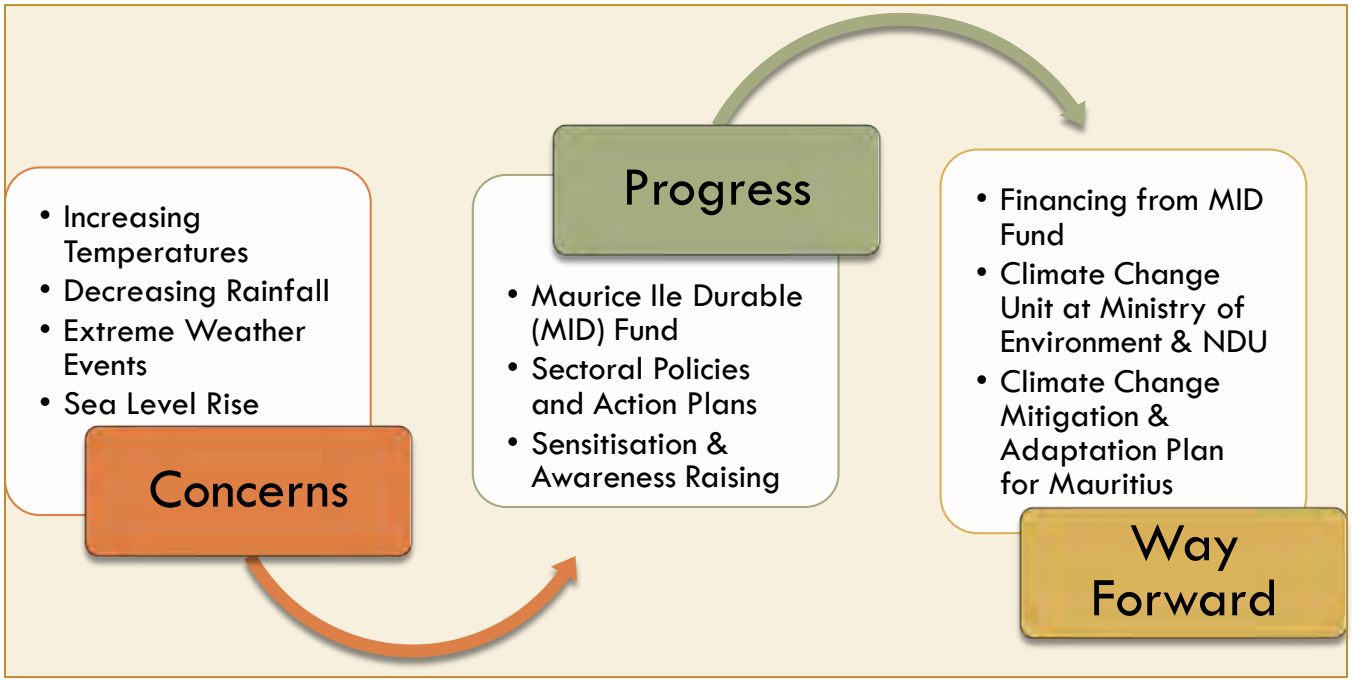
The MID Fund established in June 2008, acts as umbrella for issues pertaining to finance mechanisms for the preservation of local natural resources, for the promotion of renewable energies, including the use of local renewable sources, the encouragement of waste minimisation and recycling, and for public-private partnerships as well as local and international networking for the promotion of renewable energies, energy conservation and efficiency.

Under the Africa Adaptation Programme, the Government of Japan is assisting Mauritius in integrating and mainstreaming climate change adaptation considerations into national development policy, strategies, and plans. Around $ 3 million USD have been earmarked for this project, which will be implemented in 2010. At the end of this two-year project it is expected that:

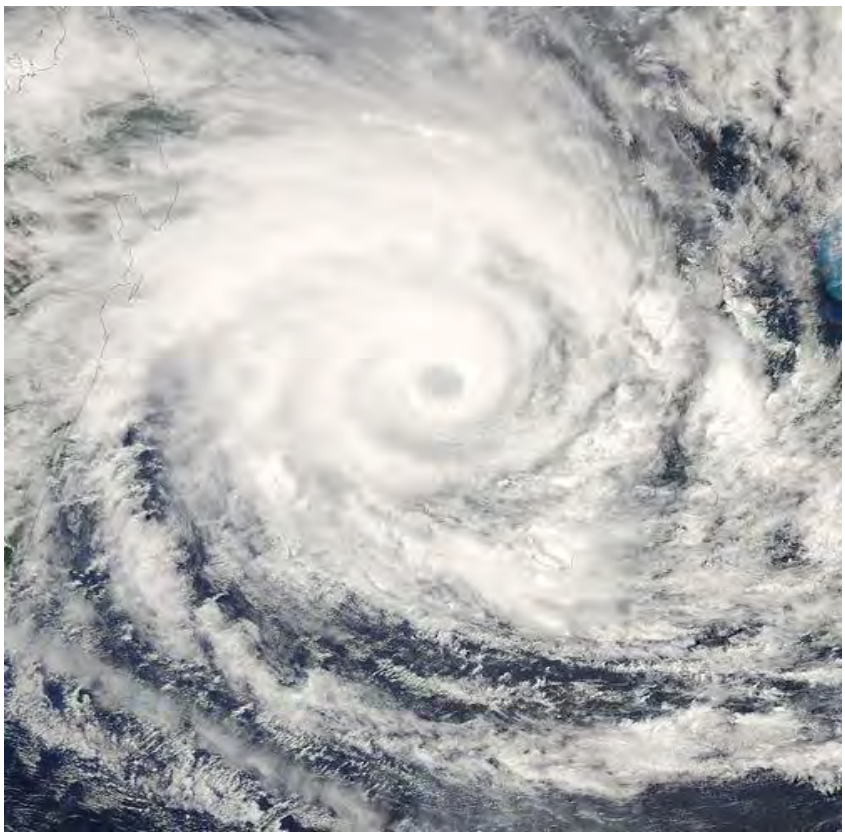
- ☐ Long term planning mechanisms to manage climate change uncertainties will be introduced.
- ☐ Leadership capacities and institutional frameworks to manage climate change risks and opportunities will be strengthened.
- ☐ Climate-resilient policies and measures will be implemented in priority sectors.
- ☐ Financing options to meet national adaptation costs will be met.
- ☐ Knowledge on adjusting national development processes to fully incorporate climate change risks and opportunities will be strengthened and shared.

On a concluding note, Mauritius is taking bold measures by integrating climate change issues into new development strategies and making concrete efforts to mitigate GHGs emissions and adapt to the impacts of climate change.

SUMMARY:



CHAPTER 2: NATURAL & ENVIRONMENTAL DISASTERS



Cyclone Gamède, February 2007 (Source: NASA)

Disasters and Conflicts –
United Nations Environment Programme Priority Area

"Since the start of the new millennium, the world has witnessed over 35 major conflicts and some 2,500 disasters. Over two billion people have been affected and millions have lost their lives."

Chapter 2: Natural & Environmental Disasters

INTRODUCTION

Located in the tropics, the Republic of Mauritius is exposed to a number of natural disasters such as cyclones, tidal surge and torrential rains thus commonly causing calamities, flash floods and landslides. However, the impacts brought about by such natural disasters have generally been reversible. Mauritius has acquired vast experience in dealing with cyclones, in particular. The Government's central committee dealing with cyclones, floods and other natural disasters has been an effective national platform which has ensured risks reductions, rescue and relief operations.

In contrast, Mauritius has so far not experienced major environmental disasters such as oil spills from petroleum tankers or improper disposal of hazardous chemical and wastes. Most spills were minor ones and occurred from inland sources and activities. Mauritius experienced its first recorded influx of tar balls along its eastern coast in the late 1970's. This incident triggered the first steps of an oil spill contingency planning, namely a Coastal Sensitivity Atlas published in 1989 with the support of the International Maritime Organisation and UNEP. This has evolved to the present National Oil Spill Contingency (NOSCP) which can cope with minor spills. Regional and international support is required for large scale spills and the mechanisms for such assistance are available through conventions and regional cooperation.

Natural Disasters include:

- Cyclones
  - Tropical cyclones usually occur in summer months which span from November to May. Whenever a cyclone comes within 100 km of Mauritius gusts of the order of 120 km/h or more are likely to be felt and are often accompanied by heavy rains.
  - The warning system used in Mauritius takes into consideration the degree of risk of gusts exceeding 120 km/h and the time factor before the advent of such gusts. The threshold value of 120 km/h represents the speed at which appreciable damage to structures may start to occur. The system essentially consists of a numbered series of cyclone bulletins and a summary statement of the class of warning in force. There are four classes of warnings numbering from 1 to 4 and these are issued by the Mauritius Meteorological Services so as to give ample lead time for necessary precautions to be taken.

- Torrential rains
  - Torrential rains are likely to occur when an active convective cloud system influences Mauritius or Rodrigues. Torrential rain conditions is said to exist when the prevailing weather in Mauritius or Rodrigues produces 100 millimetres of widespread rains in less than 12 hours and this heavy rain is likely to continue for several hours.

- Torrential rain can cause flash floods and water accumulations in flood prone areas. They may also be responsible for the overflow of rivers and is likely to cause landslide in high-risk areas.

Flooding of coastal road

Road damaged due to torrential rains

Landslides

- Locally, the main factors causing landslides are the instability of slopes, geomorphology and pore-water conditions.

Tidal surge

- These are long period waves that may cause water rise at high tide, thus flooding coastal areas.

Tsunami

Mauritius and Rodrigues have lead-time of 5-7 hours before tsunami waves are likely to reach their coasts from either the Sumatra or the Makran source. The Tsunami Warning System in Mauritius has taken into consideration the degree of risk as well as the time factor.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS

The Republic of Mauritius has a robust Early Warning System within the Cyclone and Other Natural Disaster Scheme which includes a preparedness plan for disaster risk reduction. The Scheme has defined the Emergency Operation Plan for any hazard likely to threaten Mauritius and/or Outer Islands with clear response and rehabilitation measures by the relevant authorities. Education and public awareness at community level has also been well established.

- The Central Cyclone and Other Natural Disasters Committee, representing all key stakeholders, is convened in the first fortnight of October each year to review and make necessary amendments to the Cyclone Emergency Scheme. The Cyclone Emergency Organisation provides for a high degree of decentralisation with active participation of the population at community level. The institutional set up has been improved with clearly defined roles of agencies involved in preparedness and response.

- The Torrential Rain Emergency Scheme has been strengthen to ensure greater security to school children. A flash flood risk map has been prepared and local community are being educated to know those vulnerable areas. As soon as the Meteorological Services registers 100 mm of rain in a period of 12 hours, it issues regular warnings that are broadcasted at regular interval through the television and private radio stations.

- A Landslide Emergency Scheme is now operational. Risk areas have been identified and a programme to install rain gauges to monitor rainfall in these areas is ongoing. The landslide warning and evacuation system consists of five stages namely, preparatory, warning, evacuation, emergency and termination.

- The Tsunami Emergency Scheme is also operational. A seismometer has been installed at Vacoas and another one will be shortly installed at Rodrigues. Tide gauges to monitor sea level installed at Agalega and Blue Bay now complement the existing ones at Port Louis (Mauritius) and Port Mathurin (Rodrigues). The Meteorological Services is equipped to monitor tsunami waves through a network of tide gauge stations. A new wave rider was recently launched off Blue Bay to monitor wave heights and issue timely warning in the event of tidal surge. Whenever there is a risk of tidal surge, the Meteorological Services issues special warning bulletin through the radio and television.

The tsunami warning system consists of:

1. **Tsunami watch**: This bulletin implies that a strong earthquake, generally of the magnitude greater than or equal to 7.0 on the Richter Scale, has occurred in a region adjacent to the Indian Ocean and the likelihood of a tsunami being generated is evoked. The bulletin is issued as a means of providing an advance alert to areas that could be impacted by destructive tsunami waves.
2. **Tsunami warning**: This bulletin confirms that a destructive tsunami will affect Mauritius/Rodrigues within the next 5-7 hours. In case the incident point is closer to Mauritius/Rodrigues, the lead-time will be correspondingly lesser. Plan for the evacuation of vulnerable coastal areas will be implemented.
3. **Termination**: This bulletin will be issued after information from Meteorological Services, the Police, Fisheries post, Environment Officials, observations from tide gauges at Port Louis and Port Mathurin and general sea state observation confirm that significant tsunami waves are no longer being noted.

Environmental disasters:

Oil Spill

- The potential risks of oil spills in the Western Indian Ocean Region and in particular the Mauritian waters are high, as it is estimated that over 30% of the world's petroleum is transported through these waters. Local coastal environmental features such as sandy beaches, translucent lagoons and rich corals reefs which are the essential component that generate income through tourism and fisheries for the country are potentially at risk in case of an eventual oil spill. Mauritius has developed a National Oil Spill Contingency Plan (NOSCP), which provides the organisational structure and procedures for preparedness and response during and after oil spills. The NOSCP was approved by the Cabinet in February 2003 and is presently being reviewed. Oil spill planning and response is coordinated by the Ministry of Environment.

Oil Spill Contingency Plans

1. The National Oil Spill Contingency Plan
2. South Western Indian Ocean Sub-Regional Oil Spill Contingency Plan, comprising Mauritius, Madagascar, Seychelles, Comoros and France (Reunion Island)
3. The Port Louis Harbour Oil Spill Contingency Plan
4. Oil Spill Contingency Plans of the respective petroleum companies at the level of their offloading, bunkering and inland transportation operations
5. Individual contingency plans (for both oil and other spill risks) as required by the Director of Environment for certain activities.

- In terms of response measures, a set of essential combat equipment are available locally at the National Coast Guard, Special Mobile Force and Mauritius Ports Authority. Oil spill exercises are organised on a yearly basis, to train oil spill combat personnel in their emergency roles and to test the NOSCP and its procedures. The NOSCP provides for response to Tier 1 spills (i.e spills of less than 10 metric tonnes). However, for oil spills of the order of greater than 10 metric tonnes, the NOSCP provides for seeking regional assistances from other Indian Ocean member states and international organisations such as the International Maritime Organisation. In such circumstances, the South Western Indian Ocean Sub-Regional Oil Spill Contingency Plan will be activated.

- To disseminate appropriate information available to oil spill response personnel on site, a new oil spill pocket book has been published and mini CD containing soft copies of the relevant oil spill response and combat documents has been produced. The oil spill pocket book summarises all necessary operational information from the national and regional oil spill contingency plans. It is designed to provide all necessary operational information in the event of an oil spill.

- Since 2005, most oil spills albeit minor ones occurred from inland sources and activities. The most recent cases involved a Tier 1 (or less than 10 tonnes) oil spill due to the overflow of a heavy fuel oil tank on the premises of the Central Electricity Board and an accidental leakage of 8 tonnes of heavy

fuel oil through a broken pipe at a textile factory at Ile d'Ambre. In both cases, timely and appropriate measures were taken to mitigate the impacts and restore the situation to normal.

Oil spill at GRNW, May 2005

Placement of oil sill combat equipment (boom) to contain oil spill at Ile D'Ambre, December 2006

Chemical Spills

A number of isolated environmental emergencies have been dealt with by the Department of Environment or through its coordination mechanism along with other enforcing agencies and stakeholders concerned. Although they have been of relatively small scales, they still required fast decisions, effective coordination and deployment of clean up procedures. Lessons were learnt from each incident and they provided concrete indications of trends which could be used during disasters of greater scales.

LESSONS LEARNT AND GOOD PRACTICES:

Mauritius has a long history of natural hazards preparedness and early warning. The Cyclone and Natural Disasters Scheme in place was recently strengthened, taking into consideration the evolution in technology. The country has developed the capacity to reconstruct and repair basic infrastructure so as to ensure that the economic machinery gets back on rail as quickly as possible after a disaster.

EFFECTIVENESS OF IMPLEMENTATION:

- With the setting up of the Natural Disasters Unit, institutional set up has been improved. Indeed, all stakeholders of the unit have clearly defined roles and responsibilities.
- Regular monitoring and drills in areas at risk (evacuation drills during torrential rain).
- Regular drills and exchange of regional information to reduce casualties and improve preparedness with time.

SPECIAL CONSTRAINTS AND CHALLENGES:

In spite of the state of the art technology, there are still lots of uncertainty in predicting cyclone track. Current technology and knowledge does not allow accurate prediction of rainfall amount at specific location at island scale grid points. Furthermore, earthquakes are unpredictable and tsunami waves have relatively short lead time.

As regards oil spill, the NOSCP has been put to the test through three National Oil Spill Drill held in November 2003, April 2006 and May 2007 and one desktop simulation exercise held in September 2009. They have involved the participation of all the national stakeholders. However, major constraints were encountered in its implementation ranging from lack of coordination, slowness of response, confusion amongst advisory cells, communication problems and insufficient administrative support. In terms of implementation progress, the plans have been kept reasonably active and reviewed from the lessons learnt. The main constraint for effective oil spill combat lie in maintaining effective coordination, acquisition of more up to date equipment and the training of personnel.

RECENT TRENDS AND EMERGING ISSUES:

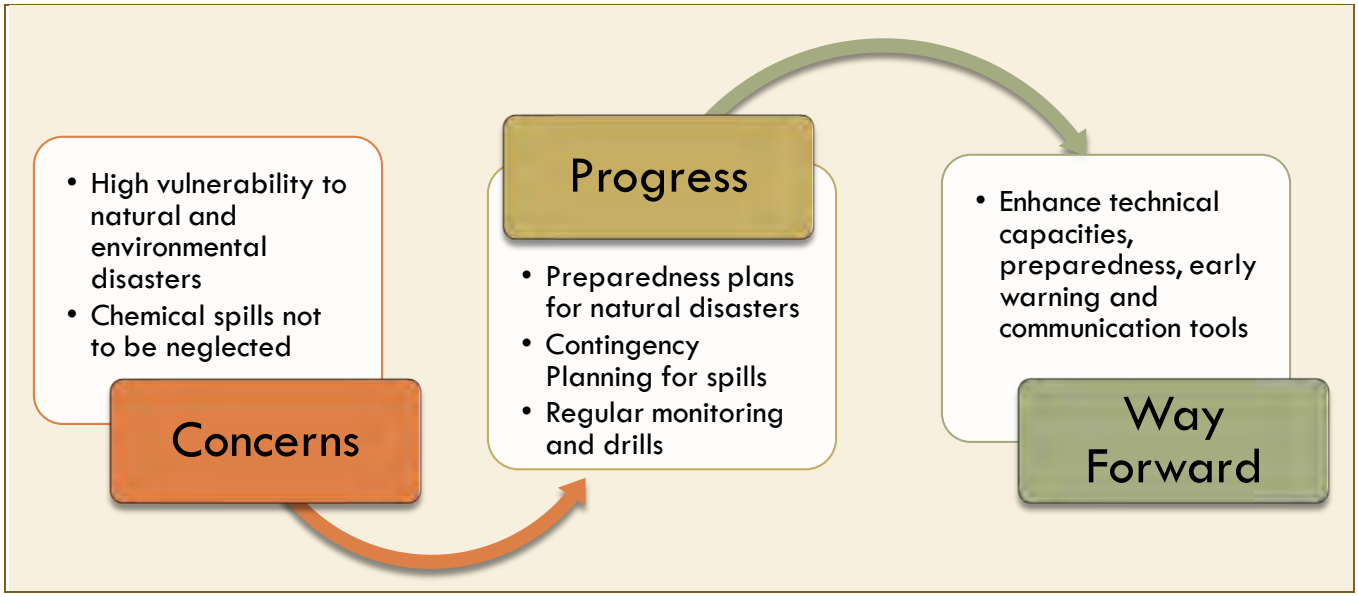
Climate change is a real challenge when dealing with natural disasters. The frequency of extreme weather events has not only increased, but their intensity as well. An increase in the number of intense tropical cyclones and torrential rain events has lately been observed. Natural disasters in a world of food, energy and financial crises make Small Island Developing States like Mauritius quite vulnerable.

With the increased use of chemicals throughout production processes and everyday activities, the events of chemical spills are potentially higher. As such, preparedness, early warning, communication tools and response need to be enhanced. Coordination among all stakeholders needs to be strengthened for effective and rapid response during environmental disasters.

CONCLUSION AND WAY FORWARD:

With a vast experience in natural hazards and at times disasters, the Republic of Mauritius has developed certain amount of resilience. There is strong political will to further enhance the existing Cyclone and Other Disaster Scheme as to ensure the security and protection of life and property.

SUMMARY:



CHAPTER 3: MANAGEMENT OF WASTES

Mauritius Strategy for Implementation

"While some small island developing States have made significant progress in waste management, most of them have serious difficulties in terms of financial and technical capacity in dealing with waste management issues. "

Chapter 3: Management of Wastes

INTRODUCTION:

The relatively rapid economic growth of Mauritius has entrained an increase in its annual amount of solid wastes collected and disposed of, from around 245,000 tonnes in 2002 to 420000 tonnes in 2009. This represents a generation of 0.9 kg per capita per day. Since the 2005 SIDS Meeting, Mauritius has made substantial progress in its waste management systems and practices. However, so as to converge further towards an environmentally sound and sustainable waste management system, there is still room for improvement particularly in the areas of recycling and, hazardous wastes containment and disposal.

Waste minimization, reuse and recycling are high on the national agenda and the target is to recycle 25% of municipal solid wastes. Mauritius has already embarked on its National Programme for Sustainable Consumption and Production, one of the vital elements of sustainable development. Projects implemented under one of the priority areas of the programme, namely Integrated Solid Waste Management and Recycling, would contribute significantly to sound waste management since it also targets the younger generation in schools.

With its high standard landfill, the concrete possibilities of waste-to-energy projects and strengthened legislative frameworks to check waste collection and disposal, Mauritius is now well past the era of uncontrolled, open dump sites. Rodrigues and the other outer islands do not possess engineered sanitary landfills, and the solid waste collected is disposed of at controlled dumping grounds.

On the academic front, the University of Technology (Mauritius) has carried out research at PhD level in solid waste collection and transportation. The studies have shown the potentials of adaptive nature-inspired intelligence to optimize solid waste collection. The findings could eventually be applied to kerbside collection systems in other SIDS sharing the same parameters.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

- **Landfill Upgrading and Gas Collection**

Transfer station **Mare Chicose Sanitary Landfill**

All the wastes collected by local authorities and private companies transit through a network of transfer stations (on the mainland Mauritius) where they are compacted and conveyed through cost effective bulk transportation to the island's only engineered sanitary landfill at Mare Chicose. The high standard of this landfill was pointed out by well-known international consultants in 2004. Domestic waste constituted 93% of the total solid waste landfilled in 2008. All waste carrier lorries, such as those for domestic wastes, recycling, effluent and hazardous wastes, are licensed.

The landfill receives around 900 to 1000 tons of waste daily and requires the development of additional cells. This is being undertaken under the present contract for the landfill site's operation and management which became effective as from 2006. To minimise risks of ground water contamination the cells will comprise an improved double lining system.

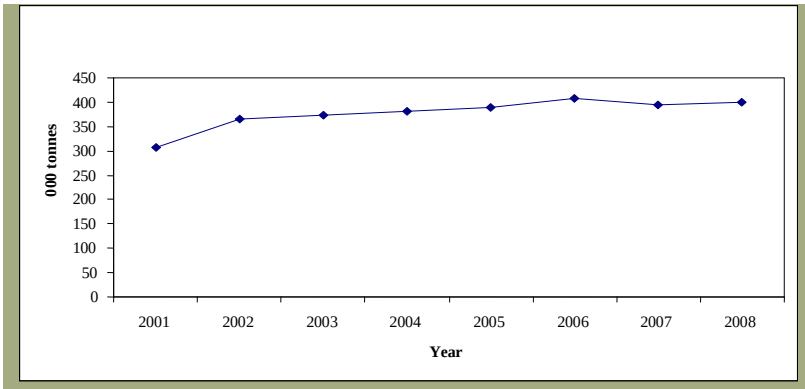


Fig. 3.1 - Total solid waste landfilled at Mare Chicose (2001-2008)
(Source : Digest of Environment Statistics, 2008)

Landfilled wastes generate methane, which amounted to 10.9 thousand tonnes in 2007 and 35.6 thousand tonnes in 2008. Since the entry into operation of Mare Chicose landfill in 1997, the landfill gas (methane) was simply vented out through a pipe reticulation and was not recovered for energy conversion. The pipe reticulation has now been upgraded to prevent leakages. The reduction in greenhouse gas emissions thus achieved has enabled Mauritius to submit a request to claim carbon credits under the Clean Development Mechanism (CDM) of the Kyoto Protocol.

At this stage, the Project Design Document pertaining to the enhanced capture of the methane gas has been submitted to the Executive Board of the CDM. The gas will be converted into electricity with an expected production capacity of 2 to 3 MW as from early 2010. Although on a small scale, the project will contribute towards the reduction of fuel oil used in electricity production, a commodity on which the country is so heavily dependent.

■ Levy on Plastic Carry Bags

In July 2006, the Government came forward with a levy on disposable plastic bags. The advent of this tax has drastically reduced the amount of disposable plastic bags generated as waste. This measure, already applied in several countries, has proved to be a successful example of waste minimization through a change in behaviour on the part of consumers who are now reusing or using less plastic bags. Moreover a reduction in inert plastic material from the waste stream is likely to bring an enhanced and more uniform degradation at both the landfill and future composting plants. The import, manufacture and

sale of plastic carry bags are stringently controlled by the Environment Protection (Plastic Carry Bags) Regulations 2004 which stipulates that the bags must be of the degradable type (within 12 months).

Waste Recycling

In view of the relatively small amounts of wastes generated in the island, recycling is not economically feasible for all waste streams. For the waste streams where recycling is emerging, collection and export for recycling are the most preferred option, such as for paper and PET plastic bottles.

With the soaring prices of raw materials during the past years, recyclers of wastes recovered from the different components of the waste streams have emerged in the country. Metal scraps, plastics of various types, paper and cartons which once used to find their way to the transfer stations and ultimately occupy valuable space in the landfill are now being segregated at source, although not all wastes are economically feasible for recycling.

The recycling of waste oil is regulated by the Environment Protection (Collection, Storage, Treatment, Use and Disposable of Waste Oil) Regulations 2006. Waste oil, particularly motor oil from workshops, are being collected and treated since 2006. Regulations also govern the collection and recycling of PET bottles used in the bottling industry.

The private sector is playing a very active role in the waste recycling sector, in particular concerning paper, scrap metal, glass, and PET bottles. An NGO, Mission Verte, with support from the GEF-SGP, has placed bins for segregated collection of domestic wastes at various locations across the island. The Ministry of Local Government, Rodrigues and Outer Islands will shortly amend the existing legislations to provide for registration and licensing of waste recyclers.

Waste to Energy Plant

The Government of Mauritius is considering the proposal for the setting up of a waste-to-energy plant with a capacity of 300,000 tonnes of mixed wastes per annum and an electricity generation capacity of 20MW. Negotiations are currently being carried out to come to an agreement on the technical and financial terms of the proposal. The project intends to address the constraint of land availability for landfilling purposes and also aims at procuring energy from sources other than fossil fuel and coal.

Large Scale Composting Plant

Characterisation studies have revealed that more than 60% of the country's average waste composition is organic in nature. With a view to promote sustainable development, the Government of Mauritius has issued a Letter of Intent to a private promoter for the development of a composting plant in the western part of Mauritius for a capacity of 100,000 tonnes of municipal wastes. The large scale composting facility is expected to be ready for reception of waste by the end of 2010. The advent of this facility will significantly increase the proportion of recycled waste, which is considered to be on the low side at present. The project will also have the dual advantage of reducing the use of chemical fertilizers, hence avoiding further contamination of land and water resources. Notwithstanding the centralized composting project, efforts are also being deployed under other programmes for the use of domestic small scale composters among the population and the community of small planters. A school compost project has been carried out on a pilot basis, demonstrating composting to pupils of primary and secondary levels.

Management of Ballast Water

Ballast water has had severe impacts on the economies of some countries. Damage to fisheries resources, increased unemployment and reduction in Gross Domestic Product (GDP) are the common consequences faced by most countries. Being a Small Island Developing State, Mauritius relies significantly on shipping for its sustainable development. Consequently, looking into the potential threat of invasive species to its coastal and marine resources is a matter of national concern.

In this context, following the national seminar on Ballast Water Management held in 2008, the Committee which was set up at the level of the Ministry of Shipping is presently working on an awareness campaign exercise to familiarize the fishing community of Mauritius and other stakeholders with the adverse impacts of ballast water and the need to protect the marine environment.

To date, the status of the ballast water management project is as follows:

- ☐ There has been mobilisation of resources to conduct a biological baseline survey at the Port Louis Harbour for ballast water management
- ☐ The required survey equipment is being purchased
- ☐ The Terms of Reference for the recruitment of specialists to assist the Mauritius Oceanography Institute (MOI) is being finalised

LESSONS LEARNT AND GOOD PRACTICES:

Recycling

In Mauritius, the disposal of waste has been centred on landfilling since 1997. The gap may soon be bridged with forthcoming waste to energy and composting facilities. Recycling of wastes, which till now has been carried out on a voluntary basis, will shortly be regulated under the new Local Government Act. It is proposed to incorporate a component of Material Recovery Centre to existing transfer stations to facilitate both generators and recyclers.

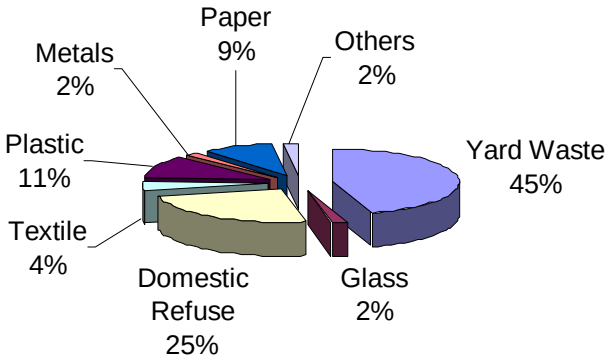


Figure 5.2 Solid Waste Composition (2004)

The recycling of plastic was tried by a company, which manufacture mostly garden furniture. Its experience shows that, because recycled plastics products are more expensive than products made from virgin plastic, the resale market is restricted. The consignment fee applicable to glass bottles is effective in consumers taking them back when empty.

Hazardous Wastes

As in many SIDS and other developed countries, the management of hazardous waste has not been an easy field due to the wide range of characteristics and complexity displayed by such wastes. At present, Mauritius does not have a dedicated facility to store or dispose of the hazardous waste. The problem is often exacerbated when there are small quantities of many types of hazardous waste. Attempts are made to re-use, recycle and dispose of the hazardous wastes after these have been rendered safe for the environment. It is expected that the facility for the interim storage of hazardous waste will be ready in 2012.

The Hazardous Wastes Regulations are being reviewed to provide for the export and transit of hazardous wastes under the provisions of the Basel Convention, which governs transboundary movement of hazardous wastes and to which Mauritius is a party.

To protect our country from the risk of importing diseases like swine fever, an incinerator is being installed within the Port Area to dispose of waste from ships. This will end the practice of transporting such waste across the country to Mare Chicose.

Clean up campaigns

Clean up campaigns which were previously carried out on an ad hoc basis are now organized in a more co-ordinated and systematic manner. In addition to environmental enhancement, their aim is to prevent proliferation of diseases and mitigate the impacts of natural disasters.

Government has recently made new regulations with higher levels of fines to deter people from littering and dumping of wastes. These measures have so far been successful to a certain extent in altering the habits of people and contributed to a cleaner Mauritius.

Sensitisation

Regular awareness-raising campaigns targeting all levels of the population and the corporate sector are regularly organised. Fixed penalties for littering have also been introduced.

EFFECTIVENESS OF IMPLEMENTATION:

Investment

To have a well coordinated and integrated waste management system entails that the state as well as the private sector and the public in general all play their respective roles adequately. Government is in the process of making the necessary investment in capital projects such as landfill, transfer stations and hazardous waste facility. Due to budgetary constraints, Government has a limited capacity to develop and operate infrastructural works so as to have a more complete integrated solid waste management system. The private sector is gradually stepping in with new projects to fill in the gaps. Examples are the upcoming waste to energy facility, compost plant and dedicated facility for electronic waste.

Resources

With the reforms brought in the public sector, namely the introduction of the Programme-Based Budgeting for Financial Management and Performance Management System, it is anticipated that effective and efficient deployment of resources will bring the expected results in the development of solid waste management projects and programmes.

Capacity Building

In the context of SIDS, training and international exposure to good and affordable waste management policies and practices are important for the necessary transfer of technology and know-how. This is particularly important in the field of hazardous waste management which is wide ranging and complex in nature. Training opportunities and networking facilities are being offered through membership to Conventions such as Basel and the Africa Institute and other bodies such as UNEP. A workshop on 'Promoting Recycling in Mauritius' was organised in 2006, with the contribution of experts from the National Environment Agency of Singapore.

SPECIAL CONSTRAINTS AND CHALLENGES:

	2005	2009
Amount of solid waste disposed yearly/tons	385,991	419,273
Amount of solid waste disposed daily/tons	1057	1149
Population	1.21 million	1.28 million
Kg of waste per capita daily	0.87	0.90
Tons of HZW/yearly	110	57

Table 3.1: Increase in wastes disposed of (2005 &2009)
(Source: Ministry of Local Government, 2010)

The ascending gradient of waste generated correlates with increasing costs of collection and disposal. Waste segregation, composting and recycling are potential options worthy of consideration. With the consumerism attitude of the population, waste minimisation needs to be encouraged through more aggressive sensitisation and the possible use of economic instruments to encourage reuse and segregation for recycling. However, such shifts need to be accompanied by the appropriate infrastructure.

	2005	2009
Disposal Cost (Landfilling and cell construction cost)	Rs 108 M	Rs 210 M
Operation of Transfer stations & transportation to Mare Chicose	Rs 127M	Rs 166 M

landfill		
Scavenging contracts by Ministry of Local Government	Rs 167 M	Rs 187 M
Collection Costs by Local Authorities	Rs 362 M	Rs 506 M
TOTAL	**Rs 764 M**	**Rs 1069 M**
	(ca. $ 25 M)	(ca. $ 36M)

Figure 3.2: Rising costs of waste collection, transfer and disposal (2005 & 2009)
(Source: Ministry of Local Government, 2010)

Mauritius, by virtue of its small size, faces much limitation with respect to the setting up of treatment facilities for several waste streams including hazardous waste. The relatively small quantities of waste generated in relevant streams just render the investment in the corresponding infrastructural facilities for recycling financially not feasible. The challenge will be to develop a regional co-operation with respect to a few selected waste streams with a view to attaining the critical mass for these particular waste streams such that the set up and operation of the corresponding facilities are viable. One such example would be the setting up of a Recycling Plant for electric and electronic waste in Mauritius but which would also be available to receive wastes from the other countries of the Indian Ocean.

In the field of medical wastes, much of the wastes generated are incinerated in incinerators housed in the public hospitals. Use of non-incineration techniques will also be explored. In order to capture medical waste from all sources, the need for the setting up of a centralized incineration plant for the country will be studied and recommendations made accordingly.

RECENT TRENDS AND EMERGING ISSUES:

■ Extended Producer Responsibility

The concept of Extended Producer Responsibility is being considered to see how best it can be adapted to the local context to engage producers and importers in the environmental protection process. The National Sustainable Consumption and Production Programme would contribute to a large extent towards such an objective. Internalising environmental costs would encourage producers and importers to adopt the cradle-to-grave approach in waste management. This approach has been quite successfully applied in the management of plastic PET bottles, whereby bottlers fund the collection of waste bottles and Rs 1 is levied on each bottle by Government. In the same vein, a levy on chemicals covered under the Dangerous Chemical Control Act will be used to finance the cost of managing the waste arising from their use and obsolete stocks.

■ Transfer Stations – Upgrading and Reconstruction

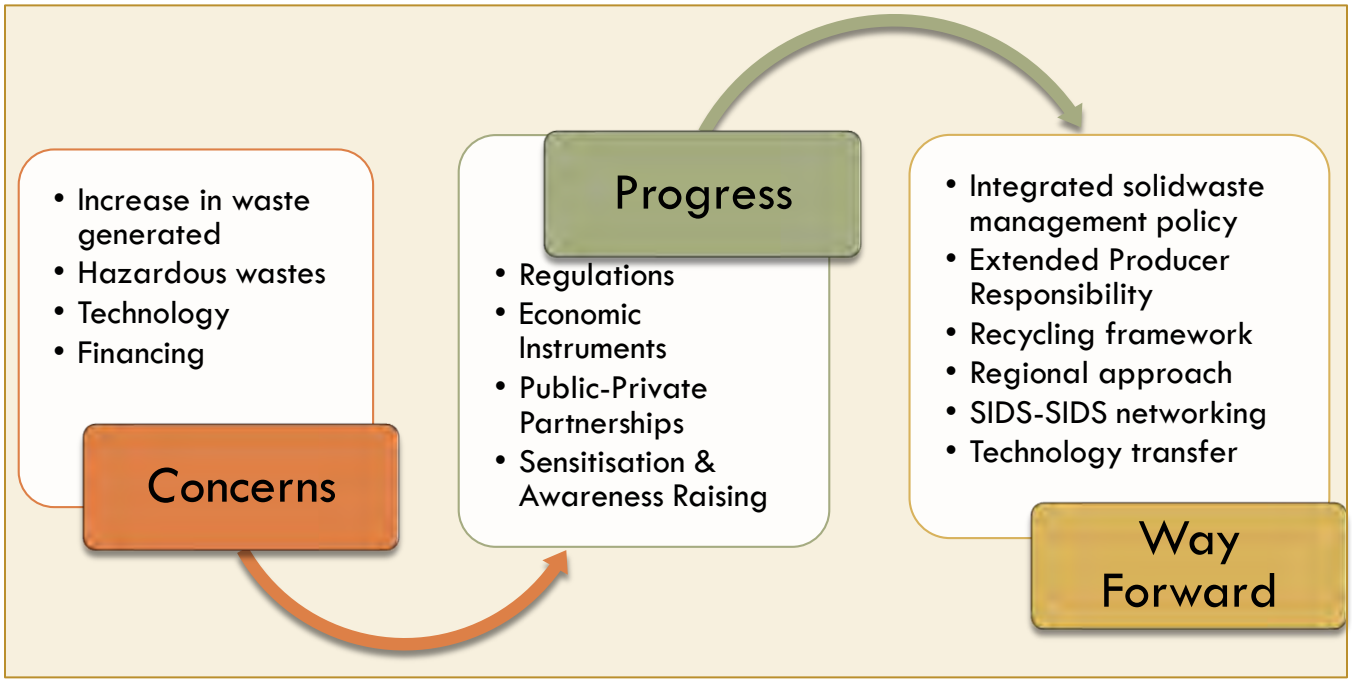
By 2010, all five transfer stations of the island would have been either upgraded or reconstructed to meet the challenges of efficient and coordinated waste management practices. The infrastructure of the upgraded or newly built transfer stations will enable wastes to be discharged directly within a very short time period in 60m^3 capacity truck trailers. This will have the effect of reducing significantly the turnaround time of waste carriers within the transfer stations. The resulting benefits of these infrastructural

improvements are that waste carriers would be able to undertake a higher number of trips within their respective local authority areas, hence contributing significantly towards the upkeep of a clean and healthy living environment.

CONCLUSION AND WAY FORWARD:

The use of IT in waste management promises to improve planning of waste collection, transfer and disposal. Greater participation of the private sector in waste-related infrastructure projects, of all segments of the population in the implementation of waste minimisation and recycling initiatives as well as the use of wider economic instruments would improve the waste management challenges the country is facing. The economic implications of going towards a more environmentally sound waste management strategy cannot be ignored. Regional avenues to waste recycling and disposal need to be explored, building on SIDS sharing of best practices worldwide. Transfer of adapted and affordable technology and know-how from developed countries needs to be enabled by the international community, in particular for hazardous and clinical wastes.

SUMMARY:



CHAPTER 4: COASTAL AND MARINE RESOURCES

Mauritius Strategy for Implementation

"Small island developing States are defined by their historic, cultural and economic links to the oceans and seas"

Chapter 4: Coastal and Marine Resources

INTRODUCTION:

Over the past few years, development pressures on the coastal and marine resources of the island have not eased, like in many SIDS. A number of new hotels, luxury villa complexes and other infrastructures have been constructed close to the shoreline, following the same pattern as in earlier years. Efforts are being made to co-ordinate the activities of stakeholders on the coastal zone, but the institutional, policy and legislative framework for the management of the coastal zone remains nested with various organisations. Integrated Coastal Zone Management (ICZM) strategies, policies and guidelines have been finalised and are awaiting formal adoption and implementation. However the ICZM approach has contributed, to some extent, in rallying the stakeholders towards common understanding and goals.

The Fisheries Division of the Ministry of Agro Industry, Food Production and Security, the Ministry of Environment and NDU, the Mauritius Oceanography Institute (MOI) and, have embarked on a number of Research & Development projects, programmes and activities related to coastal and ocean processes, oceanographic research and the rational development of marine resources. These are presently at various stages of concrete implementation.

The Republic of Mauritius is made up of a group of islands of volcanic origin with

- Total area of around 2045 km^2
- Total coastline of 496 km
- 16 840 km^2 of territorial sea
- 1.9 million km^2 of Claimed Exclusive Economic Zone
- Comprises the islands of Mauritius, Rodrigues, Saint Brandon, Agalega, Tromelin, Chagos Archipelago and a number of smaller outlying islands
- All the population live within 100 km of the coast
- Mainland, Mauritius, has an area of 1864.75 km^2
- 49 islets, largest being 253 hectares, lie close to the shores of the mainland
- Coastline of mainland Mauritius measures 322 km and is surrounded by 150 km of protective coral reefs which cover an area of around 300 km^2
- Total lagoon area about 243 km^2
- Main economic activities in the coastal zone are tourism and fisheries. In 2008, tourism contributed 8.7% to the GDP whilst the fisheries sector contributed 1.3%.

Mangrove restoration site

Brain Coral in **B**lue Bay Marine Park

Clam in Blue Bay Marine Park

SOME FACTS ON THE COASTAL AND MARINE RESOURCES OF MAURITIUS

- ☐ 16 of the 49 islets around mainland Mauritius are declared as National Parks or Nature Reserves
- ☐ 203 coastal wetlands in Mauritius (ESA study, 2009)
- ☐ 2 Ramsar sites (Rivulet Terre Rouge Bird Sanctuary and Blue Bay Marine Park)
- ☐ 2 marine parks (Blue Bay and Balaclava), and 6 fishing reserves have been proclaimed around the island
- ☐ Live coral reef cover vary from 0.6 % to 23 % as a proportion of the whole lagoon
- ☐ Mangrove propagation programme started in 1995 by the Fisheries Division. Around 70,000 mangrove plants were planted near the coast during the period 2003-2009 and the area covered was approximately 35,000 m^2
- ☐ 652 ha of coastal forest cover
- ☐ 70 km^2 of terrestrial areas and 91 km^2 of marine areas are protected
- ☐ The marine biodiversity consists of some 1656 known species
- ☐ 159 species of scleractinian corals
- ☐ Some 340 species of fish, out of which 42 are of economic importance
- ☐ 160 genera of marine algae identified in coastal waters
- ☐ 200 species of seabirds reported

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Legislative Framework & Conventions

Mauritius has ratified a number of marine-related conventions such as the Ramsar Convention, the Nairobi Convention, the Convention on Biological Diversity and the UN Convention on the Law of the Sea (UNCLOS) amongst others.

The Fisheries and Marine Resources Act 2007 (amended in 2008) is the legal tool of the Fisheries Division of the Ministry of Agro Industry, Food Production and Security and has 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.

Management Framework

ICZM	• ICZM Framework nearing finalisation • Comprises strategy; policy and regulatory framework; area and action plans for pressure zones
Environmentally Sensitive Areas	• Protection and conservation of the ESAs in Mauritius and Rodrigues • ESAs have been classified into 14 main types, 7 being coastal (coral reefs, islets, sea grass beds, mangroves, inter tidal mudflats, sand beach and dune and coastal freshwater marshland).
Coastal Erosion	• Following the Study on Coastal Erosion in Mauritius in 2003, a number of projects have been implemented to abate the impacts of erosion in the coastal areas. • To date beach reprofiling / restoration works have been carried out at 8 sites over a total of 4 km

Conservation and Management of Marine Resources (Including R&D)

Aquaculture

Aquaculture has the potential to play a determining role in the fisheries sector of Mauritius. An Aquaculture Master Plan was approved by Government in 2007 and the 2008-2009 National

Budget made provisions for its development so that self-sufficiency in fish products could be attained. Aquaculture activities are regulated by the Fisheries and Marine Resources Act 2007. All marine fish farming projects have to comply with operational guidelines for responsible fish farming practices, and require an Environmental Impact Assessment (EIA) licence.

Presently, there are two aquaculture farms: one marine and one freshwater, the latter having started its operations in 2006. The Board of Investment (BOI) is in presence of firm expressions of interest for the development of marine aquaculture from both foreign and local promoters amounting to around Rs 1.5 billion ($ 50 million).

Marine Protected areas – National and Regional Activities

Measures for more effective protection, conservation and management of Marine Protected Areas (MPAs) are now prescribed in Regulations promulgated under the Fisheries and Marine Resources Act 2007.

The Blue Bay Marine Park was officially designated a Wetland of International Importance in January 2008 and included in the List of Wetlands of International Importance established under Article 2.1 of the Ramsar Convention on Wetlands.

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.

Seafood Hub

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. The fisheries sector presently employs about 12,000 persons, including those involved in fishing, canning and marketing.

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.

Digital maps produced

In 2005, digital bathymetric maps of the lagoons of Mauritius and Rodrigues (shore to reef areas) were commissioned by the Fisheries Division, completed and provide important baseline and reference material on the lagoon resources.

In 2008, under the ICZM Framework study, inventories and mapping of 6 pressure zones were carried out. Also in 2008, under the ESA Study, inventories and mapping of environmentally sensitive areas were undertaken.

Regional Initiatives and Cooperation

Analysis and assessment of status of fish stocks

Various Research and Development projects are being run by the Fisheries Division to manage the fisheries of Mauritius through licensing and monitoring of fishing activities in the EEZ, supply of fish and fish products to the population and the study of the tuna fishery. In the tuna fishery, the stock

structure and catch trend are studied, fishing areas and distribution investigated and cooperation is ensured at a regional level in the management of tuna resources. Regular sampling exercises are carried out and data collected are analysed. Mauritius participates fully in the regional tuna programme of the Indian Ocean Tuna Commission (IOTC).

African Monitoring of Environment for Sustainable Development (AMESD) – under the aegis of the Indian Ocean Commission (IOC):

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.

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.

Fishing Licences and Agreements

Fishing licences are issued to authorise local and foreign fishing vessels to fish in the Exclusive Economic Zone of Mauritius, under the provisions of the Fisheries and Marine Resources Act 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.

In 2009, around 10 nationalities have been issued with fishing licences. Mauritius signed Fishing Agreements with the Seychelles in 2005 and with the Japan Tuna Fisheries Co-operative Association in 2007. In 2009, the annual revenue from such licences and fishing agreements was around Rs 40 million ($ 1.33 million).

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.

To date a school contest has been held, a Strategy for Tourism in Mauritius prepared, a feasibility project on mariculture potential in Rodrigues undertaken, two subcommittees have been set up to come up with an ICZM plan for two villages (Flic en Flac and La Gaulette/Morne), Study

on Fish Farming in Mauritius done, and capacity building through training on ICZM principles, planning and policies were carried out, amongst others.

UNEP/GEF WIOLAB project:

Mauritius is fully participating 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 National Development Unit as per Part V of the Environment Protection Act 2002.

Mauritius also benefitted from training and equipment under the WB/GEF WIO Regional Contingency Planning Project. Mauritius is also receiving technical assistance under the Marine Highway Project to review and update its NOSCP and other related plans.

Submission to the UN Commission on the Limits of the Continental Shelf

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.

In May 2009, the Republic of Mauritius made another submission to the United Nations for an Extended Continental Shelf in the region of Rodrigues. A Preliminary Information document for an extended continental shelf in the region of the Chagos Archipelagos was also submitted.

LESSONS LEARNT AND GOOD PRACTICES:

Measures to Combat Illegal, Unreported and Unregulated (IUU) Fishing

Mauritius being an island state depends and derives much on the exploitation of the fisheries resources found in its EEZ and from the high seas. It has developed a major fisheries complex with port facilities for the landing and transhipment of tuna, providing a free trade zone and associated infrastructures, including ship repair facilities which are attractive to European, Japanese, Taiwanese and other Asian longliners.

IUU fishing is of serious concern for Mauritius. In an effort to combat it, a National Plan of Action against IUU Fishing has been developed by the Fisheries Division with the assistance of the Government of Norway. The National Plan is based on the International Plan of Action.

Other best practices

- ☐ A setback policy (30 m from the high water mark) has been implemented and included in the National Development Strategy and the Planning Policy Guidance (2005)
- ☐ Lagoon sand mining has been banned in 2001 and monitoring effected to assess recovery
- ☐ Corals, sea shells and mangroves are protected species
- ☐ Regulations have been promulgated on used oil and recycling of same is being encouraged
- ☐ 50 % of the population would be connected to the sewer network by 2015 and 80% by 2030. Works for same are under progress
- ☐ An incinerator in the Port area, to cater for solid wastes entering the Port and discharges from ships, would be operational by mid 2010.
- ☐ Control of soil erosion in the Black River Gorges National Park is under implementation

EFFECTIVENESS OF IMPLEMENTATION:

The institutional setup provides for:

- ☐ The Environment Coordination Committee, set up under the Environment Protection Act, coordinates with relevant Ministries concerned on environmental issues, develop policies and administrative measures, ensure information sharing and ensure compliance with environmental law
- ☐ An ICZM Committee, set up under EPA 2002 and chaired by the Director of Environment, coordinates with relevant stakeholders on matters pertaining to the management of the coastal zone
- ☐ A Post EIA/PER monitoring committee has been set up under EPA 2002 (amendment 2008) to monitor EIA Licences /PER Approvals issued.

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.

Coral Reef Monitoring:

The long term monitoring of coral reefs and associated ecosystems is being carried out by the Fisheries Division at 12 sites around the island, including 23 stations both in the lagoon and off-lagoon. These sites are being monitored yearly and include data on coral cover, benthic cover, abundance of fish and invertebrates. The data collected are submitted to the Global Coral Reef Monitoring Network under the South West Indian Ocean Node.

Water quality Monitoring

23 established lagoon sites are currently monitored by the Fisheries Division for physico-chemical parameters, and 11 public beaches and both Marine Parks are being monitored for the presence of coliform bacteria. The report of Independent Environment Audit on Wastewater Projects is produced annually to meet the requirement of the funding agencies of the National Sewerage Programme for an independent assessment of the environmental impacts of the wastewater projects. The annual report presents the findings for the quality of treated wastewater, groundwater, surface water and seawater for the following four geographical catchment areas that are being covered by the four major sewerage plants:

(i) Grand Baie Sewerage Project Area
(ii) Baie du Tombeau Sewerage Project Area
(iii) Montagne Jacquot Sewerage Project Area
(iv) Upper Plaine Wilhems Sewerage Project Area

SPECIAL CONSTRAINTS AND CHALLENGES:

The coastal zone is under constant pressure from development and from overexploitation of its natural resources. The Republic of Mauritius has an immense EEZ for which it does not have the capacity to fully do the surveillance and monitoring on its own. In this regard, Mauritius participates in a regional surveillance initiative for fishing vessels. The other major constraints facing Mauritius are :

- ☐ Inadequate human and financial resources
- ☐ Synergy building
- ☐ Financial constraints and high costs for fisheries research
- ☐ Exploration of potential fish resources in the EEZ
- ☐ Implementation of management plans for the different fisheries

Due to climate change, sea water is warming up and sea level is rising. With higher sea surface temperatures, coral bleaching was observed in 1998, 2004 and in 2009 and is one of the main causes for decrease in coral cover and degradation of shoreline (due to erosion).

Bleaching of tabular corals

The promotion of off lagoon fishing and aquaculture involves high cost investments. Tourism projects take priority over aquaculture projects. Proliferation of algae on the shores in some regions, due to fresh water ingress loaded with contaminants from upstream, represent non point sources of land based pollution.

RECENT TRENDS AND EMERGING ISSUES:

As a result of overfishing, a general decline in fish catch has been observed in lagoon fishery which has resulted in some degree of poverty in coastal villages. This situation has also led to the conversion of the fishers into off lagoon fishers, with support from Government.

As a result of overfishing, pollution from land based sources and climate change, a decrease in coral cover has been noted which make the reef more vulnerable to surges as wave heights increase in lagoon leading to increase in erosion on the shores.

As Mauritius is a Small Island State with limited resources, the feasibility of exploiting the Land Based Oceanic Industry is being looked into.

The sea food hub Mauritius offers a diversified and fully integrated range of services. It has received full support from Government.

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).

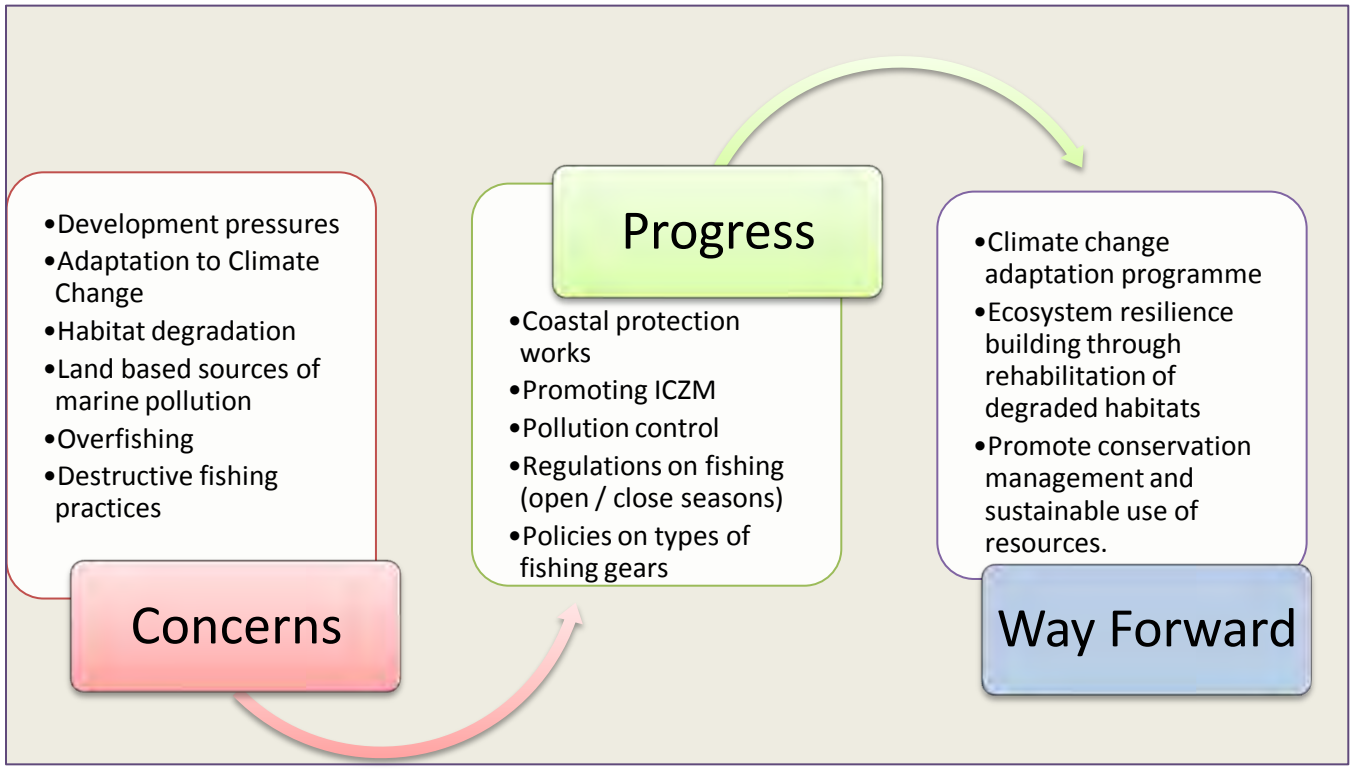
For Mauritius, the potential threat to fisheries, tourism and public health as a result of large scale disaster at sea would be catastrophic.

CONCLUSION AND WAY FORWARD:

Being a SIDS, coastal and marine resources remain our most valuable assets on which the socio economic development, in particular, tourism, fisheries, land based oceanic industry, amongst others depend. The Government and other partners are seriously committed to protect this vital resource whilst adapting to climate change. Adaptation activities on the coastline will take more prominence with the forthcoming climate change adaptation strategy that will be prepared under the African Adaptation Programme. Government is also committed to take all necessary measures against land based sources of marine pollution through projects such as sewerage project, solid

waste management project (reduce, reuse, recycle), legal provisions such as regulations and standards for wastewater discharge amongst others.

SUMMARY:



CHAPTER 5: FRESHWATER RESOURCES

Midlands Dam

United Nations Environment Programme

"Equitable and sustainable management of water resources is a major global challenge. About one third of the world's population lives in countries with moderate to high water stress"

Chapter 5: Freshwater Resources

INTRODUCTION:

Mauritius has a well developed network supply with many river sources, boreholes, aquifers and reservoirs making up the surface water resources. Most of the rivers originate from the central plateau and flow radially to the sea. The island has been divided into 25 major river basins and 21 minor ones. The catchment areas vary from 3 km^2 to 165 km^2. River water is harnessed through 11 manmade reservoirs with a combined total gross storage capacity of 93 Mm^3 and a regulated annual yield of 264 Mm^3 (2007).

Rainfall is seasonally and geographically variable; most of the rainfall occurs in the upland areas during November and April with torrential flows being common during storms and cyclones. There is a wide variation of rainfall across the island: 4000 mm in the super-humid zone on the central plateau, about 1500 mm on the eastern coastal plain and only about 800 mm on the leeward north western coastal plain (Figure 5.1). However, due to its topography and geographical setting, it suffers from rapid run off and evaporation. This is followed by periods of water shortages during which the coastal areas in the North and east are subjected to seawater intrusion (Figure 5.2).

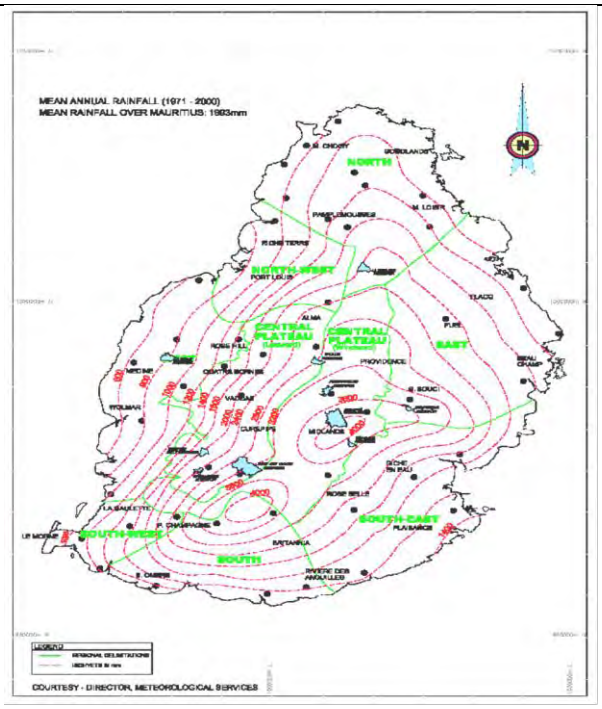


Figure 5.1: Rainfall variation

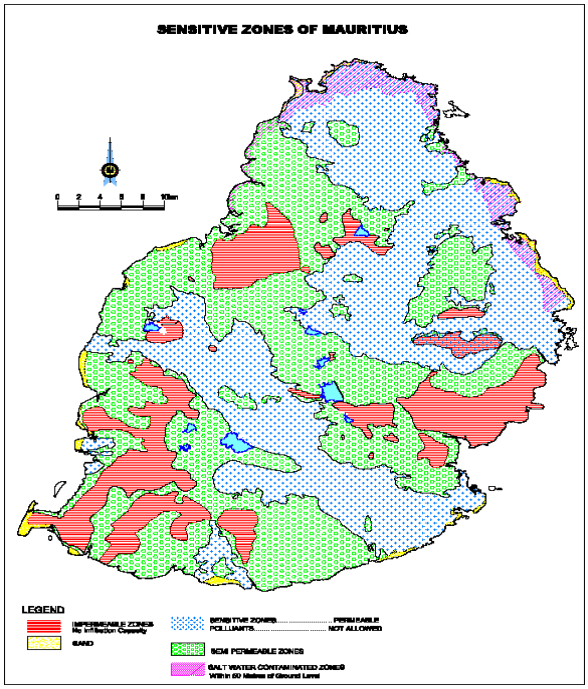


Figure 5.2: Sea water intrusion

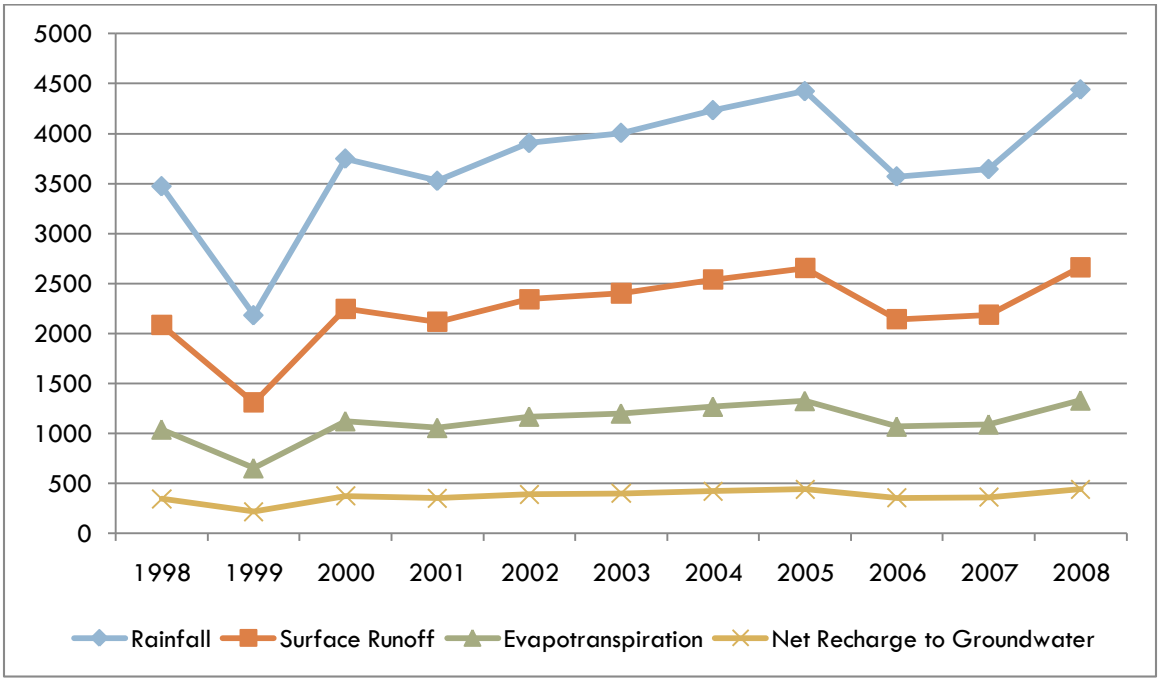
The aquifers are replenished every year. However, most of the boreholes are fed by "superficial" water-bearing formations and are within a depth usually not exceeding 60 m, the yields decrease by about

25-40 % during the dry season when the water table recedes over a range of 1-27 m depending on the location of the boreholes. Geological and hydro-geological investigations have resulted in the drilling of about 1,000 boreholes of diameter ranging from 150-300 mm. There are currently 364 boreholes in operation, out of which 125 boreholes are being used for agricultural purposes, 134 boreholes for industrial use and 105 for potable water.

Table 5.1: Water Utilization (Million cubic metres per year) (Source: CSO, 2008)

Use	Surface Water		Ground Water	Total	Percentage
	River run off-takes	Storage			
Domestic, Industrial & Tourism	36	61	112	209	21.5 %
Industrial (Private boreholes)	5	-	10	15	1.5 %
Agricultural (irrigation)	361	83	21	465	47.9 %
Hydropower	138	143		281	29.1 %
Total Mm³	**540**	**287**	**143**	**970**	**100 %**

Figure 5.3 - Water Balance (1998 – 2007) (Source: CSO, 2008)



CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

There has been considerable improvement in water supply in the last decade and there are many plans for the future to improve water management. To meet the water requirement of different sectors of the economy up to 2040, an integrated water resources plan for harnessing additional water resources has been prepared. This includes:

Increasing storage by the construction of dams

- ☐ Construction of the Midlands Dam with a capacity of 25.5 Mm^3 has been completed.
- ☐ Four other storage dams are planned to be constructed by 2020:
  - The construction of the Bagatelle Dam to the tune of Rs. 3 billion is scheduled to begin in 2010 and is expected to be completed in 2013.
  - Construction of Rivière des Anguilles Dam to start in 2011
  - Feasibility Study of Chamarel Dam
  - Extensions to La Nicoliere Water Treatment Plant Works to cater for the water needs in the North of the island.

Maintenance of Network - rehabilitation of dams, dykes and canals

- ☐ Existing storage dams have been rehabilitated on a priority basis to enhance their safety and life span and to minimize seepage losses.
- ☐ Feeder canals have been rehabilitated.
- ☐ Old and obsolete drinking water infrastructure has been replaced to provide for more treatment capacity, a better distribution network and better quality.
- ☐ Pipelines of more than 30 years are being replaced.

Research and Hydrological studies undertaken

- ☐ With a view to further enhancing development of groundwater potential and mitigating water supply problems in water stressed areas, each year about five new boreholes are drilled and commissioned. Concurrently, it is ensured that the planning guidelines set for residential and industrial developments within the vicinity of boreholes are strictly adhered to so as to harness groundwater in a sustainable manner.
- ☐ Regular sampling and testing of both surface and groundwater are undertaken to safeguard freshwater resources against pollution.
- ☐ A map of the sensitive zones of the island has been established and polluting industries identified, for the implementation of corrective measures.

Increase efficiency of Use

- ☐ Adoption of more efficient methods of irrigation such as central pivot and drip irrigation systems.

- Irrigation efficiency has also been increased by following deficit irrigation techniques and mixing the required volumes of freshwater with recycled treated wastewater for irrigation use.
- Further groundwater development and emphasis on water demand management
- More efficient use of water in all sectors

Legislations

- Water pollution is being gradually minimised by up-to-date legislations which began to be introduced in the mid 1990 and by a more effective monitoring and enforcement.
- The policy on protection of water resources have been laid down in the National Development Strategy 2003 - policy No.WS2 as follows: the natural functions and habitats of water resources including rivers, rivulets, aquifers, boreholes, groundwater, surface water and marine water resources will be protected from adverse effects of development either through incorporation of environmental mitigation measures in development schemes, prohibition of development in buffer zones (no development allowed within a 200 m radius of boreholes) and/or the protection and maintenance of natural habitat adjoining such resources.
- Promulgation of the Industrial Waste Audit Regulations 2008

Wastewater Treatment

A National Sewerage Programme was prepared with the aim to connect 50% and 80% of the population to the public sewerage network by the years 2015 and 2030 respectively. The main objectives are to improve sanitation and to halt and reverse the trend of environmental degradation. The table below indicates the Wastewater Treatment Plants in Mauritius, including their respective types of treatment and the final disposal of the respective treated wastewater.

Treatment Plant	Type of Treatment	Disposal	Actual Flow m^3/day	Treatment Plant Design Capacity m^3/day	Households connected to the Sewerage System
Grand Baie	Tertiary Treatment	Borehole injection / irrigation	1, 200	3, 500	1,500 households
Baie du Tombeau	Preliminary Treatment	Long Sea Outfall	25, 000	45, 000	1,500 households
Montagne Jacquot	Primary Treatment & disinfection	Long sea outfall	28,000	48, 000 (phase 1)	
St Martin	Tertiary Treatment	Irrigation	40, 000	69, 000 (phase1)	27, 000 households

LESSONS LEARNT AND GOOD PRACTICES:

- Ongoing public awareness campaigns on water saving habits among households and school children.

- Introduction of water saving practices and techniques to reduce water consumption by using technology transfer programmes, control of specifications of water use fittings and promotion of green industry.
- Provisions for massive water impounding projects and for further upgrading the existing distribution networks have been made in the last national Programme-Based Budget. The 2010 budget has mobilised a highly substantial provision of Rs. 10 billion to be invested in the water sector over the next five years. This includes Rs. 3 billion for the island's second major dam at Bagatelle.
- A comprehensive re-evaluation and assessment of the water resources of Mauritius is planned to start in early 2010 and is expected to be completed by mid-2011, leading to the establishment of a Master Plan which will set the road map for future integrated strategies for the water sector as a whole.
- Unaccounted for water averages 50% of throughput. Of this percentage, the physical loss rate is 65 % and the commercial loss rate 35%. The Central Water Authority has embarked on an ambitious project for the reduction of non-revenue water to 25 % by end of 2008. Projects have been identified and will be done through renewal of distribution network, renewal of non working domestic meters, implementing actions for leakage reduction.

EFFECTIVENESS OF IMPLEMENTATION:

- The Water Resources Monitoring Committee decides on the allocation of water for different sectors during the water shortage periods whilst the Water Resources Unit makes recommendations based on water resources assessments in respect of surface and groundwater quantities for water user permits issued by the Central Water Authority.
- Total daily rainfall is monitored from 250 stations island-wide, with continuous recording available from 30 stations. For assessment and monitoring of surface water resources, 113 flow-measuring stations are spread all over the island, out of which 61 are equipped with continuous water level recorders. At the remaining 52 stations, water level readings are taken manually on a daily basis or twice weekly. The hydrometric network is being further developed by setting up recording stations on major rivers, which are not currently gauged.
- New hydraulic structures such as flow measuring stations are presently being constructed in catchment basins so as to strategically manage the water resources in Mauritius. A number of existing stations are being rehabilitated for better acquisition of data, thus enabling the proper planning of water resources projects.
- Two water quality laboratories were set up to monitor drinking water samples to ensure compliance with the national and international standards and to monitor the quality of raw water resources and trade effluents discharged into aquifers and watercourses. Health Quality and Agricultural Water Quality Laboratories and the National Environmental Laboratory are all involved in the monitoring of water quality.
- An ongoing implementation of a water quality monitoring programme for surface, ground and wastewater is being carried out by the CWA and WRU for several water courses and for over hundred different sampling stations over the island. Although the majority of major watercourses on

the island are routinely monitored, the main focus is for watercourses where industrial discharges are made to those rivers that are harnessed for abstraction for potable water.

- The groundwater licensing mechanism requires the operators of private boreholes to submit analytical reports on the groundwater abstracted. This enables the CWA to obtain water quality data for monitoring purposes and to follow up on the sensitive sites.

SPECIAL CONSTRAINTS AND CHALLENGES:

- Major constraint is a scarcity of capital for projects thus the need to resort to loans from international lending institutions.
- The high population density of Mauritius, the heavy use of water for irrigation and the increasing demands from industry and tourism, place growing stress on water resources. Water stress and scarcity restrict economic and social development and pose a serious overall challenge for water management.
- There remain problems of uneven distribution for water. Whilst the current water services in principle cover the whole country, there are certain existing inequalities in provision, including premises with no piped water inside the premises for drinking and for flush sanitation and in certain areas, premises with intermittent supplies.
- Although water supply networks have been extended they are not expected to fully meet the forecast increasing demands for water. There will be a need for substantial investment in the rehabilitation and renewal of old mains in towns and for some provision of new resources, treatment capacity, storage facilities and water mains to provide an acceptable year round service to all population particularly those at the extremities of the current system, in the east and west of the island and to properties on higher ground.
- Future challenges also encompass the climate change induced phenomena of intense rains, probable droughts and salinity intrusion into coastal aquifers. In order to sustain economic development and improve quality of life, water demand management and supply management will become an increasing challenge
- Inadequate and insufficient storage facilities, outdated infrastructure and leakage, remain as constraints for the development of this sector.
- With respect to data sharing among water sector agencies, gaps exist in relation to coordination.
- Monitoring of water quality is scattered among agencies such as Central Water Authority, Wastewater Management Authority, National Environment Laboratory, Albion Fisheries Research Centre and the Ministry of Health. It is necessary to make arrangements to use data for decision making and for policy making through coordinated effort using Environment Information System.
- As watershed and drainage management will be an important function in river basin management, Forestry Services and National Parks and Conservation Service will need to be closely involved for an integrated water management.
- Community participation in watershed management will be an important component since many rivers flow within villages, private properties and their cooperation should be solicited to introduce special watershed conservation programmes.

- A river water quality indexing system need to be introduced and a formal mechanism for water quality monitoring programme for different use categories need to be practiced.
- An increase trend in rapid surface run off generation has been observed by the Water Resources Unit. These challenges have to be faced. Introducing more surface storage facilities is important as the country has no adequate forest cover or potential to substantially increase forest cover to modify the surface run off in the steep terrain.
- Protection of present forest cover and afforestation of critical watershed areas must be given attention. Land use planning should pay attention to watershed management in new developments.
- Due to lack of effective enforcements and control of onsite disposal of domestic wastewater into the environment, soil and water resources are adversely impacted. In order to address these problems many issues have to be addressed. Unclear responsibilities of enforcement, overlapping functions have to be resolved, proper coordination among responsible agencies has to be established.
- Capacity building and institutional adjustments in the Local authorities to implement and monitor the building permits and septic tank operations, activities of SMEs.
- Adequate coverage of the urban areas with sewerage network and waste disposal facilities need to be addressed.
- Climate change considerations should be taken into consideration, whilst development an integrated water resources management plan. This has not been the case in the past.

RECENT TRENDS AND EMERGING ISSUES:

Pollution

- Varying extents of pollution by domestic, industrial and agricultural activities affects mainly watercourses and to a much lesser extent, underground water. The geology of Mauritius is characterised by highly fissured volcanic rocks with relatively high permeability, hence leachates easily find their way into the ground water.
- Water pollution is being gradually minimised by up to date legislations which began to be introduced in the mid-1990s, and by a more effective monitoring and enforcement.
- The monitoring of freshwater quality is carried by out the Central Water Authority, the Ministry of Health and by the National Environmental Laboratory of the Ministry of Environment & National Development Unit. The Ministry of Health is the Enforcing Agency for drinking water quality.
- Cumulative effect of hazardous waste generated by pharmaceutical production will be harmful and need to be managed.

Impact of climate change on Hydrological Cycle.

- The hydrological cycle is affected by the climate system as changes in climate result in changes in rainfall and temperature. Climate change may pose problems of salt water intrusion into fresh water sources and reduce water supply.

- More intense rains can be another scenario of climate change that will increase run off reducing ground water recharge.
- With proposed expansion of the tourist industry, water resources management will become an increasing challenge, which may be exacerbated by the consequences of climate change.

CONCLUSION AND WAY FORWARD:

Although water supply networks have been extended they are not expected to fully meet the forecast increasing demands for water. There will be a need for substantial investment in the rehabilitation and renewal of old mains in towns and for some provision of new resources, treatment capacity, storage facilities and water mains to provide an acceptable year round service to all population particularly those at the extremities of the current system, in the east and west of the island and to properties on higher ground.

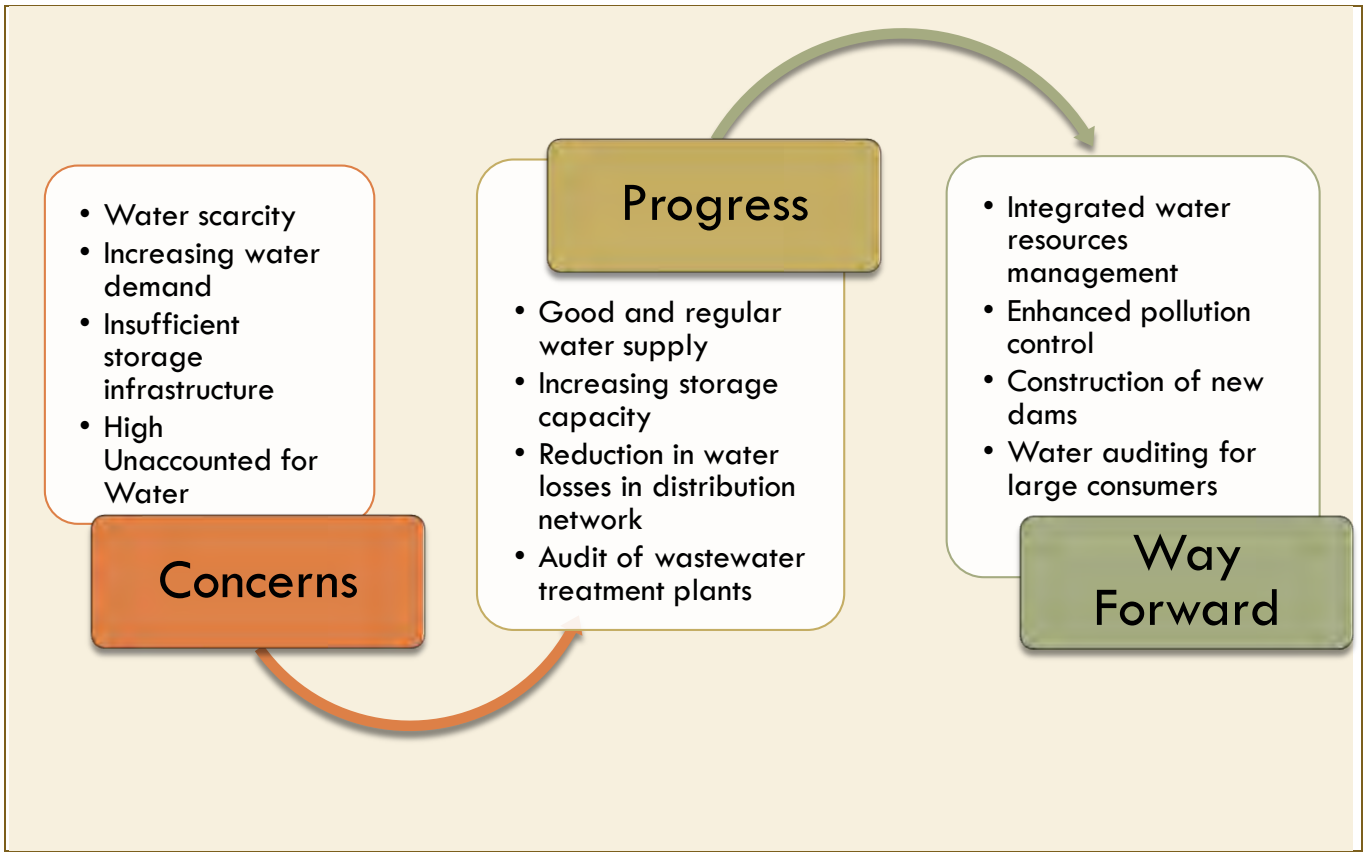
Due to lack of effective enforcements and control of onsite disposal of domestic wastewater into the environment, soil and water resources are adversely impacted. In order to address these problems many issues have to be addressed. Unclear responsibilities of enforcement, overlapping functions have to be resolved, proper coordination among responsible agencies has to be established.

The Ministry of Renewable Energy and Public Utilities/Water Resources Unit has also embarked on re-evaluating and assessing the water resources of the island through a Master Plan. The Study is expected to start in early 2010 and be completed by mid-2011. The Master Plan will set the road map for future integrated strategies for the water sector as a whole.

UNEP and UNDP are jointly implementing a GEF project on the Implementation of Integrated Water Resources and Wastewater Management in Atlantic and Indian Ocean SIDS. The major components of the project include the:

- Development and implementation of demonstration projects in Integrated Water Resources Management (IRWM) and Water Use Efficiency (WUE)
- Development of IRWM and WUE monitoring and indicators framework
- Policy, legislative and institutional reforms, pricing mechanisms/economic incentives and capacity building for IRWM and WUE
- Knowledge exchange, best practices, replication and stakeholder involvement

SUMMARY:


Concerns
• Water scarcity
• Increasing water demand
• Insufficient storage infrastructure
• High Unaccounted for Water
Progress
• Good and regular water supply
• Increasing storage capacity
• Reduction in water losses in distribution network
• Audit of wastewater treatment plants
Way Forward
• Integrated water resources management
• Enhanced pollution control
• Construction of new dams
• Water auditing for large consumers

CHAPTER 6: LAND RESOURCES

Mauritius Strategy for Implementation

"The pressures on land resources that existed 10 years ago have only been exacerbated by competing uses, increased demands and land degradation."

Chapter 6: Land Resources

INTRODUCTION:

The Republic of Mauritius consists of a group of islands with a total land area of around 2045 km^2 within an Exclusive Economic Zone of 1.9 million km^2. The mainland, Mauritius, is the largest with an area of 1865 km^2, and comprising a coastline of 322 km, out of which some 42 km are declared public beaches. The total population is around 1.2 million. Thus, Mauritius has a high population density (644 inhabitants per km^2 in 2008), and has a limited area of land suitable for development.

Mauritius has no choice but to take up the challenges of flexible land use planning to enable the sustainable use of our land resources. High quality land, particularly close to urban strips and prime coastal areas, is scarce and is sought after by a variety of competing users.

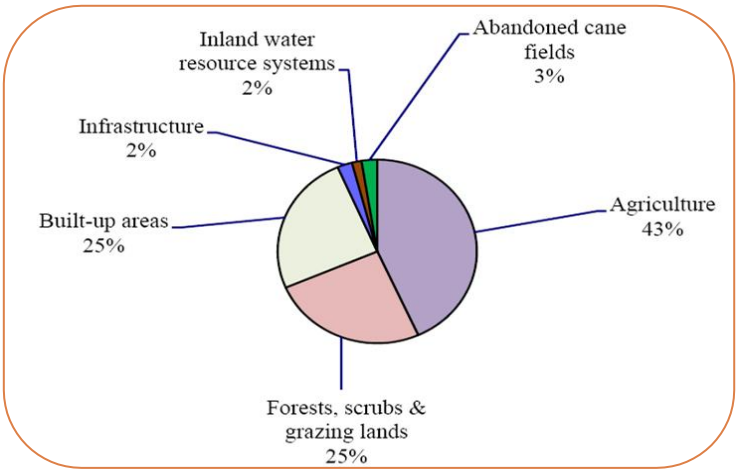


Figure 6.1: Land utilization – Island of Mauritius
(Source: Digest of Environment Statistics, 2008)

Agriculture uses more than 40% of available land. Some 66% of industries are located in the central urban zone. Environmentally sensitive areas are being degraded or lost, mainly due to expansion of built-up areas including development for housing or tourist accommodation. As a SIDS, land-based activities and sources of pollution have direct implications on the coastal zone. Forests and green spaces represent a quarter of total land area, although less than 2% consist of endemic forests.

Land in Mauritius is largely privately owned with the exception of State Lands distributed throughout the island and the coastal Pas Géométriques, which are government owned. Given the limited land resources and the pressure for development, a judicious use of land and mix of activities are required to mitigate various impacts related to:

- ☐ Food, water and energy security
- ☐ Climate change
- ☐ Coastal development
- ☐ Urban development and traffic congestion
- ☐ Poverty alleviation and development support
- ☐ Water supply and sanitation
- ☐ Energy efficiency of buildings and renewable sources of energy
- ☐ Ecosystem services

Since 1992, Mauritius has become party to the three Rio Conventions on biodiversity, climate change and, drought and desertification, amongst others, whose implementation is closely linked with sustainable land management.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Mauritius has a "plan-led" system of development control. Several complementary tools are used to plan, license and monitor development.

POLICY & PLANNING	▪ National Development Strategy ▪ Outline Planning Schemes ▪ Planning Policy Guidance ▪ Outline Planning Permission ▪ Sectoral or subject plans ▪ Forthcoming Integrated Coastal Zone Management Framework and Strategic Plan for Environmentally Sensitive Areas
REGULATORY	▪ Town and Country Planning Act 1954 ▪ Planning and Development Act 2004 ▪ Business Facilitation (Miscellaneous Provisions) Act 2006 ▪ Environment Protection Act (amended in 2008) ▪ Local Government Act (amended in 2006) ▪ Finance Acts (annual) ▪ Sugar Industry Efficiency Act (2001, as amended in 2006)
INSTITUTIONAL	▪ Town and Country Planning Board ▪ Ministry of Environment (Environment Impact Assessment Committee) ▪ Local Authorities (Business and Permits Monitoring Committee) ▪ Ministry of Agro Industry, Food Production & Security (Land Conversion Committee) ▪ Mauritius Revenue Authority ▪ Environment Appeal Tribunal
ECONOMIC INSTRUMENTS	▪ Fees to discourage conversion of agricultural land to other uses as well as to regulate parcelling of land ▪ Substantial increase in rental leases for coastal State Land (Pas Géométriques as well as City centre) ▪ Incentives and packages to planters and farmers ▪ National Residential Property Tax

■ National Development Strategy (NDS)

The NDS, the main planning instrument providing the spatial framework, was approved in 2003. Subsequent proclamation of part of the Planning and Development Act in 2005 gave legal force to the NDS.

In 2006, the policies and proposals were successfully translated at the local level through the preparation and approval of local development plans. In line with the principles of sustainability advocated in the NDS, a thorough review of the local plans for the main urban areas which have coalesced into a linear conurbation is planned so that an up to date framework for development is available for the next 10 years. The NDS is supported by sectoral or subject plans for issues like irrigation, land transport or for agricultural diversification, including the reform of the sugar and non-sugar sectors.

■ Outline Planning Permission & Planning Policy Guidance

An Outline Planning Permission has been introduced in 2009 to give comfort to developers prior to undertaking detailed drawings and studies for proposed developments. Several Policy Planning Guidance (PPG) documents have been prepared to assist developers, local authorities and the general public in complying with principles of good design and appropriate location of activities.

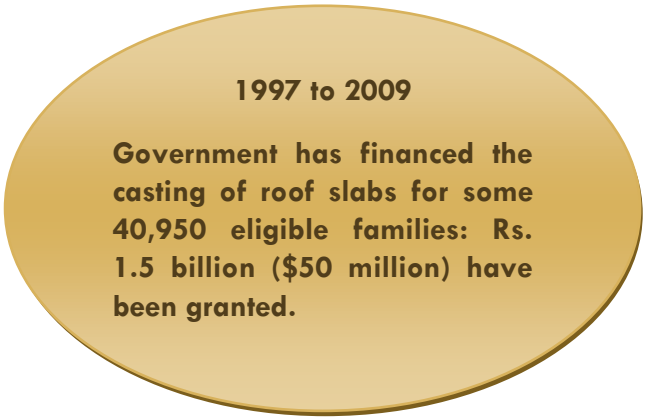
Legislative Framework

The legislative framework for the permitting process has been further reviewed to adapt to changing circumstances on the global scene and to facilitate the ease of investing and doing of business and the creation of small enterprises. In parallel, self-adherence by project proponents to prescribed guidelines was supported by a post-monitoring system. This has been implemented through the Business Facilitation (Miscellaneous Provisions) Act 2006 and consequential amendments made to related pieces of legislation concerning building and land use. Subsequently, related legislations for environmental assessment and subdivision of land have also being rationalized, in particular concerning procedures and time limits for effective implementation of layouts and delivery of serviced land for development.

Social Housing

In the sugar sector reform plan, Government will obtain 2000 arpents (844.2 ha) from the Mauritius Sugar Producers Association. 1000 arpents (422.1 ha) of land will be used for social housing purposes and 1000 arpents (422.1 ha) for food production. Under this scheme, some 166 Arpents (70 ha) of land on 12 sites have already been identified across the island representing the provision of some 2,000 serviced lots to low-income families.

In the Housing sector, Government has traditionally through the National Housing Development Corporation served the housing needs of low income and lower middle income families by constructing core housing units for low-income families as well as flats and provision of serviced plots of land to lower middle-income families. Some 10,500 low-cost housing units have been built and allocated to needy families. 1,477 lower middle-income households have acquired Exim Type housing units.



Sustainable Agriculture

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 our sugar cane sector, some 7,000 ha of land are expected to come out of sugar cane plantation. This land conversion has been carefully planned so as to optimise their development potential for non-sugar crops, farming practices, reforestation and other building and infrastructure purposes.

Creation of pasture enhances food security initiative

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.

Mining and Logging

The mining of coral sand which was formerly used as aggregate in building construction is now banned, and it has been substituted by finely crushed basalt rock. The reserve of this non-renewable inland resource is estimated to last for the next few decades at the current consumption rate. There is no significant mining sector and logging practices in Mauritius.

Land Protected Areas and Forests

In 2008, the 14,854 hectares of land protected areas comprised the Black River Gorges National Park (6,574 hectares - 45%) which are public, followed by the mountain reserves (3,800 hectares - 26%) and river reserves (2,740 hectares - 19%), which are all privately owned. The islets nature reserves accounted for nearly 621 hectares (4%). The remaining 6% consist of the Ramsar site in Rivulet Terre Rouge, mainland nature reserves, islets national parks, the Bras d'Eau reserve and other reserves.

All in all, forests represent 25.3% of the total surface area of mainland Mauritius. Yet the ratio dwindles down to a mere 1.6% for forests where native plants are still predominant. A key issue is insufficient legal protection of biodiversity on privately owned land. If the surface area of state-owned forests is stable since 1999, 53.1% of Mauritius forests are privately-owned and are diminishing, from 34,540 hectares in 1999 to 25,000 hectares in 2008. To address the issue of degrading forests, a National Forest Policy (NFP) was prepared with assistance from the Food and Agriculture Organisation. The NFP was adopted in 2006 and has a very clear emphasis on reforestation with native species, biodiversity conservation and eradication of alien invasive species.

Sustainable Land Management

Mauritius is not affected by desertification as such and the occasional droughts experienced so far have not lead to extremes of acute water shortages and food security. However, as a SIDS, 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.

SLM LONG-TERM GOAL

The agricultural, pasture, forest and other terrestrial land management in Mauritius and Rodrigues are sustainable, productive systems that maintain ecosystem productivity and ecological functions while contributing directly to the environmental, economic and social well-being of the country.

A GEF project, to build capacities for Sustainable Land Management (SLM) in appropriate government and civil society institutions/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.

Land Management Reforms

A Land Administration, Valuation and Information Management System (LAVIMS) will be operational by the end of 2010. It would comprise a national digital cadastre and an integrated information management system linking deeds registration and valuation. The project will be an important tool for efficient management of land resources.

LESSONS LEARNT AND GOOD PRACTICES:

Land use

Urbanisation and the development of industries and infrastructure have led to a loss of agricultural land. Between 1995 and 2005, the proportion of land under agriculture dropped from 48.2% to 46.4%, and that of forestry from 30.6% to 25.3% whilst built-up areas increased from 13.4% to 19.5% The effective area under sugarcane has gradually shrunk to 65,500 hectares in 2008 from 68,523 hectares in 2007 (-4.0%). During the same period area under tea plantation decreased from 701 hectares from 709 hectares and area under tobacco to 256 hectares from 258 hectares (-0.8%). More recent data is not yet available. Coastal erosion is also affecting land use.

With the reform in the sugar sector, a significant amount of land currently under sugar is likely to come under pressure for release to other uses. In 2008, with support from the European Union, a Strategic Environment Assessment (SEA) of the Multi Annual Adaptation Strategy for the sugar sector reform was undertaken. This SEA, as well as the strategic plans for the sugar and non-sugar sectors and the Food Security Strategic Plan, all make individual financial, social and environmental sustainability assessments.

Land Planning

Land planning failures in the past, coupled with inadequate control of development, have led to the admixture of incompatible developments, encroachment onto environmentally sensitive areas and conversion of prime agricultural land. Projections into the future show that the release of land from agriculture should more than meet development needs, and will provide an opportunity to redress

these problems. If future development is not carefully managed, degradation of rural, urban and coastal environments (e.g. by water pollution, congestion, noise, dust, litter) will impose increasing costs on the community.

An area wide approach to planning of land resources is becoming the norm for optimizing infrastructure, providing options for mixed use zones instead of designating single use sites and setting standards for buildings (e.g. parcel size and siting). Planning Policy Guidance seeks to avoid locating polluting entities close to sensitive uses, whilst encouraging the creation of small and medium business estates close to but outside residential zones.

It is still possible to provide development and employment opportunities in sensitive areas located in the rural zones through well planned projects and activities, and by inculcating environmental stewardship. Cross-sectoral initiatives combine siting of small businesses, permitting process, financial entrepreneurship support to alleviate poverty and job redundancy by encouraging home working and live/work premises.

Permitting and monitoring

Based on experience, lessons learnt and the need to facilitate investment and development in a responsible manner, the permitting and licensing process has been streamlined across various agencies and mandatory processing time limits have been introduced. Voluntary adherence by project developers to guidelines, such as the 28 environmental guidelines in force since 2006, has simplified the permitting process. This restructuring has shifted the responsibility for compliance, in clearly defined cases, from the licensing agency to the developer.

The authorities then focus on post-monitoring. Personnel and logistics to enable efficient post-monitoring have lagged behind the implementation of the post-monitoring framework. For example, statutory interagency post-monitoring was only promulgated in July 2008, and staffing is planned for 2010. Monitoring equipment is still inadequate. The major lesson learnt is that, despite the most detailed pre-planning, obstacles remain insufficient funds and the inadequate capacity to coordinate and operationalise policies.

Land as an asset

Reforms have been undertaken to derive fair return on vital assets (state land) owned by Government. The industrial and commercial leases have been increased and are now being granted for a period of sixty years for a security of tenure for hotels and other touristic enterprises. A National Residential Property Tax has been introduced.

Agrochemical control

The agricultural research and service institutions all encourage minimal use of inorganic fertilisers and pesticides, to avoid contamination of products, and surface and underground water courses. The Mauritius Sugar Research Institute has geared its weed control programme into a weed management programme to minimise use of herbicides.

The Agricultural Services provide free analytical services to farmers for soil and plant parts, to optimise fertiliser use. Sensitisation campaigns are carried out by the officers of institutions involved, especially AREU (Agricultural Research and Extension Unit), the MSIRI and Farmers Service Corporation. Other cases are presented in the various sections already mentioned.

EFFECTIVENESS OF IMPLEMENTATION:

Land use and planning

From 1995 to 2005, the proportion of land under sugarcane decreased by 6.3%, 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%. More recent data is not yet available.

Land use	1995	2005	% change
Agriculture (sugar and others)	46.3	43.3	-6.5
Forests, shrubs and grazing land*	30.6	25.3	-17.2
Built-up areas	19.5	24.9	27.7
Infrastructure	2.1	2.3	12.5
Inland water resource systems	1.4	1.6	11.5
Abandoned sugar cane fields	-	2.5	-

(*Natural forests have been reduced to less than 2%)

Figure 6.1 Land Use by category, Island of Mauritius (1995 and 2005) (Source: CSO, 2008)

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.

There are issues which cross-cut across several Ministries and institutions, and while most are well-defined with multi-stakeholder committees such as the Land Conversion Committee, others are still unclear or duplicated, like the role of the new Food Laboratory under the Ministry of Agro Industry. The Food Act, which governs food production and sale, is under the Ministry of Health & Quality of Life, which has enforcement powers. The multistakeholder Dangerous Chemicals Control Board under the aegis of the Ministry of Health & Quality of Life addresses the issue of dangerous chemicals including pesticides.

Environmental Impacts Assessment (EIA) Licences and Preliminary Environmental Report (PER) Approval

The Ministry of Environment and National Development Unit grants EIA licences to ensure that environmental requirements are met during the construction and operation of major development projects. The PER system handles projects with less environmental impacts. Environmental guidelines with established criteria assist developers for common projects. In 2008, 44 EIA licences were granted of which 27% were issued to land parcelling and 18% were to coastal and related works and 23% were provided to housing (Housing projects like bungalows, flats etc). During the same period, 40 PER licences were granted, out of which 40% were for industrial development projects.

Year	EIA	PER
2004	85	-
2005	55	-
2006*	55	91
2007	55	96
2008	44	40

(*2006 : Promulgation of the Business Facilitation Act)

Figure 6.2: EIA licences and PER approvals granted (2004-2008)
Source : CSO, 2008)

Monitoring

Monitoring of the outline planning schemes are being undertaken to keep the plans up to date and in line with present socio-economic objectives of Government. Furthermore, the reform in the leases of coastal State Land for residential purposes has recouped significant revenue, which has been invested into the economic reform and social support measures. The reform is being extended to State-owned industrial leases commensurate with their strategic location.

The law also makes provision for appeal against the decisions of the local authorities, in cases where development permits are refused or where conditions attached therein are considered as being unacceptable. The Environment Appeal Tribunal deals with appeals made in favour or against the granting or not of an EIA licence or PER approval. Monitoring of land management related offences are undertaken.

SPECIAL CONSTRAINTS AND CHALLENGES:

As a SIDS, Mauritius stands at a new juncture in land use planning and development. The challenging sectors of its economy continue to evolve, impacting directly on the use of its scarce and vulnerable land resources.

These perpetual challenges may be grouped as follows:

Pressure from users

- Loss of prime agricultural land to other uses
- Demand for up-market real estate (Integrated Resort Schemes) and hotels in particular along the coast, on islets and encroachment on/near Environmentally Sensitive Areas
- Residential projects

Urban sprawl

- To be limited by consolidating other urban centres, redevelopment of residential areas and inner town centres thus encouraging higher development densities, closeness to job centres and services

Decentralisation

- Over-concentration of development in central business districts of towns and villages
- To shift towards compact urban form will maximize mass urban transport mode, reduce gas emissions, reduce pollution, noise, and strain on road capacity

Transport

- Proper integration of transport planning with land use
- Linear conurbation, where development is concentrated, is served by two main transport lines, with inadequate support by lateral transport lines, is the cause of major traffic congestion
- Separation of work and living places adds to traffic pressure

Support Infrastructure required

- Public infrastruture projects (e.g. sanitary systems, road networks, sports, health, schools, dams)
- High accessibility and high density housing need the creation of pedestrian routes and cycles ways to complete the transport alternatives
- Creation of urban parks and linear green corridors
- Architectural design

Protection of environmental assets

- Adaptation to climate change
- Cumulative environmental impacts of projects
- Protection of Environmentally Sensitive Areas (ESAs)
- Soil erosion control to maintain agricultural productivity and limt siltation of dams, rivers and lagoons
- Community and promoter participation in protection initiatives
- Ecosystems approach lacking
- Valuation of environmnetal assets not undertaken

Funds

- Inadequate capacity (human, financial and logistical)
- Lack of resources for upgrading and redevelopment of existing dilapidated urban areas
- Protection of natural and man-made heritage

In order to enhance the sustainability of both land use planning and development projects, two major studies have been undertaken and are expected to be adopted shortly. Those studies intend to:

- ☐ Protect and conserve the Environmentally Sensitive Areas of Mauritius and Rodrigues. Under this project, 14 terrestrial and lagoon ESA types (e.g. wetlands, catchment areas, forests, and coral reefs) have been identified, classified and demarcated. A policy, legislative and management framework, including a GIS and geospatial database, has been developed.
- ☐ Enable judicious development of the coast through an Integrated Coastal Zone Management Framework nearing completion.

Both studies would both require substantial human, technical and financial resources to be meaningfully implemented.

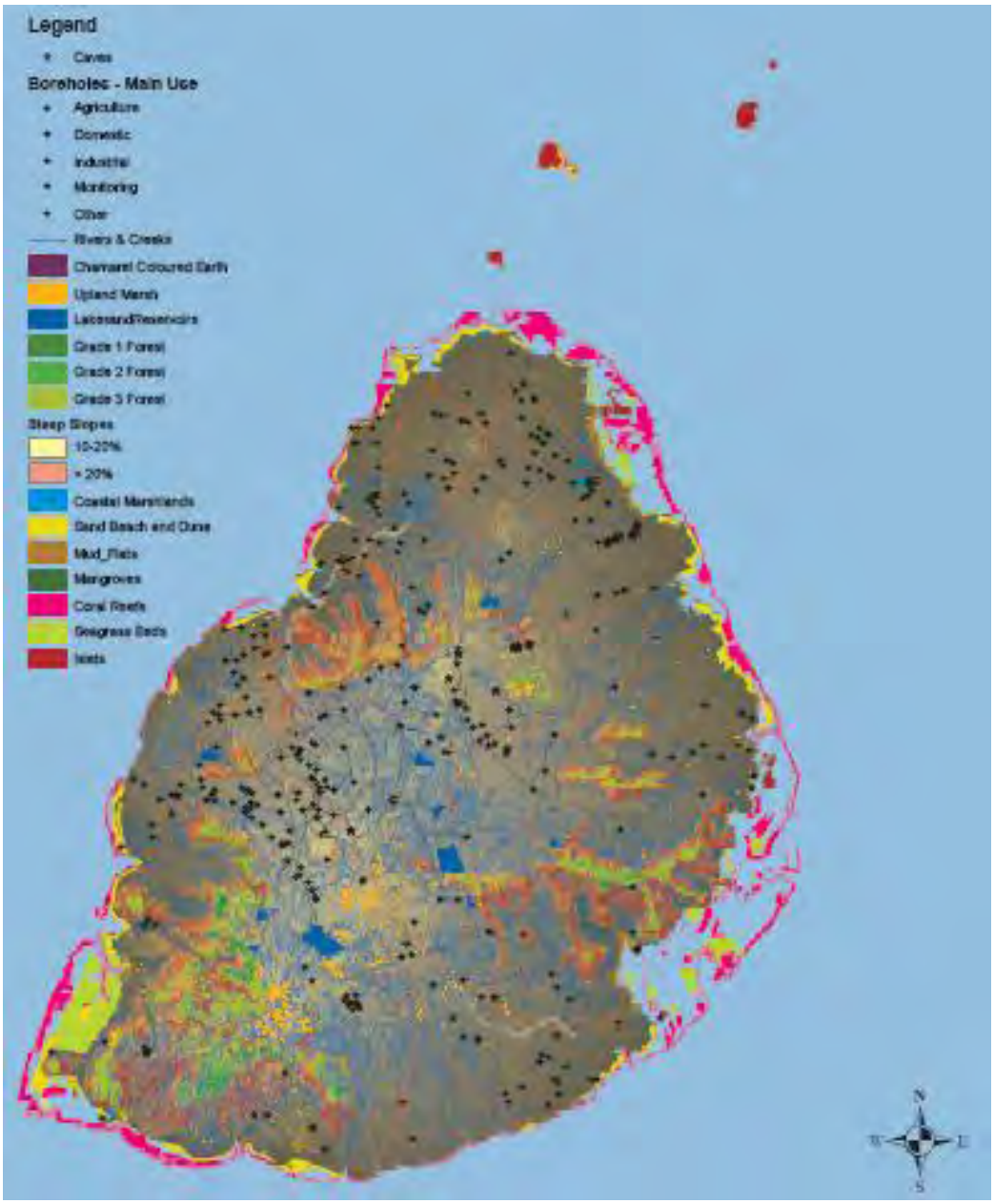


Figure 6.3: ESA Types in Mauritius
(Source: ESA Strategic Plan, 2009)

RECENT TRENDS AND EMERGING ISSUES:

■ Food Security

The recent food crisis and its impacts on Mauritian households have triggered the development of a Food Security Strategic Plan which 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 our 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 Regional Development Company Ltd. (RDC) is a private company with the Government of Mauritius as sole shareholder. Its object is to promote regional food security and other regional development projects. The Government of Mozambique is proposing to lease to the Government of Mauritius some 23,500 hectares of land (18,500 hectares in the Province of Maputo and 5,000 in the Province of Manica). The RDC will call for proposals by mid-February 2010 from private operators for projects that contribute to food security or renewable energy, including support services and production of inputs and processing of outputs

It is also proposed to set up the Regional Development Partners Company (RDPC) to deal with non-commercial risks associated with projects and issues related to raising finance at the margin and building public infrastructure required. The RDPC will have as shareholders Mauritius and Mozambique, Development Partners, Project Promoters and other stakeholders, thus providing a unique platform to facilitate interaction that will lead to a coordinated solution to investment problems in infrastructure. It will, however, also be open to other Governments in the region where regional food security and/or renewable energy projects are being developed.

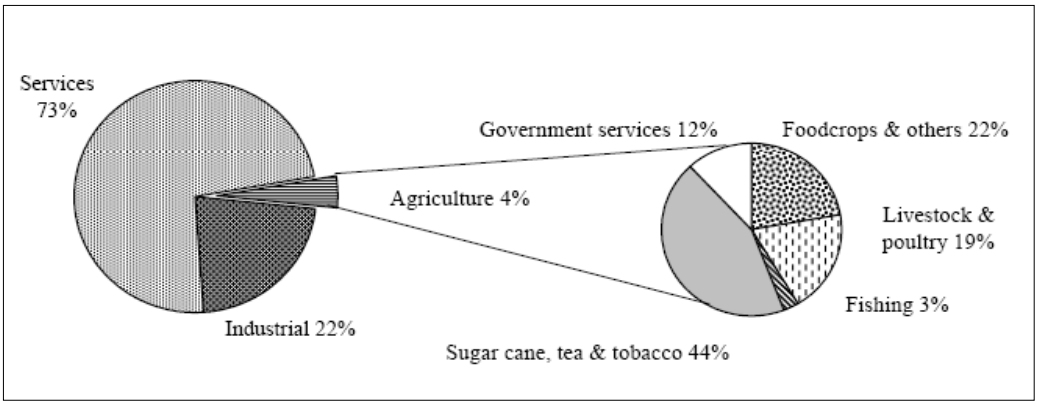


Figure 6.4: Share of Agriculture in the economy
(Source: Digest of Agriculture Statistics, 2008)

■ Climate Change & Ecosystem approach

All our land development and infrastructure need to adapt to the impacts of climate change. The upcoming trend in our export markets is that buyers are on the lookout for organic products, good

agricultural practices and for tourists to choose ecologically well-preserved destinations. Valuing our land resources and adopting an environmentally more stringent approach would be both economically and socially beneficial, especially for local communities.

Water security and land degradation are linked, the more with the impacts of climate change. Rodrigues is a clear example of how excessive deforestation has brought about uncontrolled soil erosion. This has then disturbed water retention and absorption of the soil cover, resulting in insufficient replenishment of aquifers and accelerated siltation of lagoons.

■ Land Management & Land Prices

The Land Administration, Valuation and Information Management System (LAVIMS) would provide for a national digital cadastre and integrated information management system linking deeds registration with valuation. The system would be an important tool for efficient management of land resources and would be operational by end December 2010.

The demand for luxurious villas under the Integrated Resort Scheme, Real Estate Schemes, coastal high-end hotels, nature-based tourism by a basically expatriate customer base, the facilities offered for foreign professionals to acquire property and coupled with the foreign currency exchange rate, has resulted in high property prices relative to the average local wage rate.

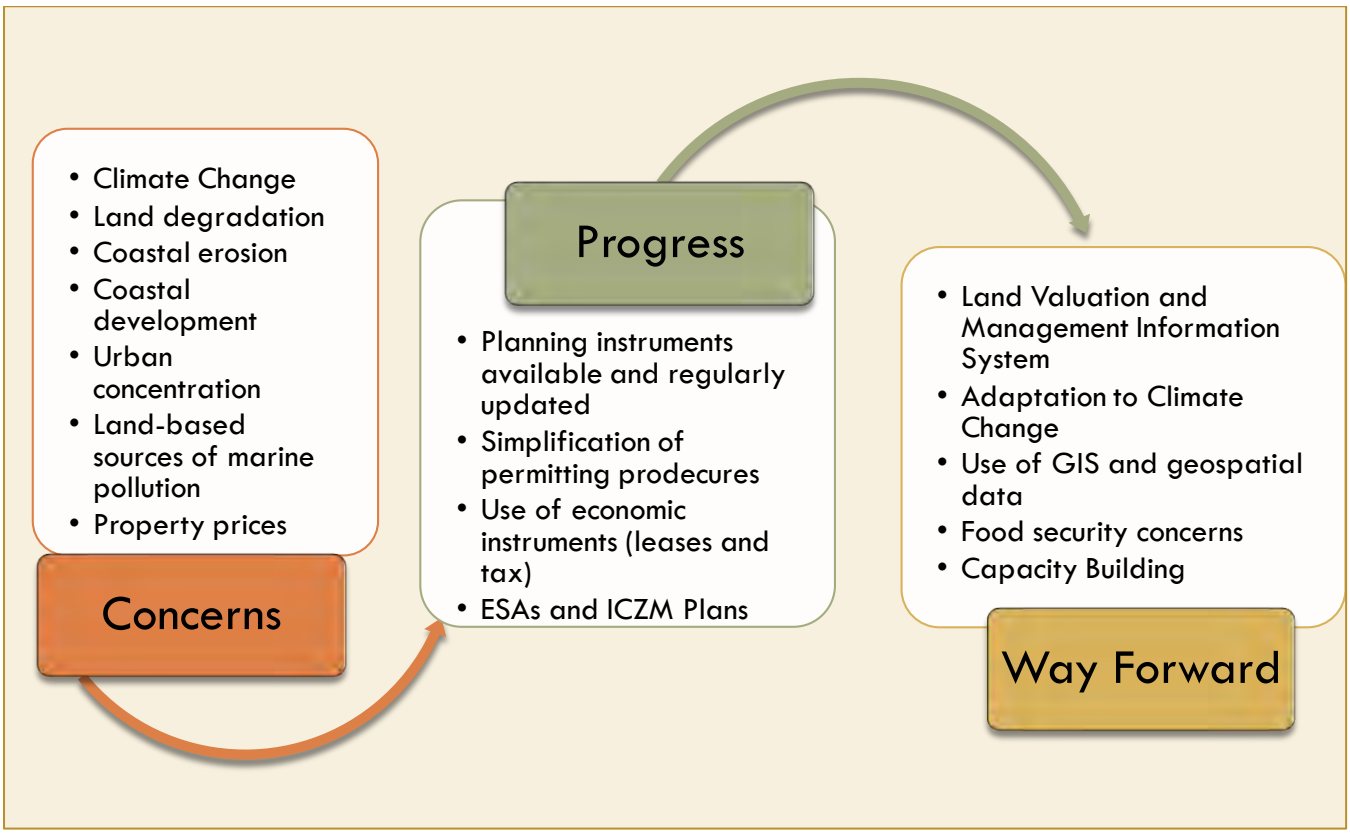
CONCLUSION AND WAY FORWARD:

Recent rapid economic development in Mauritius has seen increasing pressures on the islands' natural environment. Economic progress and new investment, particularly in the manufacturing, service and tourism sectors, have required considerable improvements in national infrastructure. Natural resource use needed to feed this development has exacerbated pressure on scarce land resources and its environmentally sensitive areas (ESAs). This is of particular importance to a SIDS like Mauritius, where land area is extremely limited and often very susceptible to changes in the environment. Sustainable land management can contribute significantly to the maintenance of inter-generational equity, considered a key component of a sustainable economy.

In Mauritius, land use planning plays an important role by helping to strike a balance between development, food security, protection of the environment and achieving social equity through judicious spatial distribution. It aims to protect natural and man-made assets for the benefit of both present and future generations, thus ensuring that development and growth are sustainable. Land use thus needs to factor in climate change and extreme weather events, and coastal developments need to also fully integrate sea level rise.

Multistakeholder consultation in land planning and major projects needs to be strengthened. Community involvement in management of ESAs is required. Adequate resources are needed to ensure the effective implementation of the post-monitoring framework and compliance with land use regulations. Resources are also needed to protect and conserve the Environmentally Sensitive Areas of Mauritius and Rodrigues, as well as to implement the national Integrated Coastal Zone Management Framework.

SUMMARY:


Climate Change
Land degradation
Coastal erosion
Coastal development
Urban concentration
Land-based sources of marine pollution
Property prices
Concerns
Progress
Planning instruments available and regularly updated
Simplification of permitting prodecures
Use of economic instruments (leases and tax)
ESAs and ICZM Plans
Land Valuation and Management Information System
Adaptation to Climate Change
Use of GIS and geospatial data
Food security concerns
Capacity Building
Way Forward

CHAPTER 7: ENERGY RESOURCES

Source: CEB Annual Report 2008

Long Term Energy Strategy (2009 – 2025)

"The Government of Mauritius is focused on diversifying the country's energy supply, improving energy efficiency, addressing environmental and climate changes and modernizing our energy infrastructure in order to meet the challenges ahead."

Chapter 7: Energy Resources

INTRODUCTION:

Energy is central to the economic development of Mauritius and will continue to be an indispensable vector on which the economic and environmental sustainability will depend. With no indigenous energy resources such as oil, natural gas or coal reserves, Mauritius, like most SIDS, relies heavily on imported energy sources and will continue to do so for the short to medium term. For instance, in 2008, energy imports amounted to 20.8% of total imports, representing 27.64 billion rupees (around $9 million USD) with the transport sector being by far the largest consumer of imported fuel (48%) followed by power generation (25%). In terms of the total energy mix, imported energy sources stood at 81% in 2008, whilst the remaining 19% was from locally available renewable energy sources: hydro and bagasse.

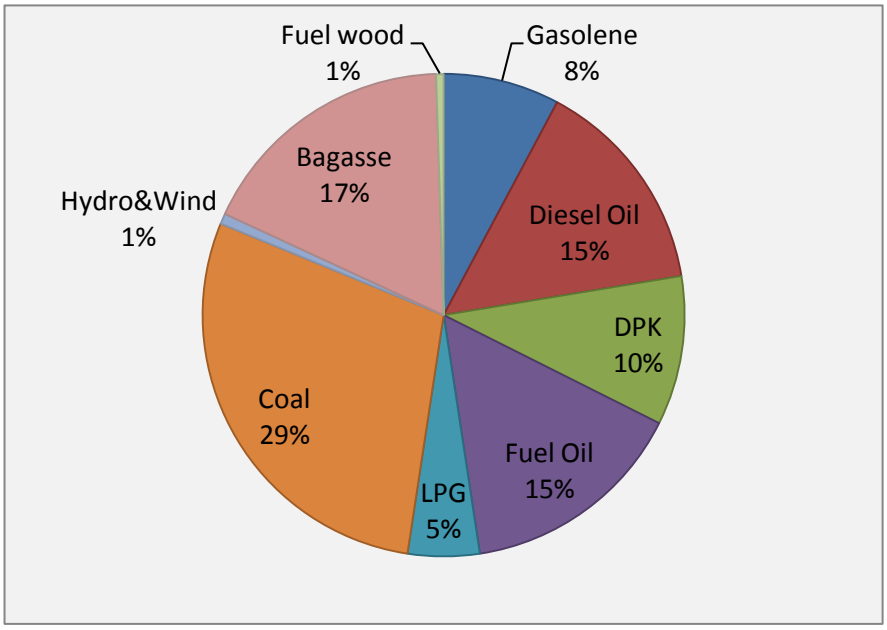


Figure 7.1: Total Primary Energy Requirements, 2008 (CSO, 2008)

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

In view of the high volatility of fossil fuel prices and in order to meet the challenges ahead, the Government of Mauritius took a decisive step to diversify the energy supply, improve energy efficiency, democratise energy supply, address environmental and climate change and modernise the country's energy infrastructure. Moreover, besides ensuring security of supply and affordability, Government is also confronted with the challenge of making a rapid shift to a low carbon, efficient and environmentally benign system of energy supply.

In this line, the Long Term Energy Strategy 2009 - 2025 was adopted in October 2009. The latter sets the path to address the energy and environmental challenges lying ahead and is based on the emerging economic model, viz. a target of two million tourist arrivals by 2015, a restructured cane industry, a

booming information technology sector, seafood hub and manufacturing industry. Furthermore, bearing in mind that energy accounts for almost 80% GHG emissions in Mauritius, the environmental dimension has also been integrated in the energy strategy.

Additionally, under Government's Maurice Ile Durable vision, a target of 35% renewable energy by 2025 has been set. To achieve this target, the Long Term Energy Strategy 2009 - 2025 is focusing on the following key objectives in the medium to long term:

- ☐ Reduce the country's vulnerability as regards imported fossil fuels and their volatile prices
- ☐ Improve energy efficiency
- ☐ Diversify the country's energy supply by democratising energy supply
- ☐ Exploit local renewable sources of energy
- ☐ Secure affordable energy to consumers
- ☐ Promote economic growth and job creation
- ☐ Sensitise civil society for a change in lifestyle with regard to energy consumption
- ☐ Ensure the financial sustainability of the electricity utility
- ☐ Promote long-term sustainable development in line with the "Maurice Ile Durable" concept

Energy Efficiency and Conservation

◘ Sensitization

The power utility - Central Electricity Board (CEB), has been active in raising energy saving awareness by disseminating a "*Guide pratique pour utiliser moins d'électricité sans diminuer son confort*" (Guide on energy conservation and efficiency at home) to all its customers.

Guide on energy conservation and efficiency at home

◘ Sale of Energy Saving Bulbs

In 2008, the CEB, with the financial assistance of the Maurice Ile Durable Fund (MIDF), embarked on a far-reaching project on energy conservation, in line with the "Maurice Ile Durable" concept. The sale of one million compact fluorescent lamps (CFLs) at heavily discounted prices to all its customers, in exchange for older, cheaper bulbs was an unprecedented success. This initiative reduced evening peak demand by about 14 MW and enabled the average customer to save some Rs 5.59 per kWh - a saving enabling its customers to recover their investment within a one year period.

◘ Diversifying Energy Mix

In line with the Long Term Energy Strategy 2009 - 2025 a number of power generation projects, to further increase the country's renewable energy capacity, are under way.

- A grid-code has been prepared, which provides the technical framework for Small Independent Power Producers (SIPPs) with capacity below 50 kW to generate electricity for their own purpose and feed any surplus into the national grid. Appropriate feed-in tariffs and incentive schemes for sale of surplus electricity to the national grid are being worked out and would be implemented as from early 2010.
- A Master Plan for Renewable Energy Development in Mauritius will soon be prepared.
- Financial incentives are being provided for the purchase of solar water heaters for domestic use.
- Consideration is being given for the development of a 25 MW wind park at Curepipe Point.
- Five wind turbines (3x60 kW and 2x275 kW) have been installed in Rodrigues and two additional 275 kW turbines will be operational this year, representing some 10% of electricity generation in the island.
- Construction of two hydro power plants of 375 kW each – one at Trente Chutes along the La Nicolière Feeder Canal and the second at Midlands Dam. The one at Trente Chutes is expected to be commissioned in 2010, while construction of the Midlands Dam power plant will be started upon finalization of financing.

New wind farm at Grenade, Rodrigues

- The setting up of a Waste-to-Energy plant is being considered.
- A 3 MW landfill gas project at Mare Chicose Sanitary Landfill.

Research & Development

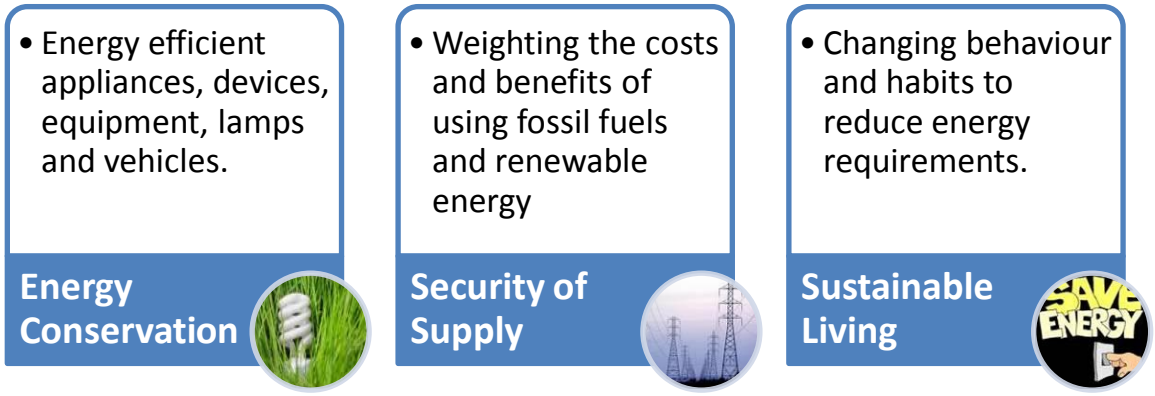
Biofuels & Renewable Energy Resource Assessment

The Mauritius Research Council has carried out several studies on energy efficiency and renewable energy:

- Waste vegetable oil as substitutes to diesel oil.
- Jatropha Biofuel Feasibility Study.
- Coconut oil as biofuel to generate electricity and for use in transports in Agalega.
- Electricity generation from seaweed biomass.

LESSONS LEARNT AND GOOD PRACTICES:

Basically, the Long Term Energy Strategy addresses the energy problem in a three pronged way, namely through:



In view of promoting the "Maurice Ile Durable" concept, summer time was implemented on a pilot basis from October 2008 to March 2009. Although the summer time initiative was expected to produce gains to the country, reduce global carbon emissions, generate substantial savings in energy consumption, this initiative was discontinued due to social implications.

EFFECTIVENESS OF IMPLEMENTATION:

To democratize and encourage greater competition in the energy sector, it is essential to have the appropriate market regulations. To that effect, a Utility Regulatory Authority Act was proclaimed in September 2008 and the Board of the multisectoral Regulatory Authority would be operational in 2010. Furthermore, once the Regulatory Authority is operational, the existing Electricity Act 1939 will be repealed and replaced by a new Act. The latter Act will provide for the reform of the electricity sector, including improvements in the standards of customer service and consumer protection.

SPECIAL CONSTRAINTS AND CHALLENGES:

Under a normal economic growth, coupled to increasing standards of living, electricity demand in Mauritius is projected to increase significantly in the next decade, thereby necessitating heavy investments in the electricity sector. With no indigenous reserves of fossils fuels nor any possibility for electricity interconnection, and the need to ensure a secure and reliable electricity supply at an affordable price, there will still be reliance of fossil fuels to meet the increase in demand, though every effort would be made to maximize on energy efficiency, renewable energy sources and demand side management. Unsustainable pressure on natural resources and on the environment is, therefore, inevitable if energy demand is not decoupled from economic growth and fossil fuel demand reduced. It is precisely to address this issue that the Long Term Energy Strategy 2009-2025 was prepared.

For the effective implementation of the energy strategy, appropriate financial, incentive and tax regimes would have to be developed that would allow for sustainable energy financing so that there is a shift in energy usage pattern that would favour efficiency at the sectoral level, which would be mirrored at the macro-economic level. This would require a paradigm shift from the traditional practice of putting in

place measures on the supply side to having a functional fiscal framework that promotes efficient energy use, affordability and opportunity to lower the cost of energy to the user through the use of sustainable energy techniques. In his address at the Copenhagen Climate Conference in December 2009, the Prime Minister, Dr. The Honourable Navinchandra Ramgoolam, stressed that the attainment of 35% renewables by 2025 is feasible only through appropriate support of the International Community, as provided for under the Bali Action Plan.

Such fiscal framework would aim at helping the population at large to use energy efficiently and generate their own energy using renewable energy sources. As regards the industrial sector, the fiscal framework should be such that affordability of energy is enhanced that would allow the local industry to remain or become more competitive.

RECENT TRENDS AND EMERGING ISSUES:

With a view to moving the country towards an energy efficient economy, a new legal framework will be set-up with the enactment of an Energy Efficiency Bill in 2010 to promote energy efficiency programmes at all levels. The objective is to reduce energy use and costs, protecting the environment, improving productivity and contributing to the mitigation of the effects of climate change.

Subsequently, an Energy Efficiency Management Office will be set up as a nodal agency for a systematic and comprehensive development and implementation of energy efficiency measures including assessment of energy consumption, formulation of strategy and enforcement of regulations for product labelling and new building codes.

Appropriate training and capacity building programmes will need to be established in collaboration with tertiary institutions and development partners to develop skills locally in the field of renewable energy and energy efficiency and encourage research and development.

To cope with increasing electricity demand, the CEB intends to use a series of economic instruments such as:

- ☐ Introduction of preferential feed-in tariffs for electricity generation from renewable energy sources.
- ☐ Introduction of 'net metering' for SIPPs as an economic incentive to install solar photovoltaic panels or micro-wind turbines.
- ☐ Introduction of time-of-day metering and tariffs that provide an economic incentive for customers to move daytime electricity loads to night time, hence increasing the overall efficiency of the power system.

The transport sector is one of the heaviest energy consumer in Mauritius. However, over the years, the situation has worsened with the significant increase in the number of vehicles on our roads as well as severe congestion along the main roads. Heavy vehicular traffic causes pollution, in terms of vehicular emission whereas traffic congestion has also a negative impact on the economy and on the health and productivity of the nation. To this end, Government is taking the following short to medium term measures:

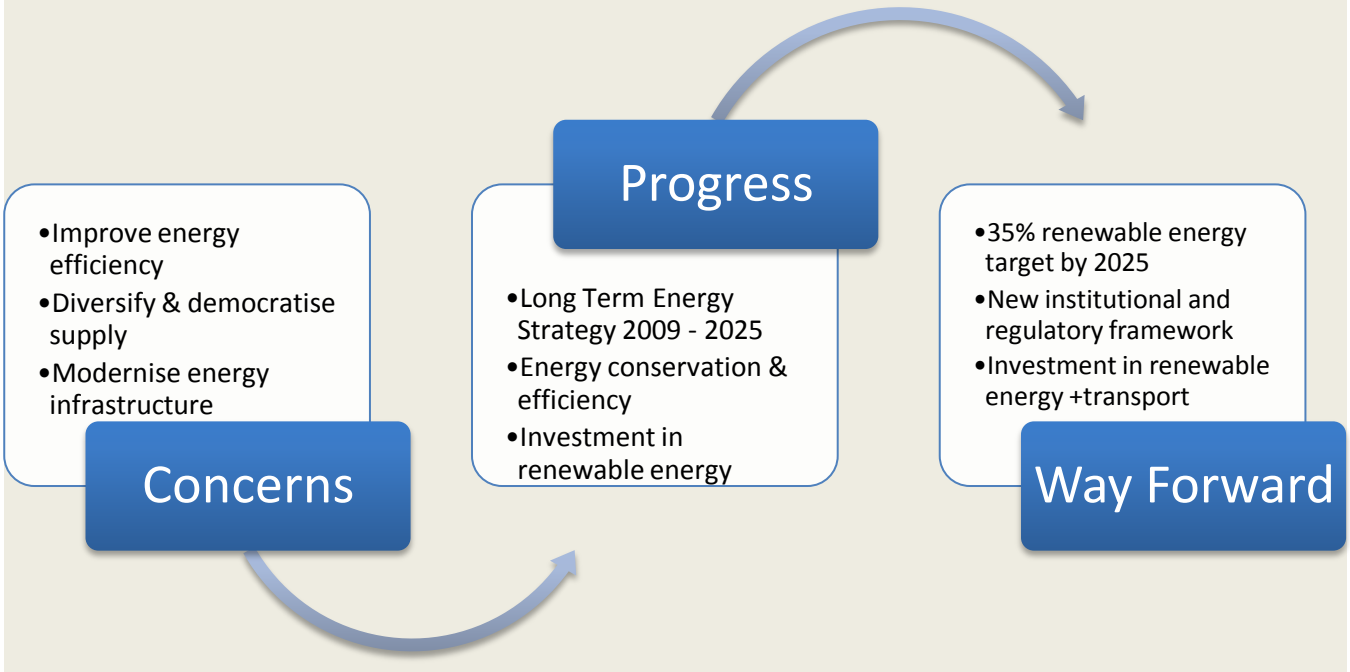
- ☐ Promotion of more efficient and lower emission vehicles and fuels.

- ☐ The sulphur content of automotive and industrial diesel oil would be lowered to 500 ppm as from August 2010, making substantial air quality improvement.
- ☐ Diversification of fuel supplies with biodiesel manufacture or import.
- ☐ Promotion of fuel saving techniques in driving through education and information programmes.
- ☐ Promotion of hybrid and electric vehicles through fiscal incentives.

CONCLUSION AND WAY FORWARD:

There is no single solution to meeting energy demand in Mauritius and, as a result, the country will have to rely on an array of resources to meet its energy needs and this portfolio will *inter alia* include renewable energy sources, traditional fossil fuels linked with new technologies to reduce their environmental impact, energy efficiency and demand side management. What is needed is nothing short of a complete change in habits through decisive policy actions, but without losing sight of the affordability criteria. In this venture, the collaboration and participation all stakeholders is a *sine qua non*.

SUMMARY:



CHAPTER 8: TOURISM RESOURCES

Positioning Mauritius in the World

- Ministry of Tourism, Leisure & External Communications, Government of Mauritius

"Mauritius is internationally renowned as one of the world's premier luxury holiday destinations. With many of the world's most famous hotels, Mauritius enjoys one of the highest rates of returning visitors in the world."

Chapter 8: Tourism Resources

INTRODUCTION

Mauritius has developed a tourism industry of worldwide recognition and the island is now identified as an established destination offering high levels of tourism products and services. Its high quality hotel sector is often described as the best in the world. The basis of its success has been the beauty of the island and the welcome of its people. The island is surrounded by coral reefs that provide long stretches of white coral beaches. The lagoon and beaches are the key resources that are widely publicized to attract international visitors.

Source: www.tourism-mauritius.mu

The Ministry of Tourism, Leisure & External Communications 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.

Government's Vision – Achieving a target of 2 million tourists by 2015

Government has placed tourism at the top of its agenda and its vision is to target 2 million tourist arrivals by the year 2015.

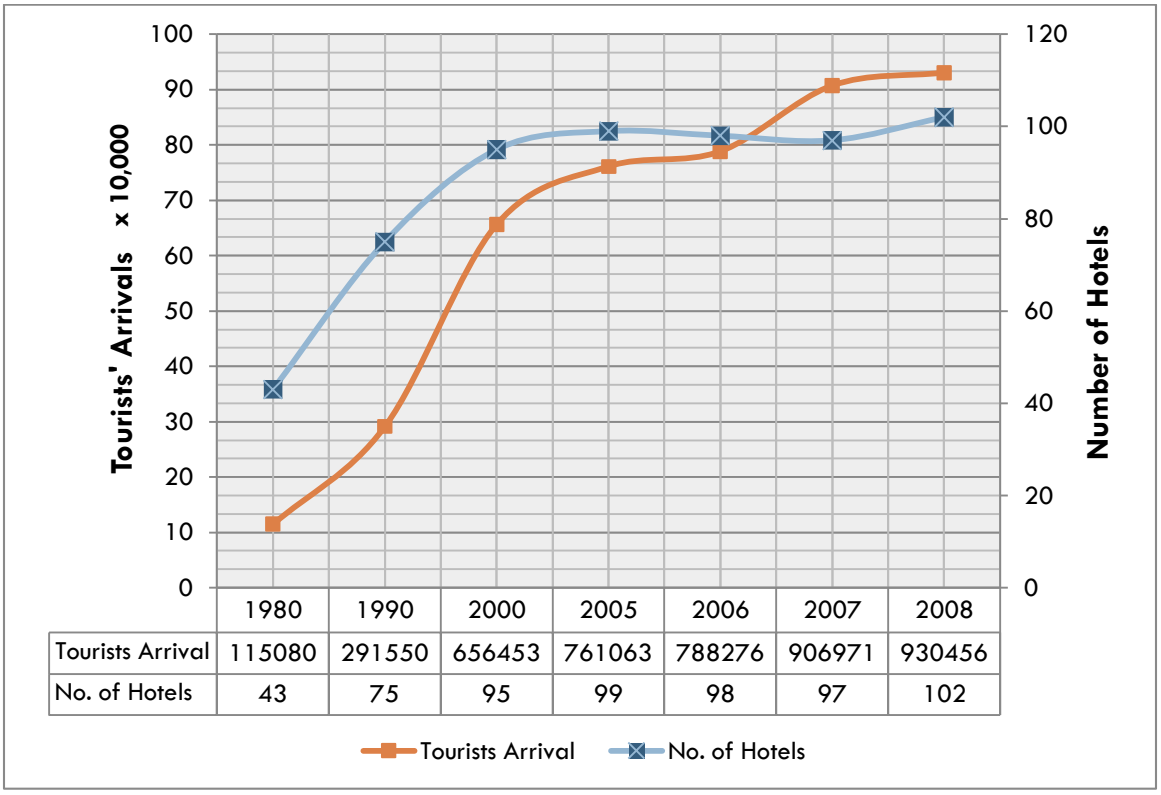
Tourism Industry makes substantial contribution to foreign exchange earnings, Gross Domestic Product (GDP) growth and employment creation. After showing signs of weakening in 2006, the sector regained dynamism, with 15.1% growth in arrivals in 2007. However, with the impact of the turmoil experienced 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. As

at 2009, the tourism sector contributed to 8.9% of GDP; created 26,922 direct jobs and generated Rs. 35,693 million ($1190 million USD) as tourism receipts.

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.

Since 2005, Mauritius has been awarded a series of prizes, such as: "World's Leading Island Destination" for 2009 and Best Outbound Travel & Leisure Destination by the India Travel Mart, just to name a few.

Table 8.1: Tourists Arrivals & Number of Hotels



	1980	1990	2000	2005	2006	2007	2008
Tourists Arrival	115080	291550	656453	761063	788276	906971	930456
No. of Hotels	43	75	95	99	98	97	102

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

In order to achieve the target of 2 million tourists by 2015, a series of measures have been taken during the past five years. These are as follows:

- ☐ Revamping of the tourism policy with focus on the gradual liberalization of air access.

- ☐ The strengthening of the marketing strategy by:
  - Positioning Mauritius as a cruising destination and during the first quarter of 2009, cruise passenger arrivals grew by 83%.
  - Marketing the country as "Maurice sans passeport" to attract French tourists to Mauritius up till 30 June 2010.

☐ The Tourism Sector Strategy Plan (2009-2015) has been prepared recommending ways and means of achieving an environmentally sound, socially acceptable and economically viable tourism development.

☐ The Mauritius Brand Strategy has been launched in October 2009 to strengthen and enhance the image of the Mauritius destination and to ensure greater visibility of the Mauritian brand worldwide. The objective of this branding exercise is to attract investors for the business opportunities in Mauritius, visitors for its hospitality industry and buyers for its export goods.

☐ Professional assistance has been given to Small and Medium Enterprises under the Empowerment Programme to improve the quality of their products so that they can act as reliable suppliers for the tourism industry.

☐ Measures taken to protect the environment (pollution control, sound environmental management, protection of natural resources, landscaping, etc.)

☐ Promotion of Sustainable Tourism

- Promoters of new hotel projects are encouraged to use renewable energy and adopt eco-friendly practices and use, as far as practicable, energy saving devices.
- Eco-friendly outboard engines for crafts at sea are now being used to protect the marine environment.
- Low-rise and low density hotel development is encouraged to avoid the disfigurement of the coastal landscapes.
- Hotel projects are monitored to ensure that they conform to the applicable Planning Policy Guidance (PPG) and the activities of tourist enterprises are regulated and monitored to promote sustainable tourism development.
- Permanent mooring buoys have been installed at dive sites to protect the coral from damage caused by anchors.

☐ Measures have been taken to ensure a safer and more secure environment for tourists.

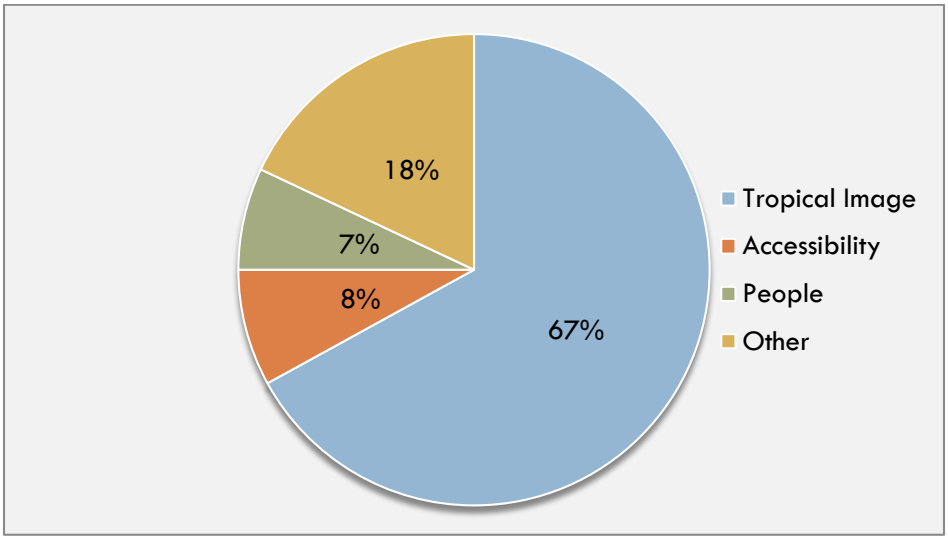
- All guest houses, tourist residences and hotels must be equipped with burglar alarm systems, and CCTV surveillance cameras. A Tourism Safety Panel has been set up to register security companies which meet the Ministry's established criteria.

☐ A Tourism Fund has been set up, which finances the provision of social amenities to locals in areas where tourism projects are being implemented; protection and rehabilitation of scenic landscapes, lagoons, rivers and islets; and control and eradication of pests and other nuisances.

☐ Measures are taken to protect our local culture:

- The Festival International Kreol is organized on a yearly basis with emphasis on the value and beauty of the Creole culture, language, cuisine, art, music and dance. Organization of Regatta competitions have also been undertaken in traditional fishing villages

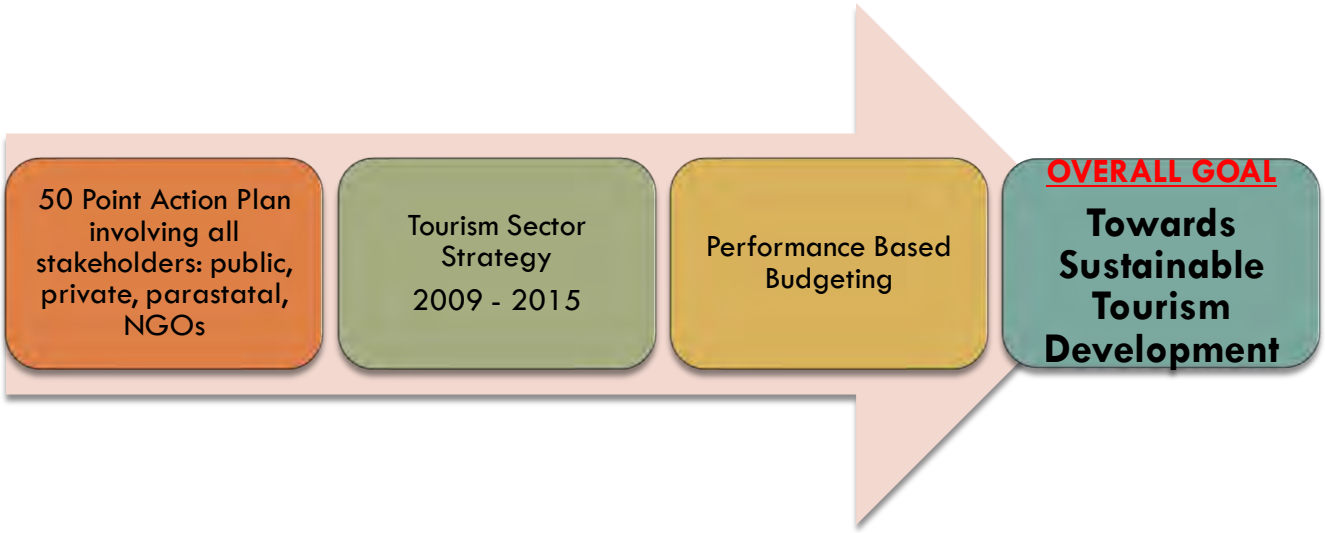
Figure 8.1: Survey on the factors motivating tourists to visit Mauritius



Note: 'Other factors' included: History and culture, price, sports and safe destination

LESSONS LEARNT AND GOOD PRACTICES:

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. 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. Government will continue to act as an enabler and facilitator thereby creating the right environment conducive for investment to take place. High standards of physical planning are vital in the further growth of Mauritius's tourism. Tourism design guidelines have been instituted and new physical plans are in the course of preparation. The development control system needs to match the need to ensure that all new building enhances the physical fabric of the country and provides enhancement to the tourism product.



EFFECTIVENESS OF IMPLEMENTATION:

SPECIAL CONSTRAINTS AND CHALLENGES:

The Mauritian tourism industry has faced several major challenges, some of which are unprecedented.

The climate challenge

Tourism is an important contributor to national economies, foreign exchange inflows and employment. However, with the looming climate challenge, tourism can be disrupted by a series of threats, namely: loss of beaches, coastal inundation, degradation of coastal ecosystems, saline intrusion and coral bleaching. Besides loss of critical coastal resources, the sector is also threatened by damage to coastal infrastructure, namely coastal roads, utilities, property and infrastructure.

Additionally, milder winters in the northern hemisphere can threaten tourism by reducing the appeal of Mauritius as tourist destination. So far, it is not clear as to how tourists or the tourism industry will react to the challenges posed by climate change. In this regard, the tourism industry may suffer from climate change mitigation measures, such as levies on aviation emissions which can increase the cost of air travel.

International Financial crisis

The international financial crisis has had adverse impacts on the local tourism industry. Mauritius enjoyed a flourishing tourism industry before the global crisis hit our shores. It expanded by an annual average rate of 7.1% from 2006 to 2008 with a peak of 15.1% in 2007. However in 2009, the sector showed a negative 6.4% growth. As a long haul destination far from its source markets, the financial crisis placed Mauritius at a competitive disadvantage compared to other destinations. Europeans, who constitute the predominant tourist clientele, chose holiday destinations closer to Europe thus resulting in a fall in tourist arrivals. The vision of attaining the target of 2 million tourists by 2015 could be more difficult to attain due to this worldwide economic crisis.

Fluctuating Oil Prices

Fluctuating oil prices have also impacted on travel costs and the tourism industry has been impacted by such instability. Currently, around 50% of all imported fossil fuel is used for transportation and the tourism sector is heavily dependent transport. Therefore, fluctuating oil prices is a limiting factor for the growing Mauritian tourism industry.

Furthermore, congestion is a serious problem on the island and brings otherwise unnecessary carbon emissions. Congestion increases transit times from the Airport to the northwest as well as constraining travel operations. It is therefore essential that concrete measures be taken to introduce a congestion charge for entry into the capital city, the enhancement of public transport services and the promotion of car sharing during peak hours. These would be of benefit to tourism as well as to other sectors.

Land Resources

There is a serious scarcity of beach frontage sites for further hotel development and 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.

Water Scarcity

Tourism growth will result in increased water demand with the target of 2 million tourists by 2015 and the development of the IRS and RES projects. Moreover, an 8% decreasing rainfall pattern has been observed and is attributed to climate change. As a result, tourism growth could pose a challenge to the water sector in terms of the additional capacity required, given a scarcity of current resources notably during dry seasons or during some peak periods.

Competition with Other Destinations

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 of projects.

RECENT TRENDS AND EMERGING ISSUES:

Tourism is also threatened by events that are beyond the control of the industry. Indeed, it is now more than ever that the industry prepares itself to respond to:

- ☐ The global threats of terrorism.
- ☐ Epidemics (chikungunya, dengue fever) and pandemics (H1N1 Flu).
- ☐ Implications of climate change, especially taxation of air transport in originating markets.
- ☐ Mauritius is located more than 10,000 kilometres away from its main tourist markets (France and UK) and nowadays tourists are increasingly concerned about green tourism and are focusing on reducing their carbon footprints. As a result, long haul destinations like Mauritius may not be favoured.

- ☐ Increased competition from destinations offering better value for money and with larger marketing budgets.
- ☐ Monitoring the impacts of tourism development.
- ☐ Focusing on regional tourism by marketing Mauritius as a stop-over destination
- ☐ Capacity to implement ecotourism along with the required certification processes involved

CONCLUSION AND WAY FORWARD:

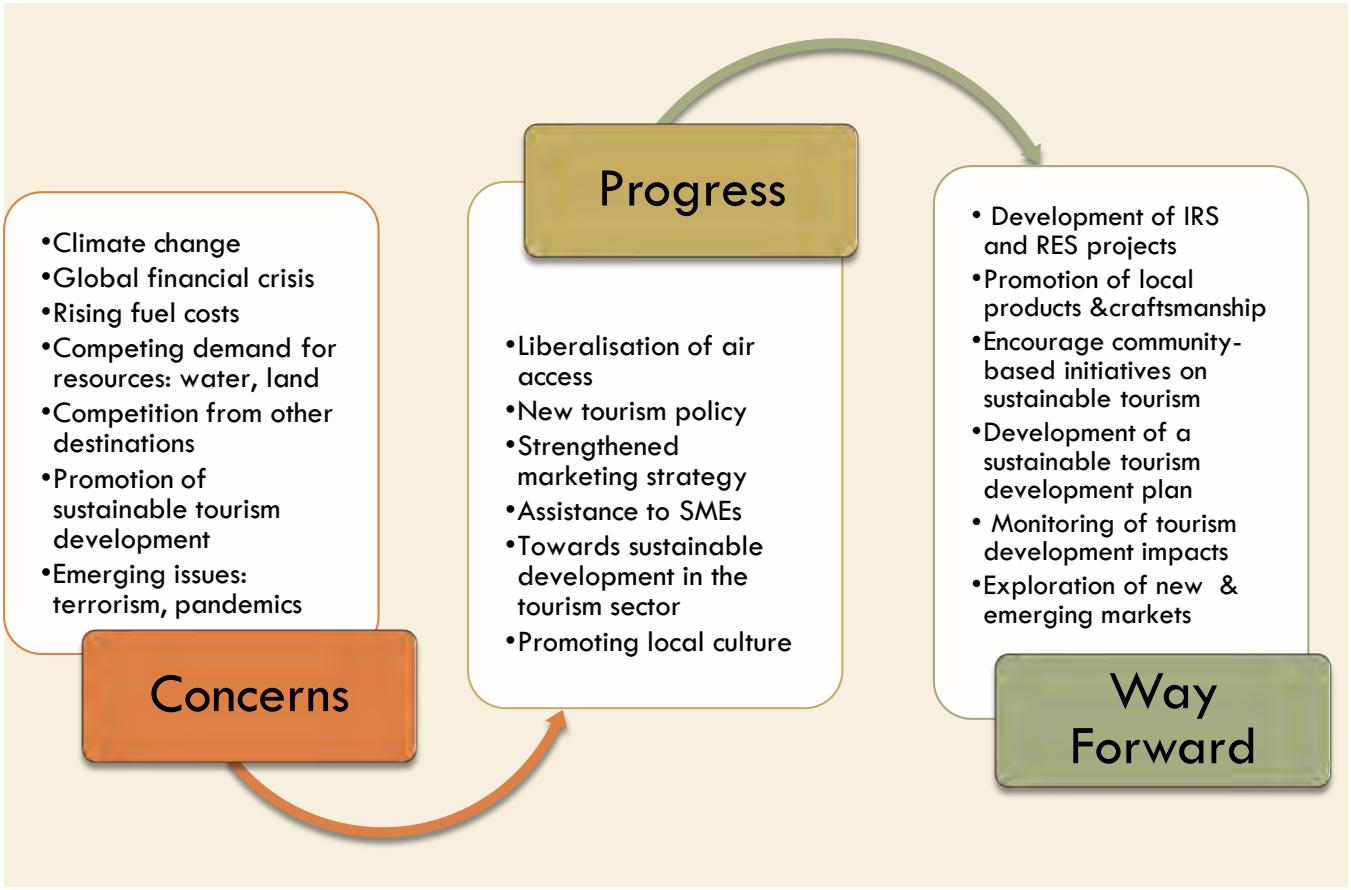
The national strategy for the tourism industry is to maintain the selective and up-market philosophy with quality service and a range of facilities. Furthermore, given the scarcity of beach frontage sites, emphasis is being laid on the development of inland attractions and eco-tourism projects as well as on the development of further IRS and RES projects. Moreover, to promote local products and craftsmanship, Government is supporting the production and sale of local quality handicraft items to tourists. However, it is essential that communities be empowered to embark on community-based initiatives on sustainable tourism.

The long-term sustainability of the tourism industry is also highly dependent on the set of policies and strategies adopted with regard to environmental protection, natural resource management and land use planning, as well as on the need for an appropriate institutional and legal framework and tighter security standards. To achieve this, it is essential that the human resources base be strengthened to monitor the impacts of tourism development, develop guidelines for assessing the carrying capacity of the island with regard to tourism and implement sustainable tourism development plans.

With regard to the marketing strategy, Mauritius will be further promoted as an attractive primary holiday and up-market touristic destination. In this context, the strategy will be focused on tapping less vulnerable and new emerging markets with relatively high growth potential such as the Middle East countries, China, and India, while concurrently carrying out more aggressive campaigns in the regional markets such as South Africa and Reunion and staying close to the traditional source markets by maintaining high visibility. Additionally, Mauritius needs to further explore the opportunity of promoting medical tourism (plastic surgery, hair transplant, etc.), nature based inland tourism, cultural tourism, amongst other.

Moreover, the local hotel sector should be encouraged adopt more sustainable practices. While some initiatives are already under way, further avenues should be explored, namely on ways to reduce food miles, saving energy and water, compositing and recycling wastes, just to name a few.

SUMMARY:


Concerns
•Climate change
•Global financial crisis
•Rising fuel costs
•Competing demand for resources: water, land
•Competition from other destinations
•Promotion of sustainable tourism development
•Emerging issues: terrorism, pandemics
Progress
•Liberalisation of air access
•New tourism policy
•Strengthened marketing strategy
•Assistance to SMEs
•Towards sustainable development in the tourism sector
•Promoting local culture
Way Forward
• Development of IRS and RES projects
•Promotion of local products &craftsmanship
•Encourage community-based initiatives on sustainable tourism
•Development of a sustainable tourism development plan
• Monitoring of tourism development impacts
•Exploration of new & emerging markets

CHAPTER 9: BIODIVERSITY RESOURCES

National Biodiversity Strategy and Action Plan 2006

"Habitat loss is identified as the major historical cause of terrestrial biodiversity loss, through initial deforestation and the latter conversion to wide scale and intensive agricultural use."

Chapter 9: Biodiversity Resources

INTRODUCTION:

The islands making the Republic of Mauritius, being mostly of volcanic origin and isolated in the Indian Ocean, have a diversity of rare and unique flora and fauna. Mauritius is unfortunately famous for the extinct *Dodo* and Rodrigues for the extinct *Solitaire*. To ensure that biodiversity is managed in a sustainable manner we have signed the UN Convention on Biological Diversity (CBD) in 1992, amongst others and are implementing the National Biodiversity Strategy and Action Plan (2006-2015). Sectoral strategies are also in place such as for islets or invasive alien species. Mauritius has also developed and is implementing several strategies geared towards food security and which are directly related to agricultural biodiversity. This chapter will be dealing with terrestrial, agricultural and freshwater biodiversity. Marine biodiversity is elaborated in Chapter 4 on Coastal and Marine Resources.

> Mauritius was the first country to ratify the CBD in 1992. We are also party to other biodiversity-related conventions – CITES, Ramsar, Bonn Convention on Migratory Species and UNCCD.

For island ecosystems like Mauritius, Rodrigues and other outlying islands and islets, biodiversity preservation and conservation is of prime importance. The systematic management and conservation of the threatened biodiversity of Mauritius and its outer islands started in the early 1970s, with advice from visiting conservation experts. Considerable progress has been made since then and a reasonably full-fledged National Parks and Conservation Service (NPCS) is now in place since 1994.

The two major threats to Mauritian biodiversity; namely invasion by exotic species and human activities, remain issues of concern. A number of initiatives have been implemented by the various organisations involved to maintain the biodiversity resources and increase the extent of protected areas in Mauritius. The coordination amongst the various institutions has improved over time, but this is a continuous process. Funding for biodiversity management remains a constraint.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

■ Policies and Strategies

The following policies and strategies have been developed, approved by Government and implementation has started:

- ☐ The National Biodiversity and Action Plan (2006 – 2015)
- ☐ The National Strategy and Action Plan (2010- 2019) for Invasive Alien Species (IAS)
- ☐ 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

■ Conservation work

Conservation work is carried out by the National Parks and Conservation Service and the Forestry Service, with the collaboration of one NGO, the Mauritian Wildlife Foundation.

- A campaign on awareness against invasive species has started with the launching of quarantine posters at the airport and production of posters about IAS for schools. A poster to sensitize fishermen and boat operators to prevent the entry of IAS on our offshore islets was also prepared.
- There are visitors' centres in the National Park, on Ile aux Aigrettes, at Mont Vert and at Bras d'Eau to inform the public about nature conservation.
- Eradication of rats and other invasive mammals have been completed on 8 islets.
- Intensive management of two islets namely Round Island and Ile aux Aigrettes, is being carried out jointly by the National Parks and Conservation Service and the Mauritian Wildlife Foundation. Round Island is well-known internationally for its unique endemic species.
- New conservation programmes for two endemic bird species, the Mauritius Fody and the Olive White Eye have been started since 2007.
- The Mauritian Rare Fern project has been set up with the support of the Darwin initiative.
- A Seed Banking Facility has been set up where some 250 species of native plant species have been banked. The construction of this facility started in 2006.
- A reptile translocation project was started in 2006 with the re-introduction of five species of reptiles on offshore islets around Mauritius.
- The proposal for a Protected Area Network Project has been submitted to the GEF for funding. The total estimated cost of this project is around US$ 8.5 million, with a 50% local input. This project aims at integrating privately-owned areas of high biodiversity value into the national conservation efforts. The full size project was approved in January 2010.
- The Rivulet Terre Rouge Estuary Bird Sanctuary, declared a reserve in 1997, has been proclaimed the first Mauritian Ramsar site in 2001.
- Restoration of habitats on Flat and Gabriel Islands.
- Control of Crows Island wide.
- Creation of Conservation Management Areas (CMAs) within National Park. Ongoing projects such as weeding, fencing and maintenance are being undertaken within CMAs.
- Novel management techniques are being developed to reduce the cost of control of invasive species.
- As at 2009, some 92 endemic gardens in educational institutions have been created by the Forestry Service. This is an ongoing project for which provisions have been made in the current national budget.
- Review of the Wildlife and National Parks Act. The Wildlife and National Parks Act is presently under review by the National Parks and Conservation Services. The reviewed Act will cover all aspects of terrestrial biodiversity and also important issues like protection of biodiversity in private lands. Amendments are also being brought to make our legislation more CITES compliant.

Partnerships

Partnerships between stakeholders or main institutions responsible for biodiversity protection as well as awareness raising are:

- *The* National Parks and Conservation Service (NPCS) under the Ministry of Agro-Industry, Food Production & Security (MAIFPS) is responsible for the conservation of native terrestrial biodiversity and also manages the Black River Gorges National Park, Islet National Parks, the Ramsar site at Terre Rouge and islets Nature Reserves
- The Forestry Service, under the MAIFPS is responsible for 15,300 ha of forest and an additional 1,938 ha of 'native' forest designated as mountain and river reserves for the protection of ecosystem services. The Service is also responsible for 200 ha of Nature Reserves, although only 4.4 ha are actively managed. The Service also carries out awareness raising through a visitor centre, nature walks, school programmes and production of native plants for public places.
- The Ministry of Environment and NDU is the national focal point for the CBD, UNCCD and UNFCCC and has undertaken several tree planting campaigns as well as awareness-raising.
- The Mauritian Wildlife Foundation (MWF), an NGO, is actively involved in islet restoration and ecotourism on Ile aux Aigrettes, species recovery management for rare birds together with the NPCS, forest surveys, rare plant propagation, and public education and awareness.
- The Mauritius Herbarium based at the MSIRI is a regional herbarium dedicated to collection from the Mascarene Islands and from islets including Agalega, St Brandon, the Chagos Archipelago and some other countries. The Mauritius Herbarium has a small living collection of native plants and also carries out research on ecology and conservation of native species.
- The Agricultural Services of the MAIFPS is responsible for the conservation of cultivated varieties of vegetables and fruits.

LESSONS LEARNT AND GOOD PRACTICES:

Implementation of obligations

To meet its obligations under the Convention on Biological Diversity, Mauritius adopted its National Biodiversity Strategy and Action Plan (2006-2015). The Government's commitment towards sustainable development and the conservation of biodiversity was once again reflected in its national budget for 2010, whereby significant provisions have been made for activities and projects such as:

- The setting up of endemic gardens in schools
- A provision of Rs 3.5 million annually for the planting of endemic plants in coastal areas
- Rs 30 million for the management of a Marine Protected Area in Rodrigues
- The development of eco-villages in Mauritius; a multi-dimensional programme that will sustain the livelihood of coastal communities and protect the ecological integrity of environmentally sensitive areas; Rs 250 million has been earmarked for a first phase of the project in 6 villages.

Rodrigues, Islets and Outer Islands

The island of Rodrigues has its own specificities in biodiversity management, which has lived through the extinction of the Solitaire bird and endemic tortoises. Because Rodrigues suffers more acutely from degraded ecosystems, deforestation, soil erosion and water deficiency, its unique flora and fauna are under threat. But conservation has started building up some solid momentum, such as the Réserve François Leguat which opened in 2007 and is a successful project for the reintroduction of tortoises on the island. The setting up of this reserve saw the first translocation of tortoise in the Mascarenes.

The other outer islands of the Republic of Mauritius, such as Agalega, St Brandon and Chagos have diverse biodiversities that have significant conservation value. Their isolation is preventing Mauritius from effectively managing their flora, fauna and ecosystems.

The islets surrounding mainland Mauritius and Rodrigues of conservation potential have management plans. Their implementation is hampered by lack of funds and human resources.

National Parks and Conservation Fund

A National Parks & Conservation Fund provides funding for conservation projects carried by or in collaboration with the National Parks and Conservation Service.

Sustainable Agriculture

The MAIFPS has several of its Divisions directly or indirectly committed to the protection of its biodiversity and sustainability of the agricultural sector.

The MAIFPS carries out routine regular quarantine work for national, regional and international commitments under International Plant Protection Convention – IPPC of the FAO. To reinforce sustainable import/ export of plants and agricultural and forestry produce the Ministry has initiated a project for a multi containment facility to reinforce quarantine, especially to address GMO material, and a project for Quarantine Treatment Plant facility for using alternative treatments to replace methyl bromide, an ozone-depleting substance (Montreal Protocol).

The National Plant Protection Office (NPPO) works in close collaboration with the Entomology Division to prevent entry (and control) of harmful plant pests and diseases in the country, to ensure sustainability of the agricultural sector. The White Grub Protocol is maintained with neighbouring Reunion Island, to prevent entry of the pest, which is a serious threat to the sugar industry. The use of environment-friendly techniques including biological control and IPM (Integrated Pest Management) techniques are widely used to control insect pests harmful to agriculture and forestry (to control coconut beetle, cypress aphid, white fly, and the various species of fruit flies, among others). In this context the Ministry has different programmes run by the Entomology Division, from area-wide techniques to free distribution to small-scale producers and backyard producers, to encourage the use of fruit fly bait to reduce insecticide usage. Recently a project has been initiated in collaboration with IAEA and FAO to use the sterile insect technique to control the peach fly and melon fly.

The Division of Veterinary Services (DVS) of the Ministry regulates and monitors all activities concerning the transboundary movements of animal and animal products including seafood products, and works in close collaboration with the NPPO and Food Technology Laboratory of the Ministry. The DVS has lately been put to heavy pressure when an outbreak of African swine fever caused significant mortality in the pig sector due to inadequate husbandry practices among other factors. The pig sector has undergone major relocation to specific areas with support from Government for land

and proper infrastructure, which allows clustering, ease of support systems from Extension and Veterinary Officers for a more effective production and prevention and control of diseases. In this context, pig breeders and other stakeholders in the pig industry, i.e. butchers, and feed suppliers, and the public at large are required to obtain a Movement Control Permit in order to transport live registered pigs from farms to the Central Abattoir (slaughter house) and/or from one place to another. The DVS has also set up alert systems for backyard to industrial scale poultry producers and pet bird owners, to protect the poultry sector from Newcastle disease, fowl pox, and especially avian flu. The Ministry has a pilot Integrated Farming Systems (IFS) pilot project for optimising a system of production involving pigs-fish-ducks and crops.

There is actually an ongoing exercise to prepare the 4th National Report on Biodiversity for the CBD. The present reference document is the NBSAP, listing in detail the various collections of germplasm in the Institutions of the Ministry.

EFFECTIVENESS OF IMPLEMENTATION:

■ 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

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 present scattered legislative frameworks 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.

The Non-Sugar Sector Strategic Plan (2003-2007)

A sustained programme for agricultural diversification includes a policy on plant genetic resources. The policy includes establishing a legal and institutional framework to address Plant Genetic Resources and GMOs, consolidation of germplasm collections, promotion of long-term conservation of Plant Genetic Resources, establishment of an information system, evaluation of genetic drift in local varieties, and development of relevant research programmes.

Genetically Modified Organisms (GMO)

The GMO Act (2004) provides for measures 'to regulate the responsible planning, development, use, marketing and application of genetically modified organisms' in the food and agricultural sector. It also ensures that all activities involving the use of GMOs and products thereof are carried out in such a way to limit damage to the environment and risk to human health. Only part of this Act has been enacted, namely entry, transit and labelling of GMOs. A National Biosafety Committee has been set up under the Act to advise on all aspects concerning the importation, exportation, transit, development, research, production and use of GMOs. A GMO Act was proclaimed in 2004 to address Genetically Modified Organisms (GMO), but needs to include operational mechanisms. A project is ongoing for "*The Implementation of the National Biosafety Framework for Mauritius*", funded by UNEP/GEF and Government of Mauritius.

Gene bank

A field gene bank for the rarest native plants species has also been set up in the uplands as a collaborative project between the National Park and Conservation Service and the Mauritian Wildlife Foundation. 20 species with less than 50 individuals in the wild have been targeted. A field genebank for coastal species is about to be established in Bras d'Eau Reserve. Sustainable farming practices including organic farming and biological control are being encouraged by the Government.

Research &Training

The University of Mauritius has carried out inventories of all medicinal plants through an Indian Ocean Commission Project (Inventory and Study of the Medicinal and Aromatic Plants of the States of the Indian Ocean). A computerized database on these plants now exists at the University. The Mauritius Research Council (MRC) has funded several projects, submitted by the University of Mauritius. The aims are to validate traditional data and to test for the biological activity of indigenous/endemic plant extracts.

Biodiversity research by students for higher degrees is encouraged and supported e.g. the effect of weeding IAS on native plant regeneration, the effect of introduced animals on native birds, detailed population and ecological studies of pink pigeons, Mauritius Fody and Echo parakeet etc.

Food Safety

The Food Technology Laboratory of the MAIFPS was set-up in 2006 and inaugurated on 16th October 2007. Its mandate is to address the quality and safety of food, and provision of analytical services in the food sector to entrepreneurs for local production and food sector, import and export of animal

and fisheries products. The analysis of pesticide residues has been given a boost by a recent Cabinet decision, and the samples are now being taken at farm gate level, instead of the markets, to increase traceability. Legislation will need to be strengthened, as at present only identification of produce above MRL (Maximum Residue Limits) is possible, and enforcement difficult. Sensitisation campaigns are maintained by Extension for Good Agricultural Practice. The staff capacity of the lab needs reinforcement, to address the novel issues cropping up in the food sector. Various Ministries and institutions are involved in the food sector and all have programmes for sensitising the stakeholders for proper procedures for production and handling of food. The Ministry of Health and Quality of Life is in the process of implementing an Action Plan on Nutrition, and an update of the Food Act, which is its mandate, in consultation with all stakeholders.

SPECIAL CONSTRAINTS AND CHALLENGES:

The 2007 IUCN Red List ranks Mauritius third among the world's top ten countries for extinct species (animals) in the last 500 years. Twelve species of land bird have so far escaped extinction. Of these, nine are threatened according to the IUCN Red List (2003). Species recovery programmes have saved three of these species from probable extinction.

The Mauritius Kestrel was once the rarest falcon in the world due to DDT poisoning with only four birds known in 1974. The kestrel population is now estimated to be 800 birds. The Echo Parakeet is the last surviving parrot in the Mascarenes. It was considered the rarest parrot in the world, with only about 12 individuals known in 1987, due to nest predation by invasive species and habitat loss. An intensive captive breeding and release programme has increased the population to about 360 birds. This species has been down listed from the critically endangered category to "endangered". The Pink Pigeon now numbers around 400 birds, compared to a population of around 25 in the 1970s. There are now five managed populations, four in the Black River Gorges National Park and one population on Ile aux Aigrettes. Another success story which was achieved in a short lapse of time is the captive breeding and release of the Mauritian Fody which now brings the population to a safe level. Based on discussions during Bird Life's globally threatened bird forums, the decision was taken to down list the Mauritius Fody to Endangered on the 2009 IUCN Red List (Birdlife International in press), which took effect in May 2009.

Aside from the threats and challenges that economic developments invariably pose to sustainable development and biodiversity, the islets close to the mainland and a few outlying ones have good potentials for ecological restoration, and under the Islets National Parks Strategic Plan (2004), the management plans of several islets are well under way. However, these islets are under considerable pressure from potential developers.

Ongoing urbanisation, land degradation, natural calamities, soil erosion, chemicals are cumulative threats on ecosystems and biodiversity. The areas under protection are limited and conservation management of native ecosystems should be enhanced. Capacity building of the National Parks and Conservation Service personnel is required, both in terms of staffing and in upgrading of technical competencies. There is a limited awareness of biodiversity among the population at large, and there is limited development of conservation as a profitable venture.

There is insufficient protection of biodiversity on privately owned land. Furthermore, if the surface area of state-owned forests is stable since 1999, 53.1% of Mauritius forests are privately-owned

and are diminishing, from 34,540 hectares in 1999 to 25,000 hectares in 2008. The inventory of the biodiversity in Mauritius is far from complete; for instance around 60 to 70% of insects have not yet been inventoried.

Development associated with the expansion of the tourism industry has resulted in the construction of a large number of hotels, bungalows, recreational facilities, marinas, jetties, slipways, piers, breakwaters, groins, sea walls as well as roads. These have contributed to the loss of critical coastal habitats and living marine resources and physical alteration to reefs, beaches, wetlands, mangroves and watercourses. If not properly planned and managed, tourism can significantly degrade the environment through pressures on the coastal and marine ecosystem on which it is so dependent.

Ecosystems are being transformed and in some cases irreversibly damaged as evidenced in the 2008 study on Environmentally Sensitive Areas. A large number of species have gone extinct in recent history or are threatened with extinction. Genetic resources, both for cultivated plants and livestock, are under substantial risk. Emphasis is being placed on a relatively small number of high yielding varieties and breeds. Endemic species domesticated over time to natural conditions have come under pressure and only a few wild relatives of economically important crops are found in the wild. The introduction of Living Modified Organisms contributes to genetic erosion and loss of traditional crops.

Agricultural biodiversity

45% of available land in Mauritius is under agriculture. Agricultural biodiversity is directly linked to food security. Mauritius is a net food importer and the world food security crises and high food prices, and various epidemics in the world livestock sectors, added to calamities to crops, has renewed the impetus towards diversification of our agriculture. This has been geared towards enhanced self-sufficiency in several essential food items, and a strategic plan on Strategic Options in Crop & Livestock Sector 2007-2015 was elaborated by the MAIFPS followed by an action plan 'Blueprint: 'Sustainable Diversified Agri-Food Strategy for Mauritius 2008 - 2015', accompanied by a massive Rs 1 billion Food Security Fund, and a Food Security Strategic Plan (2008-2011).

Some local epidemics such as the African Swine fever caused havoc in the pig sector, needing total reorganisation and relocation, and recently another deadly disease, contagious caprine pleuro-pneumonia, appeared in the goat sector but is being contained by vaccines and medical support by the Ministry's Veterinary Services. The latter has also organised the industry and country for disaster-preparedness and raised alert levels to protect our successful and self-sufficient level poultry sector from diseases such as the avian flu.

Reduction of land and logistics in the Agricultural Services of the MAIFPS is increasing the threat to agro-biodiversity conservation.

Freshwater biodiversity

Freshwater biodiversity is not given sufficient attention despite the fact that they have a significant role in freshwater ecosystems.

National Invasive Alien Species Strategy and Action Plan (2010-2019)

The strategy action plan for invasive alien species was finalised and approved by Cabinet in Jan 2010. The National Invasive Alien Species Strategy and Action Plan (NIASSAP) represents a first step towards a comprehensive and coordinated approach to the management of the IAS threat in the

country. This initiative recognises the roles and responsibilities of all levels of government in regulating the management of IAS and the importance of the involvement of non-governmental and civil society organisations, the private sector and the general public. The importance of regional and international cooperation to enhance actions undertaken at national and local levels is emphasised, given the Republic of Mauritius' status as a Small Island Developing State (SIDS).

This document presents a vision of a nation in which the negative impacts of invasive alien species on the economy, environment and society are avoided, eliminated or minimised. The Strategy serves as a guide to the nation so that all Mauritians are together responsible for avoiding, eliminating or minimising the negative impacts of invasive alien species Invasive alien species pose the most serious current threat to native species. Over the years, a large number of exotic plants and animal species have been introduced into Mauritius, either accidentally or intentionally. Some of these species have escaped into natural ecosystems and are now overrunning the indigenous species. Examples of invasive alien species are provided in the table below:

	Examples	Remarks
Invasive alien weeds	Goyave de Chine (*Psidium cattleianum*), Privet (*Ligustrum robustum* subsp. *walkeri*) , Liane cerf (*Hiptage benghalensis*),	These species, and many more, grow faster than native plants and therefore out-compete them for space, light and nutrients. They have quickly come to dominate the forests throughout the island. Forests overall represent 25.3% of the total surface area of mainland Mauritius. Yet the ratio dwindles down to a mere 1.6% for forests where native plants are still predominant.
Invasive alien animals	Rusa deer (C. *timorensis*)	➢ Browse native shrubs, saplings and seedling
	Feral pigs (*Sus scrofa*)	➢ Disturb the soil, disperse seeds of alien plants and have negative effects on native plant regeneration
	Javanese macaques (*Macaca fascicularis*)	➢ Damage unripe native fruits and eat the eggs and chicks of native birds
	Rats (*Rattus rattus* and *R. norvegicus*)	➢ Predate on eggs and chicks, reptiles and invertebrates and are notable seed predators. Have been documented to destroy up to 60 % of the seed crop of Bois Colophane (*Canarium paniculatum*).
	Feral cats (*Felis catus*)	➢ Endemic birds like the pink pigeons (*Columba mayeri*) are constantly at risk of predation
Introduced reptiles	Pinkish brown nocturnal house gecko (*Hemidactylus frenatus*)	➢ Competes with the native day gecko and also transmits parasites to it
	Indian Wolf snake (*Lycodon*	➢ a predator of native reptiles

Examples	Remarks
aulicum)	

Due mainly to extensive past deforestation , forest remnants on Mauritius nowadays subsist in an extremely fragmented state , meaning that the previous large continuous populations of all native species have now been reduced into small and for most cases severely isolated populations. This fragmentation accelerates further the invasion of alien species and the disappearance of endemic ones. 25.3% of the mainland Mauritius is considered forested. The area of good quality native forest, (i.e. that with more than 50% native plant cover), is estimated to cover 1.6% of the island. The rest consists of plantation forestry, deer-ranches or highly degraded vegetation invaded by alien plant and animal species. Inadequate genetic conservation and utilisation/ exploitation of genetic resources have led to loss of local species. Agriculture is the largest driver of genetic erosion and species loss.

Figure 9.1: Forest cover in Mauritius (Page and d'Argent, 1997)

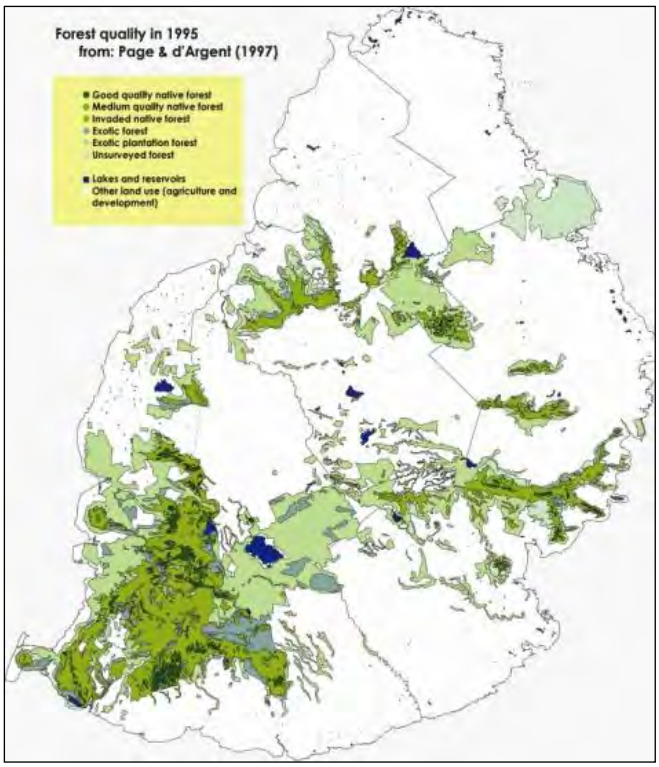


Figure 9.2: Native forest loss in Mauritius (1773 – 1997)

1773 (82.5%)

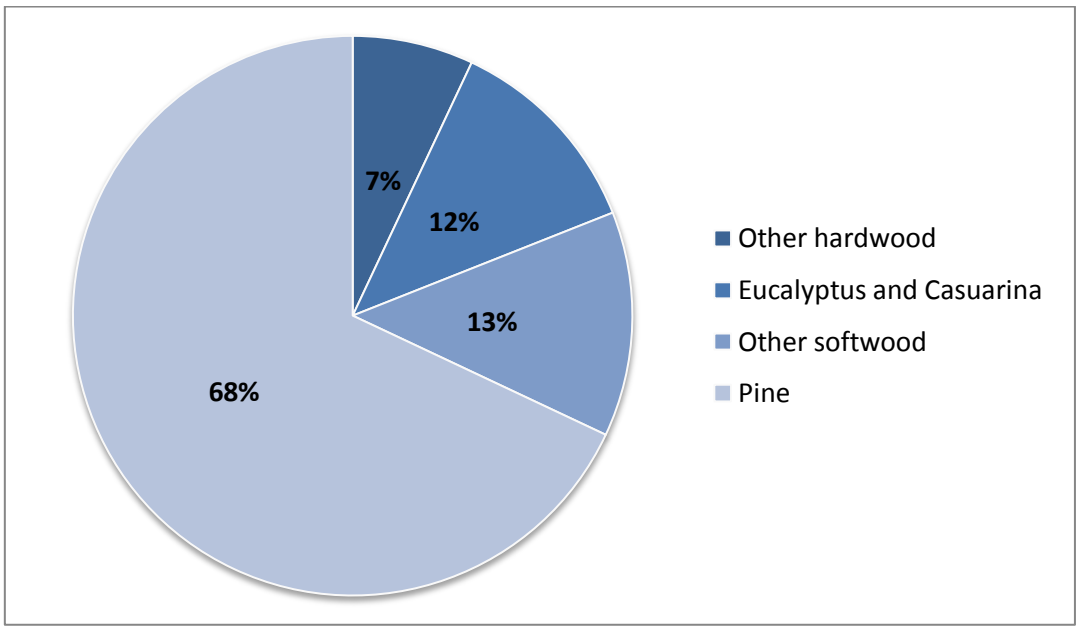
1835 (50.7%)

1872 (22.9%)

1935 (5.7%)

1997 (<2%)

Figure 9.3: Percentage composition of forest plantations, 2005



RECENT TRENDS AND EMERGING ISSUES:

Climate Change & Biodiversity

Climate change is predicted to be the greatest long term threat to biodiversity in many regions including Mauritius. Projections of future changes in climate include increasing temperatures, severe droughts, rising sea levels, possible decreasing rainfalls, regional flooding and reduced water availability. Climate change will affect biodiversity in complex and often unpredictable ways. As a result of climate change, current threats to biodiversity including habitat loss, weeds and pests are expected to intensify. Climate change may affect physiology, timing of life-cycles, demographic processes, such as birth and death rates, shifts and changes in distribution and potential for adaption. Changes in climate could also lead to new opportunities for invasive species.

Tourism & Biodiversity

Because of the limited number of beachfronts remaining for hotel development, Mauritius tourism strategy will rely increasingly on the emergence of eco-tourism activities. Biodiversity conservation and sustaining the tourism industry will thus go hand in hand increasingly. Furthermore, even when biodiversity is not the main attraction for tourist, they appreciate the wildlife and flora of the regions they visit. Protected areas, when carefully managed, can contribute to sustainable development through the provisions of important goods and services to local people, employment opportunities created by tourism. Sustainable tourism is thus clearly the way forward as it promotes conservation, preserving the biodiversity that attracts tourists, while providing economic benefits to the local and national economies. However its emergence is a challenge as it requires tough practice standards.

Private Forest Areas & Biodiversity

There is insufficient protection of biodiversity on privately owned land. Furthermore, if the surface area of state-owned forests is stable since 1999, 53.1% of Mauritius forests are privately-owned and are diminishing, from 34,540 hectares in 1999 to 25,000 hectares in 2008. The Project on Protected Areas network aims at addressing this.

Agricultural biodiversity

Mauritius is trying to move out of production of seeds towards regulation, by training and encouraging the private sector to produce seeds. It will continue to maintain basic seeds of traditional and rare varieties, and maintain reserves of strategic seeds for prompt supply after calamities like cyclones. A Seed Bill is being finalised and has reached an advanced stage. This concerns regulation of production, processing, marketing of seed, including import and export activities.

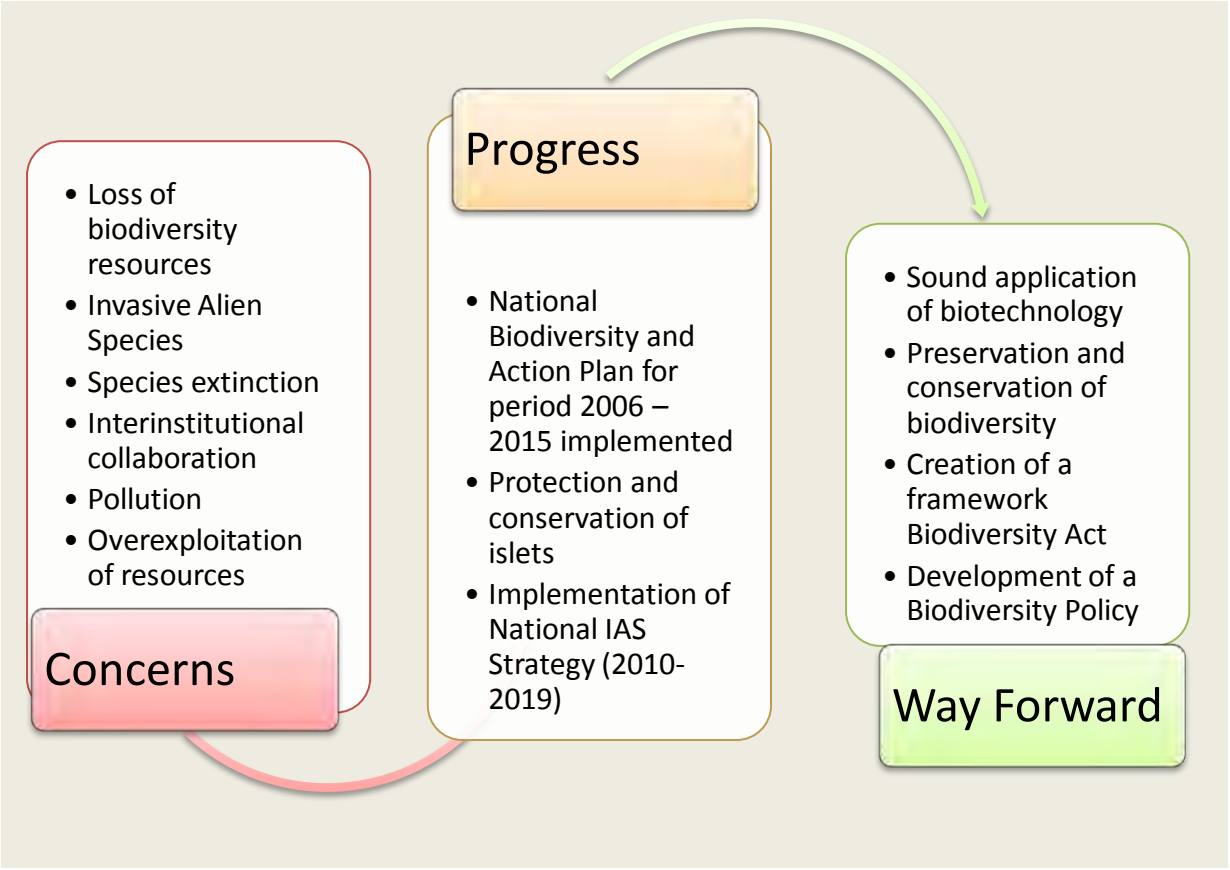
The Plant Breeders Rights bill is forthcoming, and will aim target fulfilment of our obligations under the WTO-TRIPS Agreement.

The trend towards privatisation of seed production and plant propagation is increasing the risk of imported varieties replacing traditional ones and the danger of losing the latter. Hence, the necessity for an enhanced role of the MAIFPS to conserve traditional varieties and germplasm and initiate breeding and other improvement programmes.

CONCLUSION AND WAY FORWARD:

The National Biodiversity Strategy and Action Plan (2006-2015) is the main document which guides Mauritius on the future line of action for biodiversity conservation. For a sustainable Mauritius, it is vital that all biodiversity resources are well protected and managed and utilised so that the present and future generation continues to enjoy all their benefits. It is also an established fact worldwide that the protection of biodiversity plays a potentially significant role in climate change mitigation and adaptation through maintenance of ecosystem service and provision of livelihood options.

SUMMARY:



CHAPTER 10: TRANSPORT AND COMMUNICATION

New terminal designed after the "traveller's palm" (Source: http://www.moodiereport.com)

Mauritius Strategy for Implementation

"Transport and Communications remain important lifelines linking small island developing States with the outside world."

Chapter 10: Transport and Communication

INTRODUCTION:

In an era of globalization and rapid mobility, no country can socio-economically develop without transport and communication. In Mauritius as well, transport and communication are the essential backbones that have enabled the country overcome the impact of its physical isolation with the external world. Both transport and communication have contributed to increased trade, human development and coherent government across the country as a whole.

Conscious that an efficient air transport system is fundamental for the sustained development and prosperity of the country and in line with its target of 2 million tourists by 2015, the Mauritian Government has adopted a gradual air access liberalisation policy since 2005. In this vein, the Sir Seewoosagur Ramgoolam International Airport (SSRIA) is being expanded and modernised to cater for a 4 million passengers per year capacity.

For the port area, focus has been laid on strategic development as well as on operational improvements of the harbour during the past five years. Port Louis Harbour is now at a critical crossroad and is well positioned to play the role of a major logistics hub and to capture substantial incremental traffic as well as foreign direct investment in the future.

As a small island with limited space and ever increasing vehicles on the roads, Mauritius is facing serious traffic congestion along the main roads across the island. From 2005 to 2008, the number of registered vehicles increased by 13% and the number of cars rose by 22.5% for the same period. Government is currently putting emphasis on expanding road infrastructure, demand management and road safety.

Since the SIDS Meeting in 2005, Mauritius has been promoted as a key information and communication hub in the region, while maintaining a modern and secured communications infrastructure, providing the necessary regulatory framework as well as a growing pool of trained professionals to take full advantage of this booming sector. It is the vision of Government to maintain a telecommunication environment that allows for competition and optimal opportunities for all target groups: operators, service providers and subscribers to contribute to a modern global information economy.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Air Access and Transport

■ Liberalisation of Air Access

A gradual air access liberalization policy has been implemented since 2005. Some 20 Air Services Agreements have been reviewed during that period with main focus to increase overall seat capacity, provide multiple designations of airlines and cooperative arrangements with third country airlines. Since

2005, the following new carriers have been operating in the country: Corsair (France-Mauritius), Virgin Atlantic (UK-Mauritius), Air Italy and Eurofly (Italy-Mauritius) and Comair (South Africa-Mauritius).

Consolidation of National Carrier

In 2008, the national airline Air Mauritius faced insecurities due to the volatility of fuel prices and the global economic crisis. Despite these situations, Air Mauritius has shown resilience, by taking additional measures such as: network rationalisation, adjustment of capacity to match demand and overall cost management programmes. Presently, Air Mauritius is offering 62 destinations across the world, has widened its network on Europe and Asia and has consolidated its fleet with the acquisition of 4 new aircrafts to meet passenger's expectations. New destinations have also been identified and Air Services Agreements have been entered with various countries.

Civil Aviation

Since 2009, the Instrument Landing System and Dopper Very High Frequency Radio Range/Distance Measuring Equipment have been replaced. To cater for new "Standards and Recommended Practices" issued by the International Civil Aviation Organisation, a new regulatory framework has been put in place with the promulgation of the Civil Aviation Regulations in September 2007 and the Civil Aviation (Security) Regulations in February 2008.

Sea Transport and Port Area

As the principal gateway of the country, the port plays a vital role in the national economy by handling about 99% of the total volume of the country's external trade. Over the years, the port has been transformed into an economic nerve centre, with modern port facilities.

Modernisation of the Harbour

During the period 2005-2009, Port Louis Harbour recorded unprecedented growth in transhipment traffic, following various agreements signed with major shipping consortiums using the port as a transhipment hub. Port Louis Harbour is now poised to become a major regional transhipment hub, offering a world-class service to the shipping lines operating in this part of the world. At the same time, the Port will be able to meet the growing demands of the booming national economy and cater for additional traffic generated by major developments in the country.

NEW CONTAINER YARD IN THE PORT

Strategic development and operational improvements were required to modernise port infrastructure and facilities. These are as follows:

- ☐ New Port Master Plan for the forthcoming 20/25 years.
- ☐ Expansion of the container yard with increased storage capacity from 300,000 TEUs to 550,000 TEUs.
- ☐ Commissioning of 2 new Ship to Shore cranes.
- ☐ Acquisition of new yard equipment.
- ☐ Deepening of the access channel for handling 4th and 5th generation vessels.
- ☐ Construction of a new oil jetty for unloading petroleum products and LPG.
- ☐ Strengthening of security measures in the port area.
- ☐ Construction of a new harbour radio station.
- ☐ Construction of cruise berthing facilities to promote Mauritius as a cruise destination.

■ Strengthening of the Legal Framework

The Merchant and Shipping Act (2007) promulgated in June 2009 ensures that shipping practices and operations are conducted according to international safety norms and caters for ships registration under the Mauritian flag amongst others.

■ Mauritius Maritime Training Academy

The Mauritius Maritime Training Academy (MMTA) was inaugurated in 2007 to provide quality and value added training adapted to the needs of the Mauritius Maritime Industry and to the region as per international standards.

Capacity building programmes run by the MMTA:

- ☐ Basic safety training for Seafarers.
- ☐ Training course for grade certificate as Efficient Deck Hand & Able Bodied Seaman.
- ☐ Training for Seafarers forming part of a Navigation/Engine Room Watch.
- ☐ Crowd Management, Passenger Safety and Safety Training for personnel providing direct services to passengers.
- ☐ Proficiency in Crisis Management and Human Behaviours Training.
- ☐ Training for Skipper and Second Hand for Certificate of Competency for Local Fishing Vessels of 24 metres in length.
- ☐ Training for Chief Engineer and Second Engineer for Certificate of Competency (COC) for Local Fishing Vessels of 24 metres in length.
- ☐ Ad Hoc courses upon request from other Ministries and Private Sector.

National Strategic Plan for Mauritius Shipping Sector

To restructure the maritime sector, a National Strategic Plan for Mauritius shipping sector for 2009-2015 is under way. This plan is an essential step in the development of a sustainable shipping sector and will take into account the following: a maritime administration for Mauritius, flag policy of Mauritius, development and marketing strategies for the Mauritius Register of shipping, future policies, maritime cluster development and training.

Global Maritime Distress Safety System Services

As party to the International Convention on safety of Life at Sea, Mauritius has the obligation to provide Global Maritime Distress System Services on maritime weather forecasts, navigational and safety matters to ships plying in our territorial waters and Exclusive Economic Zone. In this regard, current developments in this area include: the purchase of High Frequency communication equipment and the provision of Long Range Identification and Tracking of Vessels services.

Road transport

With the expansion in the economic activities and improvements in the standard of living, there has been a massive increase in the number of vehicles. The transport sector is one of the heaviest energy consumers in Mauritius. The situation has worsened over the years with the significant increase in the number of vehicles on our roads. During the past years, the fleet of vehicle has increased from some 190,000 in the 1990's to around 351,406 vehicles in 2008.

This has led to saturation along the major roads across the island, especially those leading to the capital. Traffic congestion therefore is a severe problem within the conurbations and 15-20 km journeys by car typically take around one hour during peak periods. This is attributed to increased ownership in private cars. Heavy vehicular traffic is also one of the causes of pollution problems, in terms of vehicular emission whereas traffic congestion has also a negative impact on the economy (estimated to be around 3 billion rupees per year) and on the health and productivity of the nation.

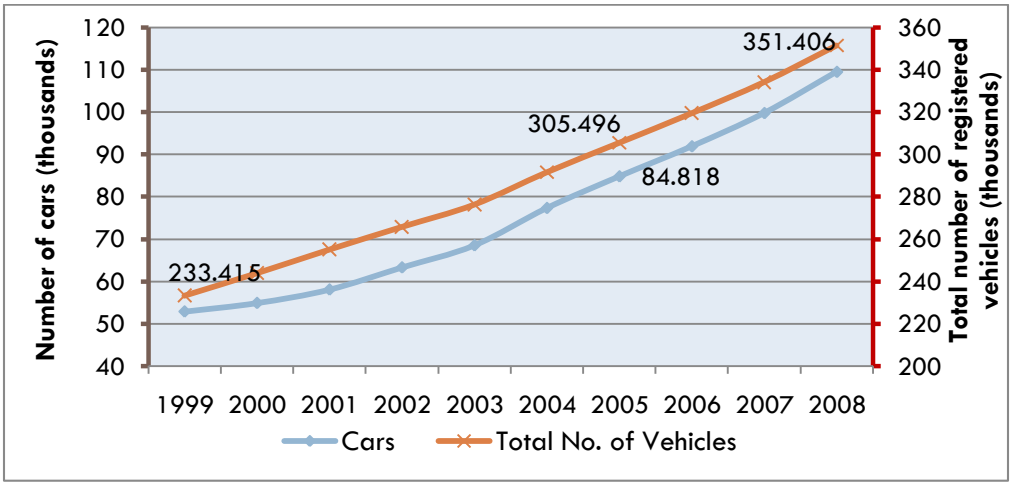


Figure 10.1: Number of Registered Vehicles (1999 – 2008)

Improvement of Road Safety

For the past five years, there has been a continual improvement of road safety in Mauritius. In fact, the goal is to reduce the number of killed and seriously injured by one third by the year 2010 compared to the average 1996-2000 by using a combination of measures involving: Engineering, Education and Enforcement.

Speed Limit Review

Under the National Road Safety Strategy, speed limits have been reviewed and aim at striking the right balance between traffic fluidity and road safety as well as achieving a reasonable speed limit with regard to drivers and other road users.

Road Safety Campaigns

To create a safer road environment, regular road safety education and aggressive campaigns are conducted to increase awareness among all categories of road users. For the past 5 years, campaigns have focused on: pedestrian safety and campaigns for drivers (mobile phone campaign, drink driving campaign and rear seat belt campaign).

Laser Speed Radar

To deter traffic offenders, three automatic speed cameras have been purchased. The speed cameras, which can be used during the day as well as at night, are each equipped with speed radar, high resolution camera unit and flashing unit. They will be used to track down speed limit violations and also to detect the use of hand held cellular phones while driving, as well as non-compliance with traffic lights and other traffic signals. The Road traffic Act has been amended in order to provide for legal enforcement as regards this new device.

Traffic Management Measures to relieve congestion

The following measures have been taken in order to provide a short-term relief to congestion problems on all major roads:

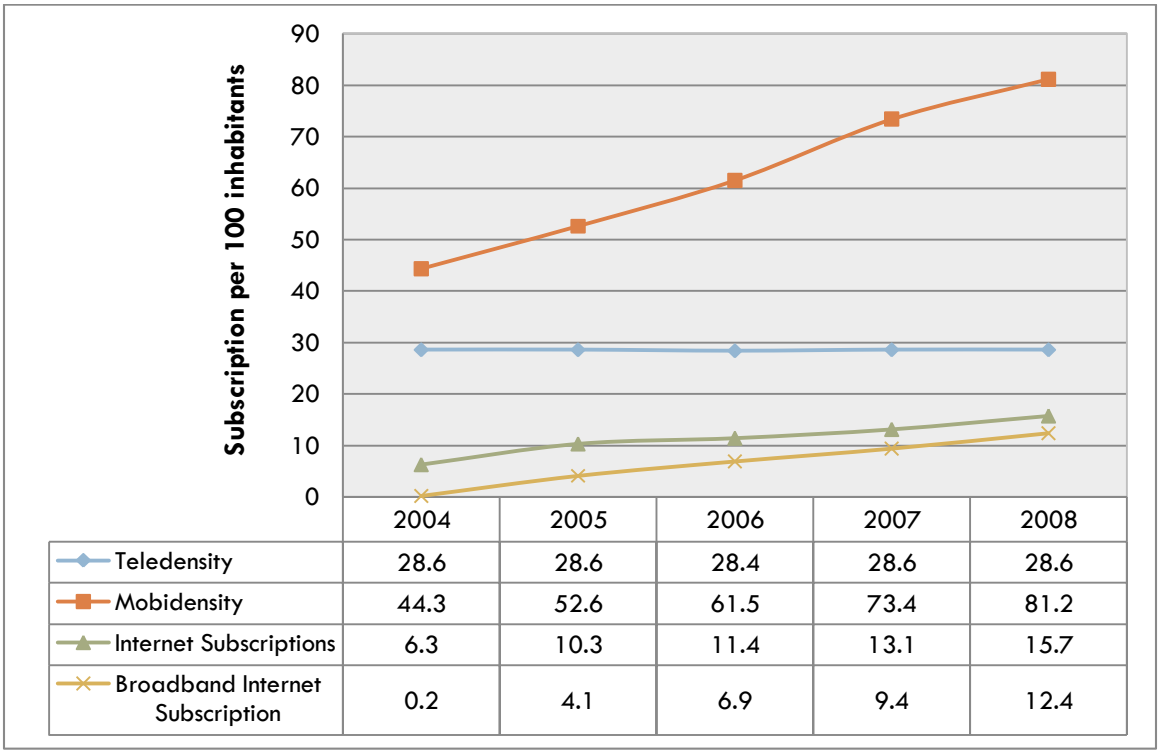
- ☐ Use of Grade Separated Junction and New Bus Terminal to ease congestion
- ☐ Opening of the third lane as from 07.00 hrs instead of 07.30 hrs and until 09.30 hrs
- ☐ Increasing road capacity by constructing additional lanes in towns to ease congestion and bottlenecks

Telecommunications

Mauritius is well set to be on the Information highway and focuses on the provision of state-of-the-art public telecommunications services such as fixed, mobile, international long distance, internet and other value added services. These services are essential for the development of international trade, business, financial and other services.

The vision of transforming Mauritius into a Cyber Island is backed by bold measures like the liberalisation of telecommunications. Since January 2003, telecommunication services are totally liberalised.

Teledensity, Mobidensity and Internet penetration



	2004	2005	2006	2007	2008
Teledensity	28.6	28.6	28.4	28.6	28.6
Mobidensity	44.3	52.6	61.5	73.4	81.2
Internet Subscriptions	6.3	10.3	11.4	13.1	15.7
Broadband Internet Subscription	0.2	4.1	6.9	9.4	12.4

Figure 10.2: Fixed telephones lines, mobile phones and internet access (2004 – 2008)

Digital Economy

Registered operators as at March 2009

- ☐ Network Infrastructure Providers – 1
- ☐ Service Operators – 2
- ☐ Mobile Operators – 3
- ☐ International Long Distance Operators – 8
- ☐ Internet Service Providers – 1

Mauritius has emerged as one of the most business-friendly countries in the region. Several leading US companies such as Microsoft, IBM, Hewlett Packard and Oracle use Mauritius as regional distribution centre for their operations. The principal goals of the national regulatory agency for the telecommunications sector are to open the market to new operators and create a level playing field among operators for the benefit of

the consumers. Liberalisation of the sector has also enable competition flourish under optimal conditions and as at March 2009, the number of registered operators for the following services has increased.

Network Development

Mauritius has one of the most efficient and up-to-date telecommunication network in Africa and a fully digitalized telecommunication system ranking with the most sophisticated anywhere.

To transform Mauritius into a Cyber Island, Government invested in state-of-the-art telecom network at the Ebène CyberCity. The communication network was designed with the objective of positioning the CyberCity as an advanced technology park, for provisioning and managing various Data Communication Services to clients in the CyberCity and the Cyber Towers. The Business Parks of Mauritius Ltd presently provides services to high-bandwidth consumers such as ISPs, Call Centers, BPOs, DRCs and other software development companies.

CYBER TOWER AT EBENE

The telecommunication network has been significantly enhanced by investments in the following technologies: FTTC (Fibre-to-the-Cabinet) and HSPA (High Speed Packet Access). Broadband access to fixed-line and mobile customers has also been extended across Mauritius. The current network is also being upgraded to the Next Generation Network (NGN), which is a state-of-the-art fully IP (Internet Protocol) network, enabling switching between voice, internet and multimedia through the same equipment. It also provides a platform that considerably facilitates the rapid deployment of the latest technologies and services.

TELECOMMUNICATION TRAFFIC

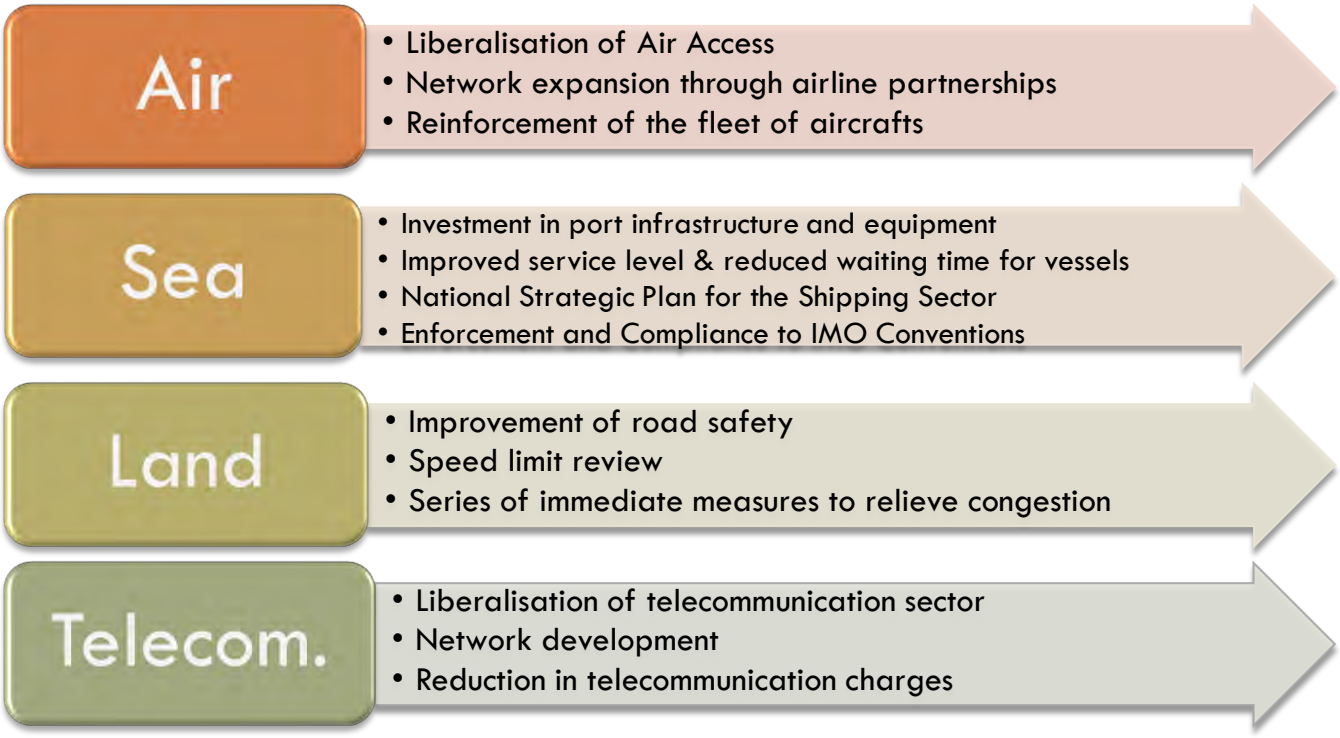
Telecommunications Charges

Between 2007 and 2008, a number of measures have been taken to bring down telecommunication charges. The costs of international connectivity between Mauritius and Europe have been brought down by up to 52% over an 18 months' period thus making Mauritius the most affordable ICT destination in Africa. Cost of a local telecom call has been brought down by 27% and by 19.8% for an international call. Moreover, cost of Internet charges has decreased by 26% and 24.2% of wholesale and retail charges respectively.

Inter Island Connectivity Project (SEGANET)

In December 2008, Mauritius along with Member States of the Indian Ocean Commission signed the "Protocole d'Accord" relating to the project - SEGANET (the Inter Island connectivity project). SEGANET aims at connecting member states together via a sub marine fibre optic cable thus providing high telecommunications bandwidth for the socio-economic development of the region.

LESSONS LEARNT AND GOOD PRACTICES:



EFFECTIVENESS OF IMPLEMENTATION:

The liberalization of air access is in line with Government's vision of two million tourists by 2015. In the midst of the global economic crisis, the national carrier showed resilience. This has been possible by taking timely measures such as network rationalisation, the adjustment of capacity to match demand as well as overall cost management programmes.

Similarly for the port sector, despite a slight decrease in total trade volume for the 2008/2009 financial year, concerted efforts were made to reduce the cost base. Furthermore, Government invested massively to make Port Louis Harbour a major regional logistics hub to capture substantial incremental traffic and foreign direct investment.

As the number of single occupancy vehicles soars on the roads and the fact that most offices are located in the capital city, congestion has dramatically increased during peak hours. In this regard, several

immediate measures have been undertaken to curb down the congestion problem until other more effective measures are taken.

Liberalisation of the telecommunications sector ensured that competition flourish under optimal conditions. However, the prominent feature of the telecommunications sector is all about innovation and technological progress. As far as possible, Mauritius is taking full advantage of new developments in the sector by inviting private companies invest in new technologies.

SPECIAL CONSTRAINTS AND CHALLENGES:

Mauritius is a trading nation. Owing to its remoteness from major markets, it depends heavily on transportation and telecommunication technologies to ensure timely sourcing of raw materials and delivery of its goods, and also to ensure its competitiveness on the world market. Moreover, being far from its main markets and with the advent of new tax regimes with regard to climate change, Mauritius will also be at a disadvantage as it may be subject to carbon taxes.

In the air transportation sector, the volatility of fuel prices has a consequential impact on the national carrier. For instance, in 2009 the latter incurred a Loss for the year of Euro 85.4 million as a result of fuel hedging losses. For a small island like Mauritius, any extreme and unprecedented industry environment can make the national carrier collapse. Additionally, extreme weather events arising from climate change may also impact on the air transport sector with more and more flights being diverted to other regional airports. As a result, the national industry is likely to incur significant losses.

Similar to all island States, ports are critical links in the supply chain and to promote economic growth. Since the past five years, the port and maritime sectors have moved from a situation of boom and severe congestion to one of uncertainty and loss of business associated with the effects of the world economic crisis. Furthermore, due to the shortage of marine engineers and maritime administration staff, targets set for Flag State surveys and Port State inspections cannot be achieved.

In Mauritius, the density of vehicles as at 2008 is currently 173 vehicles per km of road and there are 285 vehicles per 1,000 inhabitants. Traffic congestion along the major roads leading to the capital city is a daily hurdle, accounting for approximately Rs. 3 billion (approximately $ 100 million/year) losses in economic activity per year. At present, the challenge lies in alleviating the congestion problem, invest in more sustainable modes of travel and the adoption of complementary land use and transport strategies to sustain urban and coastal tourism growths. Yet another challenge is the shift from private to public transportation.

Even though the telecommunications sector has been fully liberalised, new companies cannot compete with existing major players as investment costs are exceedingly high, thus constituting a major constraint in promoting liberalisation. The challenge also rests in revising the liberalised environment into more general ex-post competition regulation model, reducing market access gaps, providing ongoing capacity building and ensuring consumer protection.

RECENT TRENDS AND EMERGING ISSUES:

Terrorism & Piracy at Sea	Sanitary & Phytosanitary Measures	Drug Trafficking
• Priacy and terrorism in the Indian Ocean can cripple vital air and shipping lines.	• Threat posed by invasive species, spills and ballast water from ships and risk of oil spill since the Indian Ocean is a very important navigation route.	• More stringent control and security measures at the airport and port for the detection of illegal drug trafficking.

CONCLUSION AND WAY FORWARD:

Air Transport:

Government is exploring possibilities to further open air access. Moreover, in response to tourism growth forecasts, Government is expanding the SSRIA by creating a new terminal that with a 4 million passenger per year capacity. Aéroports de Paris Management will be financing, building and managing the new terminal jointly with Airports of Mauritius Ltd. The design of the terminal is closely linked to the 'Maurice Ile Durable' concept. In this regard, photovoltaic panels will be installed. Solar energy and rain water will be harnessed for the patios and sanitary blocks, while the building facades will be thermo-insulated.

W TERMINAL:

k times

- 8 contact stands, with one A380-compatible
- 52 check-in desks
- 9 telescopic air bridges

Sea Transport:

To maintain the impetus of modernisation the port area, Government is adopting the following strategies:

- ☐ Make Port Louis Harbour an important bunker station to service vessels plying in the region;

- ☐ Expand fishing port facilities to support the development of the seafood hub;
- ☐ Use the new cruise berthing facilities to promote Mauritius as a cruise destination in collaboration with the Mauritius Tourism Promotion Authority and other stakeholders in the tourism sector;
- ☐ Promote expansion of waterfront development that will bring major changes in the skyline of Port Louis and make a major contribution to the rejuvenation of the City of Port Louis and
- ☐ Facilitate the development of marinas for leisure craft both at Port Louis and Port Mathurin.

Road Transport:

Government is addressing the problem of land transport and traffic congestion as a priority and on three axes, that is: expanding road infrastructure, demand management and road safety. In the next few years, Government will channel some Rs 3 billion ($100 million USD) in road development. For 2010, Government has earmarked Rs 752 million ($25 million USD), to be invested in 13 road projects that will expand as well as improve the road network and allow for a more fluid movement of traffic.

Forthcoming road works:

- ☐ The South Eastern Highway,
- ☐ Access roads at Réduit and Riche Terre,
- ☐ The Terre-Rouge/Verdun Link Road,
- ☐ The bus lane along Motorway M1,
- ☐ Ring road bypassing Port Louis
- ☐ Resurfacing of Motorway M1 & M2
- ☐ Road maintenance.

Furthermore, Government has approved the setting up of the Mauritius Land Transport Authority (MLTA), which will integrate all functions presently carried out by the National Transport Authority, the Road Development Authority and the Traffic Management and Road Safety Unit. The MLTA will assume an instrumental role in strategic policy development and coordination and will have the following responsibilities: development of the institutional mechanism for integrated and coordinated policy formulation and project implementation; production of a land transport master plan and management of transport; integration of the transport policy, especially with regard to land use planning and planning, execution and management all land transport projects amongst others.

Government is also embarking on a Bus Modernisation Programme, which includes the construction a 25 km bus way to be operated together as an integrated Bus Rapid Transit System. The implementation of a toll system on the motor way as well as on the forthcoming roads is also being discussed.

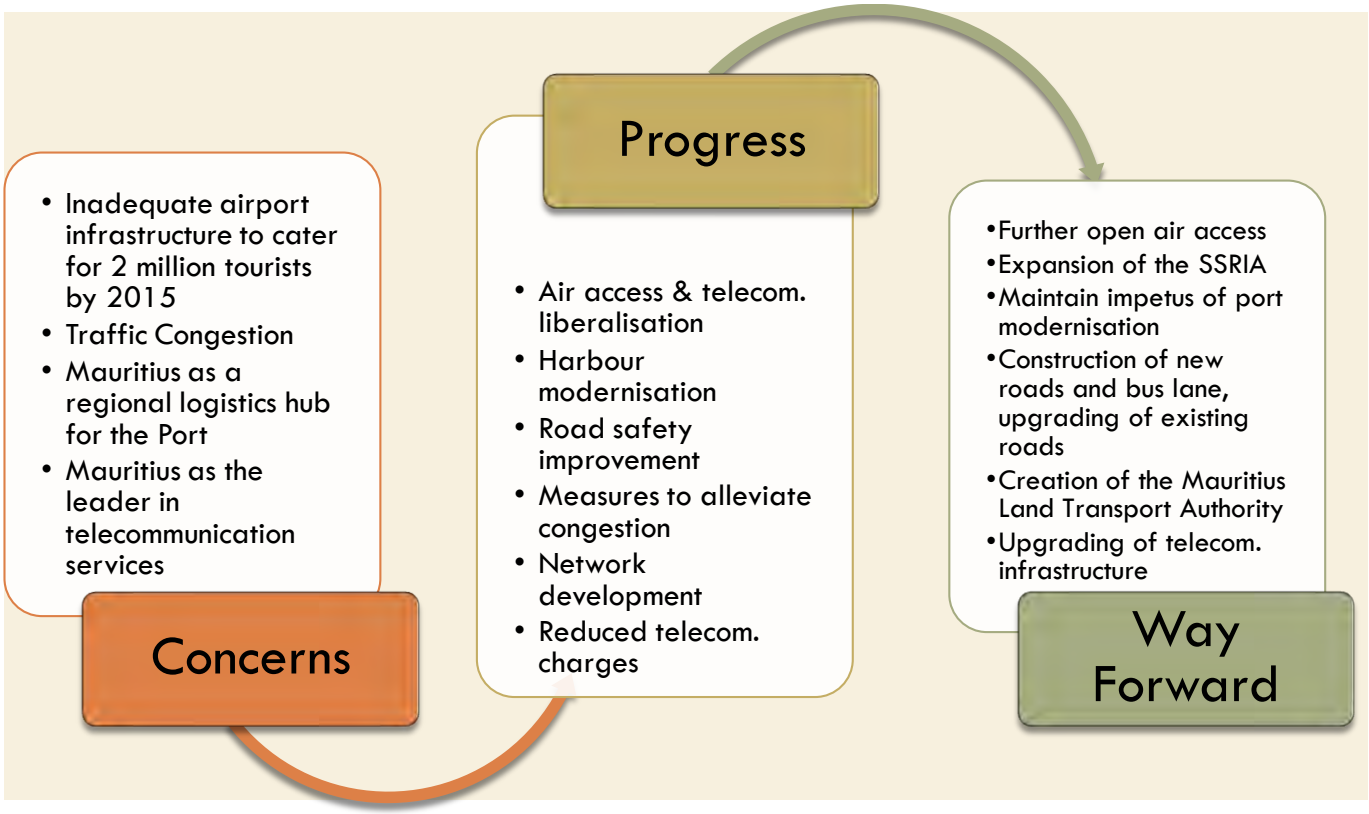
Telecommunications:

Further investments in the upgrading of the SAFE cable's bandwidth capacity, the Lower Indian Ocean Network (LION), Eastern Africa Submarine System (EASSy), Europe-India Gateway (EIG) and other regional undersea cable projects, to increase the capacity, speed, reliability and resilience of our international connectivity. All these will facilitate the further growth of the IT-Enabled Services sector, consisting principally of BPO enterprises and call centres.

In 2010, the Global Fibre Network will be put in place in selected Government buildings to replace current cabling system and to improve connectivity.

Furthermore, a 4th telephony operator is expected to join the local telecommunications market.

SUMMARY:



CHAPTER 11: SCIENCE & TECHNOLOGY




2010 Budget Speech

"The Science, Technology and Innovation (STI) framework will establish the process for improving the linkage between research and technological advances with industrial application"

Chapter 11: Science & Technology

INTRODUCTION:

Scientific and technological know-how drive productivity and are important enablers of sustainable development. In Mauritius, Science and Technology (S&T) is present through applications and in the educational field. There is no formal policy on S&T per se, and research in S&T fields is still low.

For Small Island Developing States (SIDS), S&T is a cross-cutting parameter for critical sectors such as climate change, food security, public health, cleaner and greener production, the sustainable exploitation of natural and agricultural resources, and development of renewable energy sources.

Given the increasing importance of science and technology in building resilience in SIDS as highlighted in the Mauritius Strategy 2005, various measures have been initiated to strengthen the science and technology base of our economy. New sectors of growth being pursued required a broad range of scientific and technological skills. The pace of transfer of technology needs to be accelerated. Development of skills in the S&T sphere must be reinforced.

Science and research is being promoted for wealth generation, job creation and sustainable development. There are around 12 institutions which undertake research and development (R&D) in various fields. Science in schools and at tertiary level is being encouraged, in order to redress the mismatch between labour skills and sector demand.

Scientific knowledge and new technologies is gradually becoming more prominent in the policy framework in Mauritius to tackle challenges of globalisation and trade liberalisation, as well as more sustainable patterns of production and consumption. Through S&T Mauritius can develop new or improved products and processes, thus accelerating the rise in productivity, competitiveness and economic growth in all sectors of our economy and to support improved quality of life of the population.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Since the Mauritius Meeting in 2005, the Government of Mauritius has identified appropriate science and technology elements towards meeting the objectives of Mauritius as a sustainable island, 'Maurice Ile Durable'. Within the national budget 2010, emphasis on science and technology has been made and some Rs 22 million (about $730,000) has been earmarked to develop a framework to support Science, Technology and Innovation.

■ Ministry of Industry, Science and Research

In 2008, Mauritius created a Ministry of Industry, Science and Research for the first time, as part of its strategy to promote a modern and vibrant economy base propelled by innovation, technology, knowledge and specialized skills. Major initiatives in the area of S&T taken by the Ministry of Industry, Science and Research include:

- ☐ Energy audits, carbon footprints and promotion of greener industry, in collaboration with Enterprise Mauritius and the Mauritius Standards Bureau, to promote sustainable production
- ☐ The proposal for a Resource Efficient Cleaner Production Programme, with the assistance of UNIDO and UNEP.
- ☐ Promotion of green textile.
- ☐ Promotion of bioinformatics for industrial diversification.

■ Mauritius Sugar Industry Research Institute

The Mauritius Sugar Industry Research Institute (MSIRI) is one of the leading research centres on sugar cane worldwide. Its research has culminated into the development of a variety of cane with high sugar content combined with high fibre content or electricity generation. Over time, it has developed various areas of research in other food crops as well as on the possible use of bagasse to produce bioplastic.

The MSIRI also hosts the Mauritius Herbarium, which is a repository of local plant specimens. Furthermore, the MSIRI conducts research in a number of fields related to crop diversification, agricultural land use changes and the impact of climate change on agriculture. The MSIRI is involved in the preparation of the Second National Communication for Mauritius on climate change.

■ National Information & Communication Technology (ICT) Strategic Plan

The National ICT Strategic Plan (2007-2011) was elaborated in 2006. This sector is already contributing immensely to the advancement of science and technology in Mauritius. One significant step, amongst others, has been the setting up of an ICT Business Incubator, a joint initiative of the National Computer Board and the University of Technology to support potential entrepreneurs with new and innovative ideas in the field of ICT.

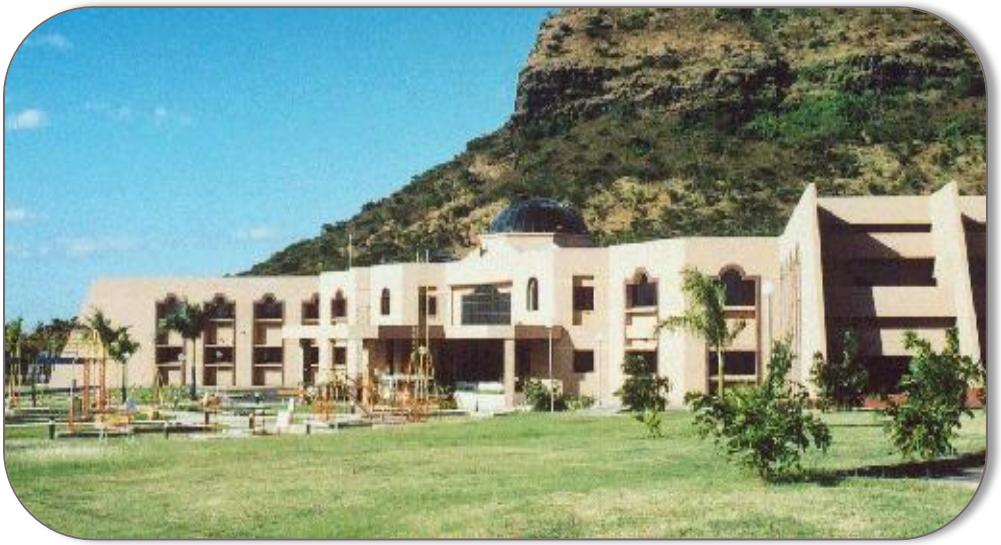
The ICT sector is one of the most basic tools for the enhancement of science and technology. ICT is dealt with in more details in Chapter 17 Knowledge Management and Information for Decision-Making.

■ Rajiv Gandhi Science Centre

The prime objective of the Rajiv Gandhi Science Centre is to popularise science and technology among students and the Mauritian public in general. Its successful National Science Challenge competition has been running for six years with an active participation of around 2000 secondary

school students so far, out of the total secondary school enrolment (Grades I to VII) of 116,503 in 2008. The Centre recently undertook research in the field of Science and Society in the Mauritian context. Many other activities are being undertaken by the Centre which include science projects for primary, secondary and tertiary students, and outreach programmes for students and the general public.

Rajiv Gandhi Science Centre, Bell Village



Mauritius Oceanography Institute

The Mauritius Oceanography Institute (MOI) is presently the regional implementation centre of the African Monitoring of Environment for Sustainable Development (AMESD). The MOI has been instrumental in:

- ☐ Assisting the Government of Mauritius to prepare various submissions to the United Nations for an extension of the continental shelf of the Republic of Mauritius.
- ☐ Development of a tsunami preparedness plan.
- ☐ Initiation of a four-year project to evaluate the anti-cancerous properties of marine sponges extract
- ☐ Investigation on the population structure of certain specific corals and reef fishes to determine their genetic link and enable better fisheries management, both locally and regionally
- ☐ The feasibility study on pearl culture and the reefs habitats of the South East coast of Mauritius.
- ☐ A pilot coral farming project to investigate optimal conditions for the growth of corals in pond-nurseries

Mauritius Research Council

The Mauritius Research Council (MRC) was set up in May 1992 as the apex body to promote and coordinate national investment in research and to advise Government on science and technology issues. It funds research projects in areas of national priority and promotes strategic partnerships among the public sector, the business community and academia. The MRC operates five research grant schemes through which it has funded research with social and economic potential in the following areas of national priority interest:

- ☐ Biomedical and Pharmaceutical
- ☐ Biotechnology
- ☐ Energy Efficiency and Renewable Energy
- ☐ Information Communication Technology (ICT)
- ☐ Land & Land Use
- ☐ Manufacturing Technology
- ☐ Ocean Technology and Marine Resources
- ☐ Science & Technology Education
- ☐ Social/Economic
- ☐ Water Resources
- ☐ Waste Management and Water Recycling

Some examples of recent research undertaken under the MRC research grants schemes are:

Seaweed Industry

- A Survey of seaweed resources was carried out to determine its agronomic value and assess its potential as a source of human and animal feed as well as its calorific value. Phase I of the study has been completed in July 2009. Phase 2 will last for the next two years.

Coconut Oil

- A feasibility study on the potential to use coconut oil to generate electricity in Agalega Island was done and a presentation on the findings made on 16 January 2010.

e-waste

- In 2009, a study was undertaken to quantify and characterise the e-wastes (Wastes of Electric and Electronic Equipment -WEEE) generated in Mauritius.

Geothermal energy

- A feasibility study on geothermal energy was completed in July 2009 and it is anticipated that the project will start in 2010

Private Sector

The private sector, operating in all sectors of the economy, is one of the biggest users of S&T applications in Mauritius. Ranging from ICT solutions, use of production equipment in the agricultural and manufacturing sectors, basic and high-tech health care equipment, media, advertising and recruitment portals. Despite not contributing significantly to research initiatives in Mauritius, in an effort to diversify its range of activities and improve its productivity, competitiveness and service delivery, the private sector engages in technological improvement and capacity building. SMEs are increasingly being encouraged by Government to modernise their operations.

Civil society

Few NGOs make use of S&T, especially in view of funding and capacity limitations. The trend is evolving as some NGOs now have websites and use modern communication tools. One example is the Mauritian Wildlife Foundation, an NGO engaged in biodiversity conservation since decades, which uses captive breeding, propagation techniques, habitat restoration and species translocation, amongst others.

Research and S&T

A number of organisations are engaged in empirical and/or applied research using S&T tools and applications, such as the :

- ☐ Tertiary institutions (e.g. University of Mauritius, University of Technology Mauritius, Schools of Medicine and Dentistry, Mauritius Institute of Health)
- ☐ Agricultural Research and Extension Unit
- ☐ Food and Agriculture Research Council

Furthermore, the University of Mauritius and the University of Technology Mauritius organised conferences on scientific issues on SIDS.

LESSONS LEARNT AND GOOD PRACTICES:

Since 2008, to foster a science and technology-based economy in Mauritius, Research and Science have been placed under the portfolio of the Ministry of Industry. The objective is to create greater space for science and technology in the economic development process, and allow emergence of skill and technology intensive economic sectors.

S&T in education

A number of courses are being run in S&T fields, from primary, through secondary to tertiary level. Technical and vocational training on S&T subjects are also being offered in order to

strengthen the skilled workforce requirements of the country. However, a decline in pupils opting for science subjects has been noted. In an attempt to foster interest in science subjects among students, a number of pilot initiatives are being introduced :

- ☐ The 'Science for the 21st Century' project is a new approach to science at secondary level. Introduced on a pilot basis in 2009 in 14 secondary schools, all secondary level students from Grade IV level who pursue non-scientific studies need to take 'Science for the 21st Century' as a compulsory subject. It is intended to maintain a minimum scientific knowledge amongst all students. This may be extended to all secondary schools in 2011.
- ☐ The 'Ecological Footprint' project is being run in 12 schools, to measure and reduce the ecological footprint at their schools. It also aims at creating teamwork in science activities.
- ☐ Award of 42 bursaries by the MRC to support MPhil/PhD students in various fields to address the constraint of low intake in post-graduate studies.

■ Mauritius Science Portal

The Mauritius Science Portal (http://science.gov.mu) is the first national portal of its type in Mauritius for sharing of information. It was launched by the Ministry of Industry, Science and Research in March 2009. This portal cuts across all aspects of science and technology in Mauritius and provides a set of comprehensive links to four major components of S&T, namely Research in Science & Technology, Science & Industry, Science Education and Science Popularisation.

The Mauritius Science Portal forms part of the National Science and Research Policy Framework which is presently under preparation. The policy framework will address issues such as market oriented research, synergy among Science, Technology and Innovation (STI) institutions, infrastructure upgrading for STI promotion, Intellectual Property Rights (IPR), skills development in STI, market driven technology development and innovation.

■ SADC Science, Engineering &Technology week

The first SADC Science, Engineering &Technology (SET) week was held in Mauritius during the third week of October 2009. SADC Countries unanimously recognize that the integration of Science, Technology and Innovation (STI) in the development process assumes critical importance in the attainment of the millennium Development Goals. The key objective of the SADC SET Week is to raise public understanding of science, engineering and technology and their contribution towards socio economic development and improving the quality of life of our people.

EFFECTIVENESS OF IMPLEMENTATION:

Science and technology is recognised as being crucial in the development of the country. However, it is noted that the level of penetration of S&T in everyday life is not commensurate with the level required in most sectors of our economy. Access to technology, inadequacy of

appropriate skills, remuneration of scientific and technology-related workforce and the absence of a comprehensive policy and legal framework on S&T need to be overcome to ensure that S&T permeates society, the education system and productive sectors of the economy.

S&T in Industry

S&T applications in industries and in agricultural production are widespread. Improving their adaptability to the local context requires testing and research, which is slow to take-off. Possible causes for this state of affairs is lack of funds for research, in particular from the private sector.

S&T in education

The low rates of enrolment in science disciplines at schools and universities in Mauritius have been a matter of concern in the development of scientific skills. The following graphs indicate the general situation:

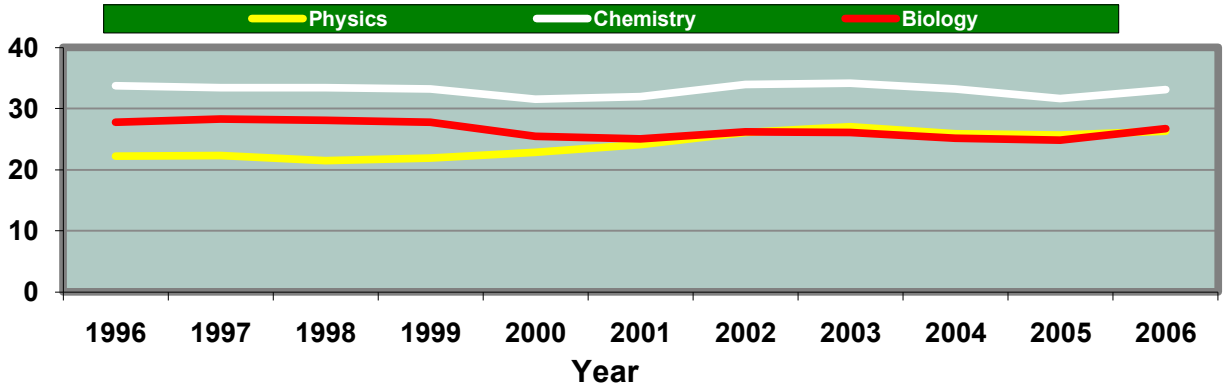


Figure 11.1: Enrolment in science subjects at 'O' level (% and year)
(Source: Ministry of Industry, Science and Research, 2010)

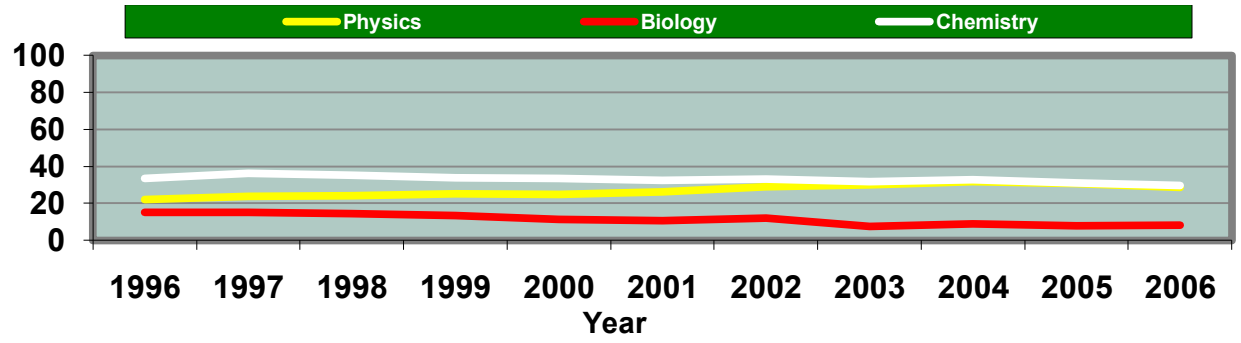


Figure 11.2: Enrolment in science subjects at 'A' level (% and year)
(Source: Ministry of Industry, Science and Research, 2010)

Local enrolment in postgraduate studies (MPhil/PhD), during period 2000-2008, excluding Mauritians enrolled at foreign institutions, has almost stagnated as shown below.

Table 11.1 Enrolment rate in postgraduate studies (MPhil/PhD level - % and year)

Year	2000/01	2001/02	2002/03	2003/04	2004/05	2005/06	2006/07	2007/08
Research (MPhil/PhD)	108	114	125	146	167	185	196	216
Total Tertiary Enrolment	17,132	20,488	22,292	25,685	26,074	28,864	33,230	35,023
MPhil/PhD as a % of total tertiary Enrolment	0.63	0.56	0.56	0.57	0.64	0.64	0.59	0.62

SPECIAL CONSTRAINTS AND CHALLENGES:

Developmental efforts in Mauritius have been constrained by inadequate human skills in science and technology, lack of synergy among research institutions and inadequate investment in Research &Development for the consolidation and diversification of the economic structures. Transfer of technology has been hampered by current IPR regimes, new technology originating mostly from developed countries and often prohibitive costs.

Until recently, public and private sector expenditure on science and technology, and Research & Development, has been on the low side in Mauritius. It stood at around 0.36% of the GDP compared, for instance, with the targeted 1% recommended by African Union Commission/NEPAD.

Science for all

The curriculum base programme at the secondary level has been broadened with emphasis on the teaching of science and technology to those not intending to take science as their field of study in higher classes. General Science will become compulsory till Form V (representing 5 years at secondary level) for students not opting for a pure science subject in view of the increasingly important role of science.

Technology at industry level

There is virtually no formal industrial Research and Development in the industrial sector, although a few flagship companies have accentuated their research activities. The opportunities of S&T in environmentally sound production and other applications have not been as widespread as needed, mainly due to financial reasons and lack of technical capacity to operate such new technologies.

Nevertheless, there has been limited progress concerning the application of science and technology through environmentally sound technologies in the reduction of environmental risk. The utilization of indigenous technologies need to be explored.

Legal Framework Supporting S&T Issues

There is a general policy to promote science, technology and innovation in Mauritius. However, there is not yet any comprehensive policy document and legal framework supporting S&T issues in Mauritius, apart from the:

- ☐ Policies to support science development in the education system
- ☐ Some incentive schemes for auditing, cleaner production and technology improvement in some sectors
- ☐ The National Science and Research policy framework being developed
- ☐ Funding to support Science, Technology and Innovation

Intellectual Property Rights

A study by the Mauritius Research Council has shown that in general there is a lack of awareness of Intellectual Property (IP) issues, inadequate awareness of the benefits of owning and commercializing IP assets, high costs of legal advisory services and lack of comprehensive institutional framework to promote the commercialization of IP assets.

Capacity requirements

Lack of interest in science subjects at secondary level and the fact that the quality and quantity of vocational education opportunities are lagging, is proving detrimental to the industry needs. The Human Resources Development Plan (Phase 2), recently launched, proposes strategies to better

match supply and demand of human resources, and the major orientations of capacity development for the country. With the opportunities arising from a shift to a low-carbon economy and the MID vision, trained workforce (green jobs) to handle new and greener technologies is required. Training and technology transfer from developed countries is necessary for this to be successful.

RECENT TRENDS AND EMERGING ISSUES:

Science and technology represent significant avenues for sustainable development, through the emergence of an Environment Industry whereby Mauritius can position itself as a provider of goods and services, including opportunities for a low-carbon economy

■ UNIDO Mauritius Office

Access to high-tech industrial facilities will be enabled by UNIDO, which is shortly setting up a regional office in Mauritius.

■ Framework to support Science, Technology and Innovation (STI)

The Government is putting emphasis on science and technology through the allocation funds for the development of a framework to support Science, Technology and Innovation (STI). The framework will establish the process for improving the linkage between research and technological advances with industrial application. A Science, Technology and Innovation Fund will be set up to finance market oriented research projects and support creativity with regard to invention and innovation. A policy is being devised to establish the STI Park in Mauritius.

■ RMCE

Regional integration will be significantly strengthened through the Regional Multi-Disciplinary Centre of Excellence (RMCE) being set up in Mauritius. The RMCE will involve several regional and international organisations and will also be an excellent platform for exchanging science and technology facts, data, research and applications.

CONCLUSION AND WAY FORWARD:

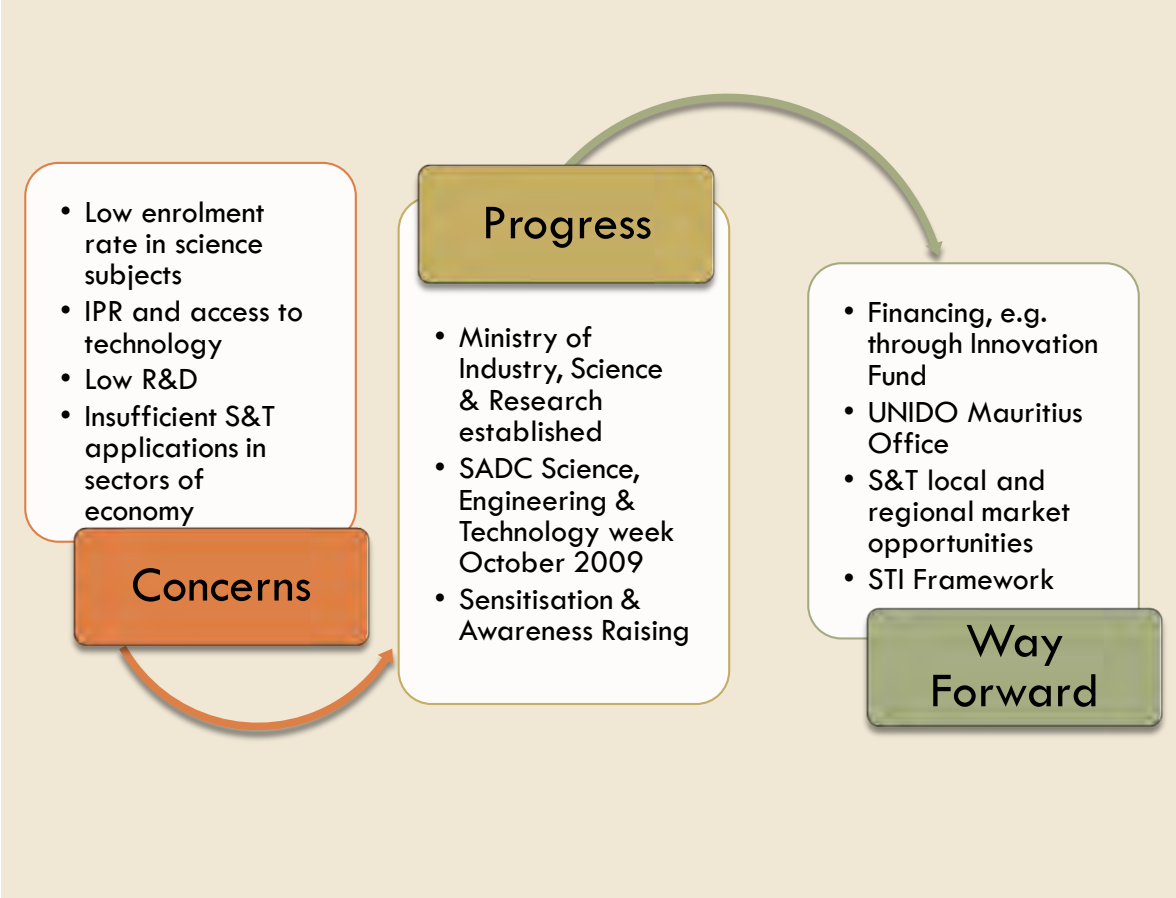
It is a historically and internationally established fact that the world economy has been transformed by scientific developments, technological prowess and cutting edge innovation at different stages of its development. It is also a fact that civilizations have crumbled due to their inability to renew their knowledge pool. Although S&T in Mauritius centres towards industrial development, its mission includes the promotion of science and research for wealth generation, job creation and sustainable development. One of the main challenges has been a low and stagnating enrolment rates in science subjects at the secondary and tertiary levels. Moreover

research institutions are constrained by inadequate skills in science and technology, insufficient budgets until recently and a lack of synergy among them.

The ability to develop and adapt scientific know-how, to generate original knowledge and innovations and to commercialise research output vary between developing and developed countries. Mauritius has to bridge the gap by increasing awareness and interests for science subjects among primary and secondary level students, identifying areas where to upgrade technical education, increase investment in science and technology and higher education, and consolidate entrepreneurial training and technology learning. Technical, academic and vocational courses in S&T would be increased and given due recognition.

The new policy of placing greater emphasis on science and technology will contribute towards the accentuation of scientific research, and enhance intake of new technology and application of innovative practices in economic activities. Funding to support Science, Technology and Innovation is crucial to enable capacity development and information sharing for synergy among stakeholders. An Innovation System/ Fund is planned to be set up.

SUMMARY:



CHAPTER 12: TRADE – GLOBALISATION AND TRADE LIBERALISATION

Mauritius Strategy for Implementation

"The potential benefits from trade liberalization and globalization can be best realized if the specific limitations and vulnerabilities of Small Island Developing States are addressed at all levels."

Chapter 12: Trade – Globalisation and Trade Liberalisation

INTRODUCTION:

Mauritius has an export-driven economy and faces a number of handicaps common to many SIDS. It is small with an exiguous domestic market, remote from both its import and export markets, has very limited natural resources, occupies a minimal share of world trade, and faces supply-side constraints. There is the need to adapt to natural hazards, such as cyclones or droughts, which have repercussions on our goods and services sectors. Furthermore, the trade sector requires accompanying measures to withstand the impacts of trade liberalisation and recent protectionist measures during the crisis.

Over the period 2004 to 2008, the balance of trade clearly demonstrates the widening trade deficit. The trade deficit has doubled from Rs 10 billion in 2003/04 to Rs 20 billion in 2004/05, to Rs 25 billion in 2005/06 and around Rs 34 billion in 2006/07.

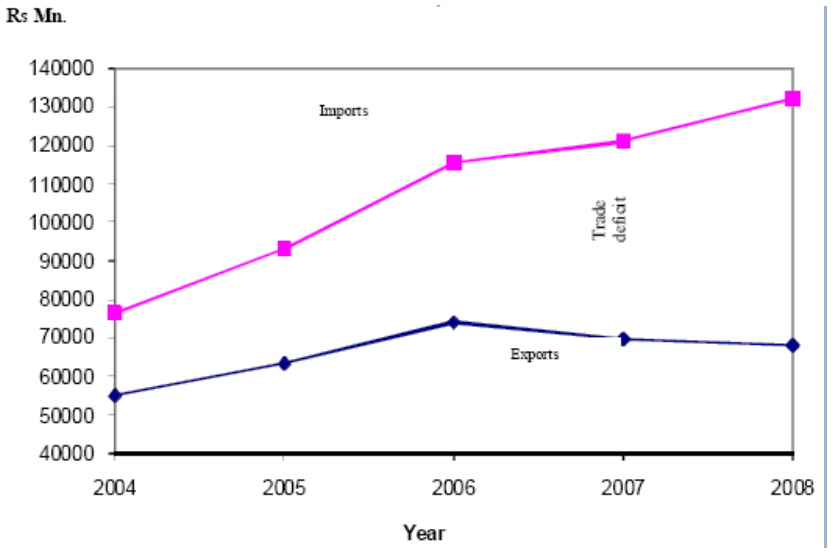


Figure 12.1: Balance of trade, 2004-2008(CSO, 2008)

In 2008, the trade balance resulted in a trade deficit of Rs 64,195 million (about $2.1 billion), where total exports reached Rs 67,970 million (about $2.3 billion) compared to total imports of Rs 132,165 million (about $4.4 billion). Comparing 2008 to 2007 terms of trade, export prices decreased by 4% in and import prices increased by 8%.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Since 2005, international trade policy changes have had strong repercussions on the Mauritian economy. These trade developments, particularly continuous trade liberalization and erosion of trade preferences, had profound impacts on the socio-economic structure of Mauritius, and required painful adjustments. A declining volume of world trade and successive global oil, food and financial crises have dramatically worsened the outlook.

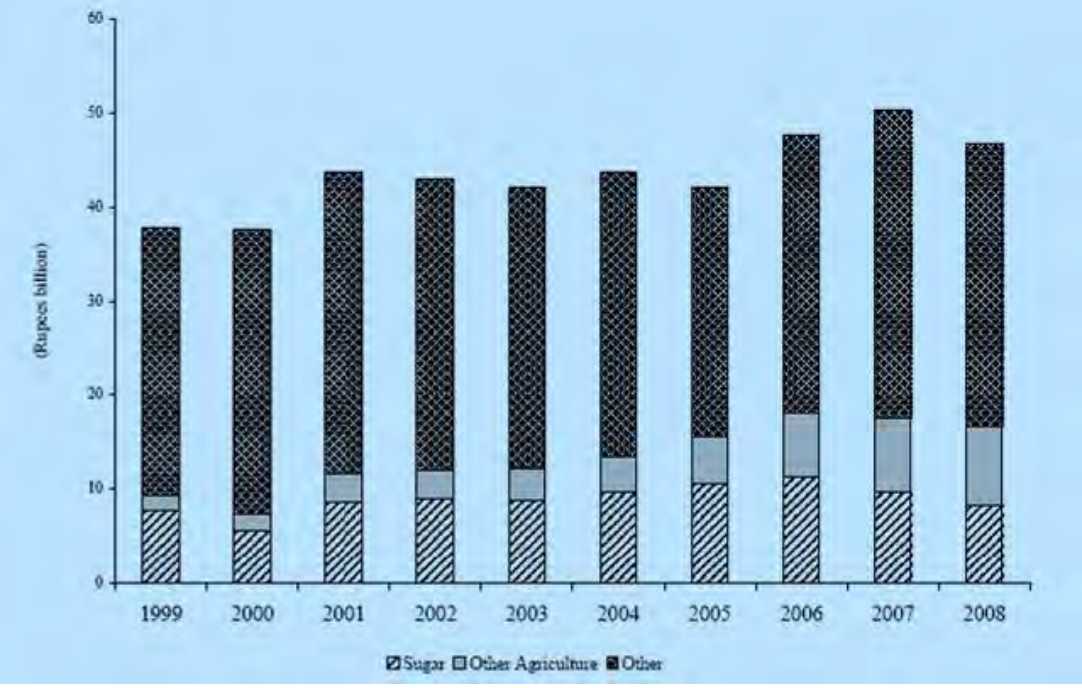
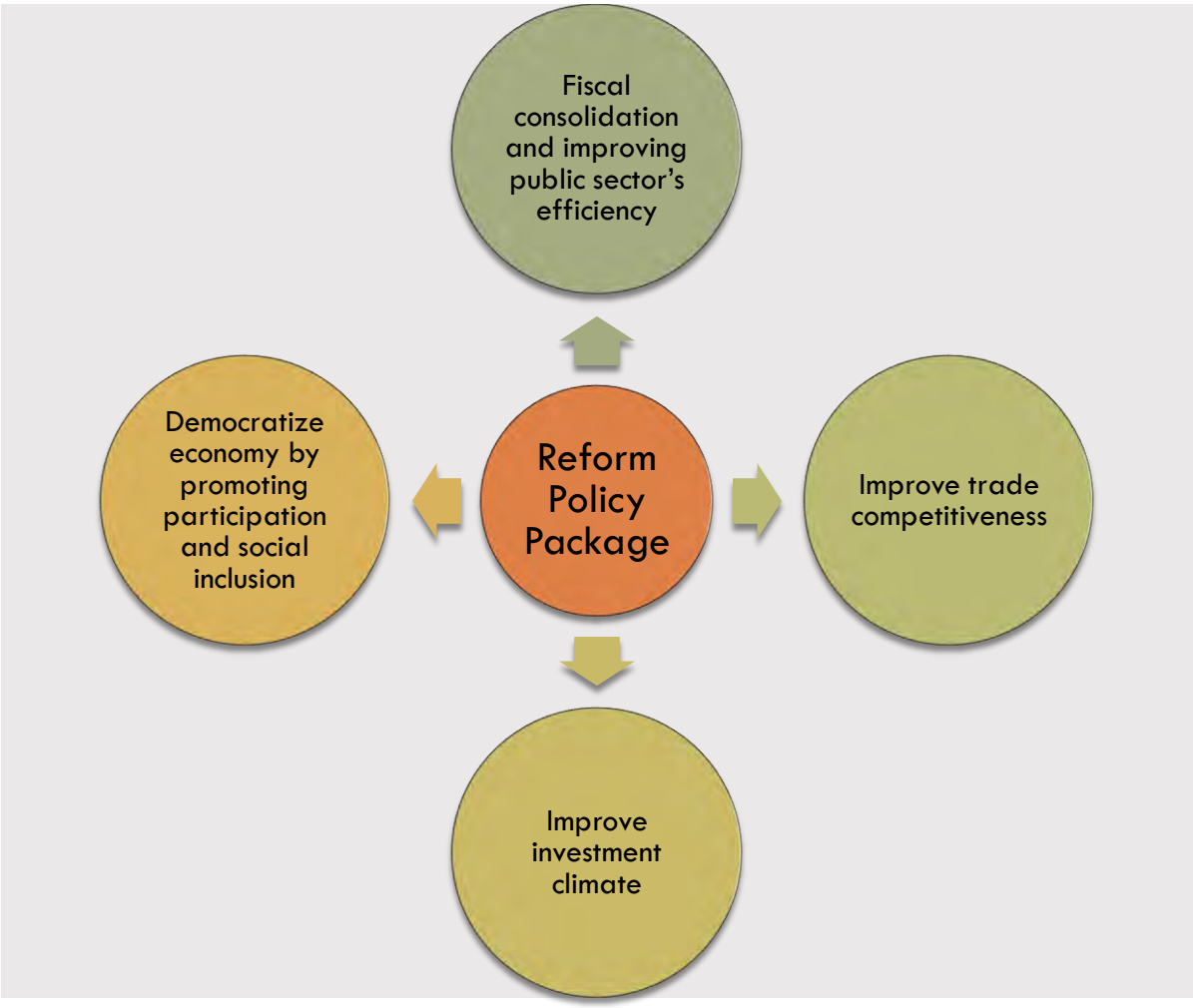


Figure 12.2: Total domestic exports, 1999-2008 (f.o.b. value)
(Source: CSO, 2008)

☐ Economic Reforms

The openness of the Mauritian economy makes it particularly vulnerable to external shocks, many of which are beyond our control. These challenges prompted Mauritius to embark on a comprehensive 10-year reform programme as from Financial Year 2006-2007 to embrace radical changes and build a new, open and competitive service platform that is fully integrated into the global economy. The two-pronged approach for the reform programme is:

- ☐ At the national level, the reform programme aims at accelerating the integration of the economy of Mauritius into the global economy;
- ☐ At the regional level, we are actively supporting and participating in the establishment of an effective Free Trade Area (FTA) embracing COMESA and SADC, with the further aim to collectively negotiate an FTA with EU and ultimately promote horizontal and vertical integration within Africa.



Specific components of the reforms encompass:

- ☐ Regional and global trade liberalisation
- ☐ Facilitate investment for new and existing businesses
- ☐ Open up the economy to attract foreign investment and talent
- ☐ Reform the labour market to make it more competitive and sustainable
- ☐ Make our social policies more in line with social needs
- ☐ Control wastage and securing efficiency gains in the public sector
- ☐ Bring in fiscal consolidation and restore discipline
- ☐ Reform our tax system including trade taxes to make it simple, fair and to respond to our current needs, and
- ☐ Broaden the circle of opportunities and brought in an innovative and comprehensive Economic Empowerment Programme
- ☐ Tackle high female unemployment and low earnings of women
- ☐ Radically improve the support framework for new entrepreneurs and SMEs
- ☐ Expand the range of financing instruments for micro enterprises and SMEs

Policy/Regulations	Capacity Development	Productive Capacity	Infrastructure	Adjustment
Guidelines for start-up of foreign investments	Abolish trade licenses	Support framework for SMEs	EaSSY participation	Reduce tariffs
Link wages to productivity	Establish predestinated Development Areas	Re-engineering for sugar and textile industries	Transport	Upgrade skills
Integrate various labour markets	Open air access			Assist SMEs
Combat corruption				Empowerment programme
Reform tax system				
Merge EPZ and non-EPZ sectors				

Figure 12.2: Mauritius Trade-Related Reform measures
(Source: Ministry of Finance and Economic Empowerment, 2010)

The Business Facilitation (Miscellaneous Provisions) Act 2006 allows for a significant easing of the business climate and provides for a completely new approach to business facilitation that is simpler, less cumbersome, less costly and less time consuming. Businesses can start operations on the basis of self adherence to comprehensive and clear guidelines. Authorities can exercise ex-post control to check for compliance and ease of doing of business, acquisition of properties by foreigners and for small enterprises to start their business activities within 3 working days.

The Business Facilitation (Miscellaneous Provisions) Act 2006 also opens up the economy to attract foreign talents, know how, ideas and technology. Consequently, the Immigration Act & Non-Citizens (Employment Restriction) Act is amended to combine the work and residence permits into a single "occupation permit" for investors generating more than Rs 3 million annual turnover, for professionals being offered employment with a monthly salary of more than Rs 30,000 ($1000) and for self employed professional generating annual income of Rs 600,000 ($20,000). The occupation permit is issued by the Immigration Office within 2 working days. The silent agreement principle will apply if there has been no reply within that time frame.

LESSONS LEARNT AND GOOD PRACTICES:

Mauritius has been facing a sharp transition from dependence on trade preferences to open competition in the global economy in the wake of the triple shock of rising energy prices, review of the EU sugar regime and the dismantling of the Multi Fibre Agreement. As a result the economic environment was deteriorating and was compounded by low productivity, rising unemployment, worsening terms of trade and falling FDI, unfavourable macroeconomic situation, loss of preferences and an outdated incentive framework, which failed to generate growth. This situation resulted in high budget deficit, rising public debt, negative trade balance, falling investment and savings.

Despite these economic problems, Mauritius has refrained from the temptation of policy reversals and has maintained a high degree of openness. Consistent with its effort to remain fully integrated within the world economy, Mauritius has been very pro-active both on the national and international fronts. Our strategy was based on an accelerated diversification of our economy, human resource development, increased productivity and competitiveness, greater openness and a more efficient tax system and investment regime. In addition, regional integration, Aid for Trade and implementation of multilateral obligations, have contributed to enhancing the resilience of our trade-related architecture.

☐ Export Diversification

Mauritius has moved from a monocrop economy, at the time of its independence in 1968, to a relatively diversified export-oriented economy. Economic diversification initially encompassed agricultural diversification and textile and clothing. Recently, services such as tourism and financial services, have assumed considerable importance and accounted for around 74% of real GDP in 2008.

☐ Erosion of Trade Preferences

The high socio-economic growth that Mauritius achieved during the 80s and the 90s was primarily due to the country successfully exporting sugar and textile products to the European and American markets. The results of the Uruguay Round, mainly the phasing out of the Multi-Fibre Arrangement and the reform of the EU sugar regime, have thus had significant impacts on our economy. Preferential trading arrangements have had to be redefined to be WTO-compliant, such as the Economic Partnership Agreement with the EU, which is the successor to the Cotonou Agreement.

☐ Trade Agreements

Mauritius continues to strongly strengthen its trade relations with the rest of the world. Mauritius signed the interim Economic Partnership Agreement with the European Union in 2009. On the regional front, Mauritius is participating in the COMESA and SADC Free Trade Area and supports the establishment of the COMESA-EAC-SADC Tripartite Free Area.

Besides its regional integration interests, Mauritius will continue to strengthen ties with key trading partners including India, with which a Comprehensive Economic Co-operation and Partnership Agreement has been negotiated. Negotiations for similar agreements are under way with other Asian countries including China and Pakistan. A trading arrangement with Turkey is under discussion.

The main thrust of Mauritius's foreign policy is to negotiate suitable transition arrangements to protect its preferential access to developed markets and cultivate inflows of foreign direct investment and financial relationships. Mauritius will therefore campaign for the further extension of the US's African Growth and Opportunity Act (AGOA), which gives the country preferential access to the US market for certain products. A Trade and Investment Framework Agreement (TIFA) was signed with the US in 2006.

☐ Improving trade competitiveness

The centrepiece of the effort to improve trade competitiveness is an overhaul of the incentive framework to reduce distortions and biases. A three-year programme (2006-2009) to liberalise tariffs and turn Mauritius into a duty-free island levelled the playing field between those producing for the domestic and export markets. The tariff liberalisation programme achieved a low and uniform level of protection for the manufacturing sector while preparing Mauritius to become a 'duty free island'. The enquiry points for sanitary and phytosanitary measures (SPS), Technical Barriers to Trade (TBT) and Trade in Services have been operational since 1995.

☐ Addressing the cost of services

A second phase of the economic reform programme will tackle the high cost of services. The cost of International Private Leased Circuits (IPLC) will be reduced by 25% immediately, while increasing competition and strengthening the Information Communication Technology Authority (the telecommunications regulator) will promote more cost-effective supply in the future. Other measures call for liberalizing air access, developing ports infrastructure, increasing training and promotional efforts for the hospitality and tourism sector, and strengthening financial institutions.

Restoring global competitiveness also requires modernizing and restructuring existing sectors (sugar and textiles and clothing) and, where a role for the public sector is indicated, providing public support for the development of new activities such as ICT, financial services, specialty tourism, seafood and land-based ocean activities. Achieving these objectives will entail adequate planning and preparation of long term development plans and sectoral strategies as well as enhanced access to financial services.

Another challenge is to identify which services have potential for growth and what are the markets for these services. Export of professional services has been identified as one of the areas where the full potential remains untapped. The Government is in the process of developing

a roadmap for the export of professional services in the following four areas: healthcare; HR training & development; IT and outsourcing; and professional services, including financial services.

☐ Sanitary and Phytosanitary (SPS) Issues

In line with WTO obligations, Mauritius has already established an SPS enquiry point, the National Plant Protection Office. SPS issues are coordinated by a National Steering Committee comprising the public and private sector. Mauritius is trying to adapt to the stringent standards and measures set by developed countries, including those that are higher than international ones.

☐ Intellectual Property Rights

To fulfil its WTO obligations Mauritius is in the process of implementing its IPR legislations. They are one of the most extensive legal frameworks in the developing world. The present legislation in force includes the Copyright Act 1997, the Patents Industrial Designs and Trademarks Act 2002, and the Protection Against Unfair Practices (Industrial Property) Act 2002.

The local institutions and enforcing agencies dealing with IPR issues are scattered and lack effective enforcement capacity. With the assistance of a high level team from the World Intellectual Property Organization (WIPO), the enforcement mechanism will be streamlined and reinforced. However, like most SIDS, Mauritius faces difficulties like the violation of protected works through the internet. IPR is equally essential to Mauritius for the protection its indigenous resources under geographical locations.

In the light of the Protocol amending the TRIPS Agreement with regard to compulsory licensing, Mauritius is also aiming at the possibility of becoming a supplier of generic drugs which otherwise would be too expensive for the region.

In 2009, the Ministry of Foreign Affairs, Regional Integration & International Trade published 'Understanding Intellectual Property – A Practical Guide for Business & Entrepreneurs' with technical assistance and funding from Trade.Com Facility. The latter has also provided Mauritius with the necessary technical assistance in implementing an Intellectual Property Development Plan.

☐ Trade and Investment

Mauritius hosted the first Peer-to-Peer Learning Experience of African States in improving their business and investment climate. The three day intensive event was held in January 2010. It was jointly organised by the Government of Mauritius and the World Bank Group, with the Board of Investment (BOI) and the Regional Multidisciplinary Centre of Excellence (RMCE). Over 110 delegates from 16 African States participated in this experience sharing and learning-from-peers event, with seven countries being represented at Ministerial level. The participants comprised policy makers, key representatives of Ministries and country Investment Promotion Agencies (IPOs) from Sub-Saharan Africa. Africa's top reformers namely Rwanda, Mauritius, Liberia and Burkina Faso shared their Reform Experiences with the participants. Participants also had one-to-one meeting with agencies and institutions which are engaged in the implementation of the Mauritian

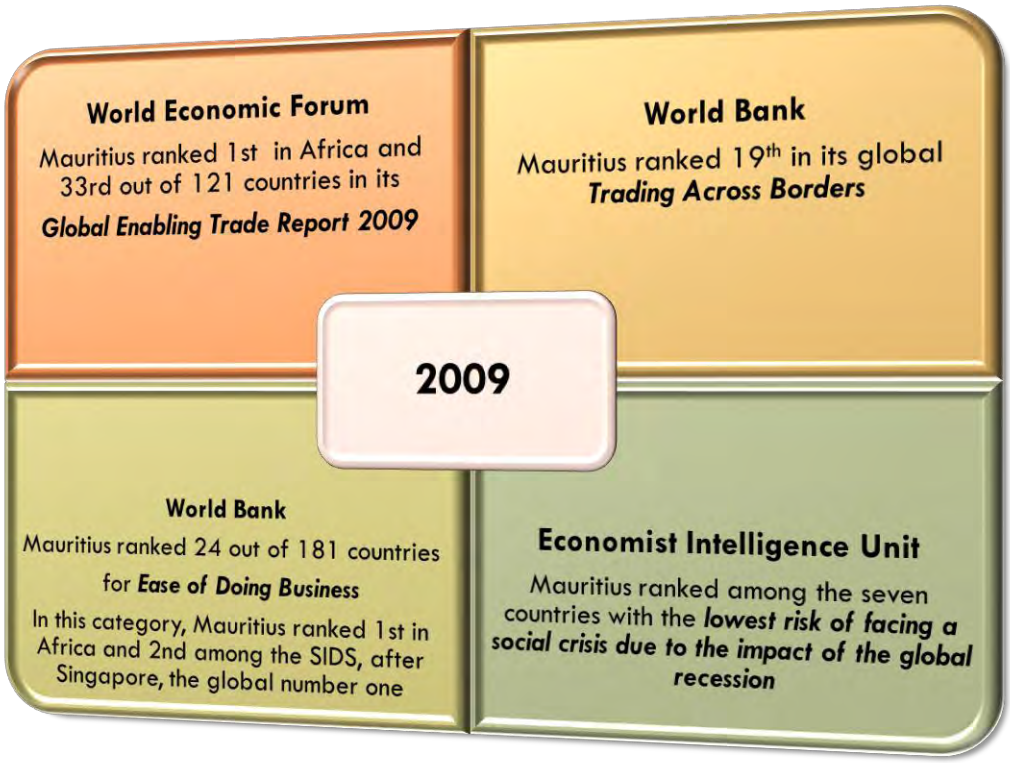
Government's Reform Programmes. The BOI provided an overview of the Mauritius Reform Programme and highlighted the crucial role it played in implementing the reform. Several bilateral discussions were held with countries desiring to obtain the BOI's assistance in designing their reform agenda.

The Government of Mauritius has agreed to formalize the assistance to peer countries of the region into a "Mauritius Development Initiative." The BOI and the RMCE were called upon to drive the Programme with a view to improving the overall investment climate in Africa, with specific regards to improving its overall ranking in the World Bank Doing Business Report 2011.

EFFECTIVENESS OF IMPLEMENTATION:

Despite the global economic and trade downturn, increased costs associated with unexpectedly high oil prices and freight, and unfavourable foreign exchange rates, our trade-related economic reform strategy over the period 2005-2009 has been fruitful. Our resilience and effectiveness at coping with multiple international setbacks has been recognised by the international community.

In 2009, the African Business Awards has selected Mauritius for the ***Most Improved Investment Climate*** Award. This award recognises best practices, excellence and those who have driven Africa's rapidly transforming economy.



☐ Trade licensing

In Mauritius, trade policies are geared towards securing a liberal trading environment where import, export and re-export activities can take place with minimal restrictions. There are a limited number of products which are subject to import control. Existing control relate mainly to

health, sanitary and phytosanitary, security, social and environmental concerns. The delivery of permits is under the purview of the relevant ministries such as Commerce, Health, Agriculture, Fisheries or other controlling agencies. Similarly for exports, there are no restrictions except for a few products of strategic importance where export permits are required such as cement, silver and gold. Clear rules and procedures are available on the web site of the Ministry of Industry, Small & Medium Enterprises, Commerce & Co-operatives for obtaining import and export permits.

☐ Competition

In order to provide a competitive trading environment, the Competition Act 2007 was promulgated. It establishes the legal framework for the control of restrictive business practices so as to enhance competition in Mauritius and provides for fair and transparent competition rules. An independent Competition Commission has been set up to administer all matters relating to competition in Mauritius. Audiovisual public awareness campaigns on the national radio and TV station is being undertaken.

SPECIAL CONSTRAINTS AND CHALLENGES:

☐ The World Trade Organisation Accession Process

Although in the UN system SIDS are recognised as a distinct category, at the level of the WTO they are lumped in the group of countries with 'small vulnerable economies'. At the 2005 SIDS International Meeting in Mauritius, delegates agreed on the importance of intensifying efforts to facilitate full and effective participation of SIDS in WTO decision-making. And at the United Nations General Assembly in 2008, Mauritius advocated the same cause and pointed out to the fact that the 'arbitrary GDP criteria applied to determine the eligibility for securing concessional finance disqualifies most SIDS from accessing much needed funds for important infrastructure development' and that 'it is absolutely necessary in this regard that SIDS are treated as a distinct category.'

Mauritius h**as been a member of the WTO** since 1st January 1995 and has a representation in Geneva.

Whilst one of the fundamental aims of globalisation is to help small countries to integrate the global economy, they are faced with constraints in international forums. They encounter difficulties vis-à-vis their larger and more developed counterparts in defending their interests. In the context of multilateral dispute settlement mechanisms established by the WTO, they are handicapped by their limited technical capacities. Their capacity to comply with international commitments on environmental and intellectual property issues is also limited.

☐ Impacts of Trade Liberalisation and Erosion of Trade Preferences

Trade Liberalisation, coupled with the erosion of trade preferences, has had relatively severe consequences on vulnerable economies like Mauritius. Existing preferential arrangements are being dismantled under agreed rules of WTO, affecting commodities like sugar, bananas, coffee

and coconut which small and vulnerable countries used to rely upon for their exports. In the case of Mauritius, the island had been put under severe pressure following the recent EU sugar reform leading to a fall of 36% in sugar prices. Moreover, the guarantees which Mauritius benefitted under the Sugar Protocol would eventually be phased out. The Sugar Protocol has now been replaced by Annex 2 of the Economic Partnership Agreement between the EC and the Eastern and Southern African (ESA) configuration to which Mauritius belongs.

With the phase out of the Multi Fibre Arrangement, Mauritius has to compete with major textiles producers like China. The new LDC scheme proposed by the US to extend the AGOA type benefits to all LDCs pose a major threat to Mauritian exports to the US, particularly for garments. With the application of a coefficient of 8 in a Swiss formula to reduce tariffs in the context of the Doha Development Agenda, the preference margin for garments will fall from an average of 12% on the EU and US markets to below 5%. For canned tuna, which Mauritius exports, the preference margin will drop to around 6% from a high of 24%.

The challenge is to find a middle ground solution for vulnerable economies, such as SIDS, so as to sustain their level of exports without undermining the broader multilateral trade liberalisation. A longer transitional period of some 10 years for tariff reduction on key exports has so far been incorporated in the draft modalities texts on agriculture and NAMA (Non-Agricultural Market Access).

At the level of the WTO, Mauritius has been able to secure longer transitional periods on a list of agricultural and industrial products which are highly sensitive to preference erosion, namely: sugar, tuna, jewellery and textiles. The negotiations are however not completed. The gradual reduction of tariffs is being accompanied by unilateral measures, such as carbon taxes as a disguised non-tariff barrier to trade.

RECENT TRENDS AND EMERGING ISSUES:

☐ Regional Integration and Economic Partnership

Regional integration is one of the core objectives of the strategy of Mauritius. Mauritius has been very active in the negotiations and conclusion of the Economic Partnership Agreement between the Eastern and Southern Africa group of countries and the European Community. Mauritius has also endeavoured to become a nucleus for activities that promote regional integration in member states of COMESA, SADC and the Indian Ocean Commission. The following institutional set-ups, plans and projects are concretely ongoing:

- ☐ UNIDO will shortly set up a regional office in Mauritius
- ☐ The Regional Multidisciplinary Centre of Excellence (RMCE), involving a dozen regional and international organizations and development partners, has been set up and is now operating in Mauritius. The RMCE will contribute significantly towards training and capacity building for regional and global trade.

- The IMF is locating the Africa Regional Technical Assistance Centre (AFRITAC), a knowledge and training institution for countries of Sub-Saharan Africa, in Mauritius
- Mauritius has been awarded the hosting of the COMESA Infrastructure Fund (CIF) as a COMESA Institution by COMESA. The CIF will support economic growth and integration in the member countries of COMESA and will promote and facilitate private sector investment to undertake regional projects either as Public Private Partnership or purely private projects in infrastructure, agriculture, food production, communications and renewable energy

Mauritius is now poised as a business gateway between Africa and China. The Chinese Jin Fei project is the largest integrated development project ever undertaken in Mauritius, besides being the largest foreign direct investment the country has ever attracted, representing Rs 20 billion (more than $650 million) over five years. The Chinese investors have opted for Mauritius because of its business friendly environment and its preferential market access to the EU, US, COMESA and SADC.

Doing Business 2010, a conference jointly organized by Mauritius and the World Bank in January 2010, drew the participation of 150 delegates from 15 African countries as well as Singapore, including nine ministers. The conference served as a platform for the participants to discuss doing business reforms, mainly the regulations that either enhance or constrain business activities with a view to promoting business-friendly reforms within the African countries, share lessons of experience, and strengthen South-South cooperation. In addition to fostering trade, improving competitiveness and catalyzing economic growth necessary for achieving sustainable development in the region, the Conference focused on strengthening national capacities for undertaking pro-business reforms in a bid to improve business competitiveness across the African continent.

Aid for Trade

In light of the mandate of the WTO, Mauritius strongly advocates for the extension of support facilities to enable the most vulnerable countries to fully participate in International Trade and to better integrate the multilateral trading system. In this regard, Mauritius has played a major role in framing the Aid for Trade initiative as a major development component of the Doha Development Round and has been actively involved in the WTO Aid for Trade Task Force by representing the ACP Group.

Mauritius strongly believes that Market Access will never deliver in the absence of the capacity to produce. While there is general consensus on the broad recommendations of the Aid for Trade (AFT) initiative, there is an urgent need now to ensure that it is operationalised as early as possible, independently of the results of the WTO negotiations. For Mauritius, this is very important as:

- Erosion of trade preferences can be offset by Aid for Trade
- The financing of the reform program is expected to be partially met by AFT funds

☐ Climate Change and Border Measures

Some developed countries have taken the recent initiative to impose border measures on products associated with a high rate of carbon emission:

- ☐ During the production process
- ☐ During maritime and air-bound freight in view of their remoteness.

This is yet another challenge faced by Mauritius, and SIDS in general. Mauritius is located roughly 10,000 kilometres from Western Europe and 15,000 kilometres from the USA. Both the United States and European Union are considering legislation to compensate domestic companies from the higher costs of carbon reduction measures if imports from other countries are not subject to similar restrictions. SIDS such as Mauritius that relies heavily on exports to the US and the EU would thus be severely affected if such border taxes were to be imposed.

One of the essential components of global action to address climate change is the continuous innovation and rapid diffusion of environmentally sound technologies which the developing countries may eventually adopt and apply on their own. Despite the Bali Action Plan, the smooth transfer of such technologies from developed to developing countries, with the necessary assistance, has so far not materialised. Most of the increasing number of environmentally related technologies are patented and owned by firms in developed countries. At the level of the WTO, there have been no negotiations on relaxing IPR on environmentally friendly technology.

CONCLUSION AND WAY FORWARD:

The need for SIDS to form strategic alliances on trade matters and pursue general development programmes should be persevered with and enhanced in order to enable them to protect their common interests and use their scarce financial and human resources more judiciously. Mauritius fully supports SIDS cooperation aiming at the elaboration of a strategy for international trade negotiations and will consistently seek to play an assertive role on the international front with regard to the advocacy of SIDS.

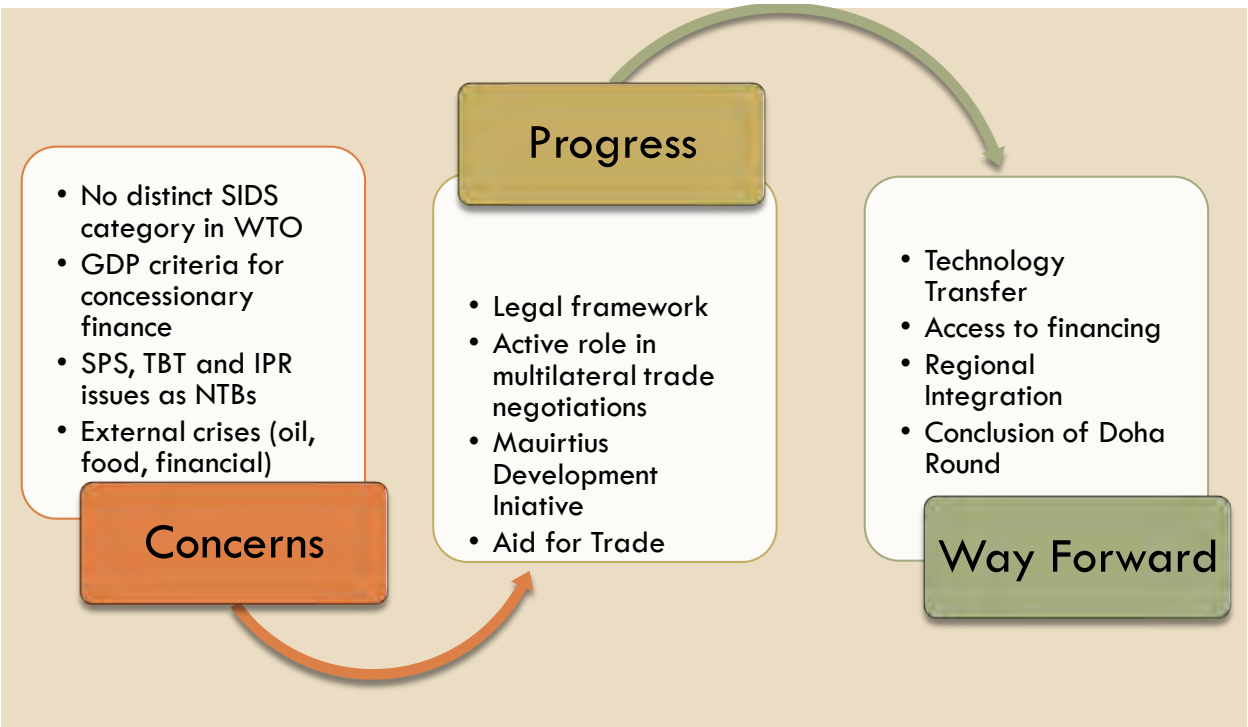
One of the main challenges for Mauritius is to persevere further in the shifting of its economy towards service development. This offers a significant new opportunity for long term growth for many SIDS. It includes the development of offshore sectors, financial services and information and communication technology (ICT). These are high value–added economic sectors with lower environmental impacts that can help to overcome the handicaps of size and geographical isolation through the use of modern technology. The resources required for this shift in the balance of the economy include good governance, security, the natural geographical and environmental assets of the island, direct air links to the major trading partners, sound development of ICT, ease of access for inward investment and business operations, and a resilient local population, well educated and responsive to a changing world.

Trade policies in Mauritius are an integral part of the economic policies aimed at improving the standard of living of the population through the establishment of a thriving, competitive and modern economy growing at high rates. However, given its small size and being a net-food and fossil fuel importer, Mauritius remains vulnerable to external trade shocks. Without external support, it would be difficult for Mauritius to meet the adjustment costs with a view to improving competitiveness and confronting the challenges of globalisation. For Mauritius to maintain its development momentum, much would depend on not only the trade opportunities provided by the multilateral trading system, but more importantly as to how the WTO would address its concerns.

If there is preference erosion, this should be linked to accompanying measures. Harnessing the full potential of trade liberalisation requires a priori the adoption of accompanying measures to (i) ease supply constraints (ii) modernize trade-related infrastructure, (iii) improve market access, (iv) sharpen product/firm/trade competitiveness and (v) protect the vulnerable groups from the downside of liberalization.

Such accompanying measures must be frontloaded as most of the costs of adjustment would be borne in the first few years whilst the benefits would accrue over the long term. The success of a reform programme rest for the most part on the availability of grants/ concessional financing especially for SIDS.

SUMMARY:



CHAPTER 13: SUSTAINABLE CAPACITY DEVELOPMENT AND EDUCATION FOR SUSTAINABLE DEVELOPMENT

Education & Human Resources Strategy Plan 2008-2020

"The ultimate objective of any educational enterprise is to improve student achievement so that individuals may fulfill their personal aspirations for a sound, value-based lifestyle and also become positive contributing members of society."

Chapter 13: Sustainable Capacity Development and Education for Sustainable Development

INTRODUCTION

Mauritius has achieved the goals of universal primary education and gender parity in its gross enrolment rate. Similarly, tertiary education is continually playing a crucial role by virtue of its centrality in providing an educated, well trained, adaptable and innovative workforce. For the people of Mauritius, education is crucial for achieving economic progress and for ensuring upward social movement. Since 2005, policies on education and training have been geared towards the development of knowledge, competencies, skills and values needed for a knowledge-based economy as well as a sustainable society.

The development of Mauritius into a Knowledge Hub and a Regional Multi-disciplinary Centre of Excellence resides in a sharpened focus on the education sector. It is therefore Government's aim to ensure that sustainable capacity development, information technologies and the vision for the future are woven into an integrated educational experience. To achieve this vision, Government increased its education budget each year (from Rs. 6.8 billion ($ 23 million USD) in 2005/2006 to Rs. 8.5 billion ($ 28 million USD) in 2008/2009). In fact for 2008/2009 financial year, around 11.4% of total government expenditure was allocated to education.

Overall, the education system of Mauritius is doing well, with the literacy rate at 85%. Most of the indicators are already at very satisfactory levels and are almost all moving in the right direction. Indicative of this progress are the literacy/illiteracy rates revealed in the last two censuses (1990 and 2000) undertaken in Mauritius, which show clear increases across selected age groups, and for both male and female populations.

One of the fortes of Mauritius is the use of bilingual/trilingual education programmes across the pre-primary, primary and secondary education sector. The latter emphasises on the use of English and French. Students can also choose to study an Asian-language.

In 2005, universal and compulsory education was raised from 12 years to 16 years.

Overview of the Mauritian Education System

The Mauritian education system is based on the British structure. It consists of two years of pre-primary schooling followed by a six-year primary cycle. Upon passing the primary cycle (Certificate of Primary Education - CPE), students qualify for a five year secondary education leading to School Certificate or GCE-O Level and an additional two years preparing students for Higher School Certificate or GCE-A Level to get access to tertiary education.

Students who are unsuccessful in the primary cycle (after repeating the primary national examination and who have reached the age of 13 after a second attempt) are enrolled in pre-vocational schools. After three years of pre-vocational education, these students are allowed to follow the National Trade Certificate Foundation course at different Vocational Training Centres.

Tertiary education is provided in both private and public institutions and through distance education. The publicly funded institutions include the University of Mauritius, the University of Technology – Mauritius, the Mauritius Institute of Education, the Mahatma Gandhi Institute and the Mauritius College of the Air.

The Education Sector at a glance (Focus year: 2008)

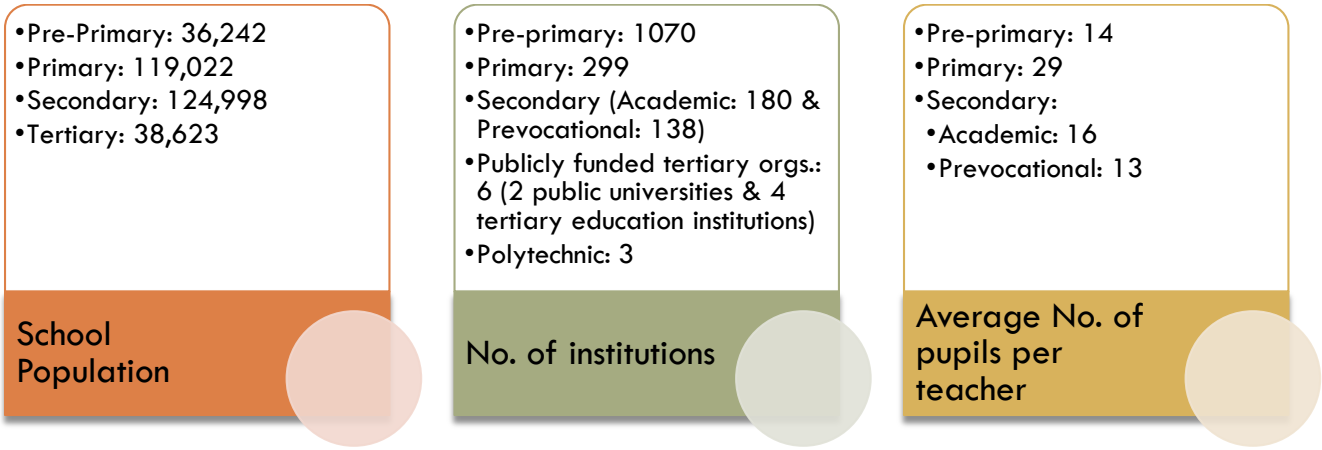


Figure 13.1: Expenditure on Education by sector 2008-2009

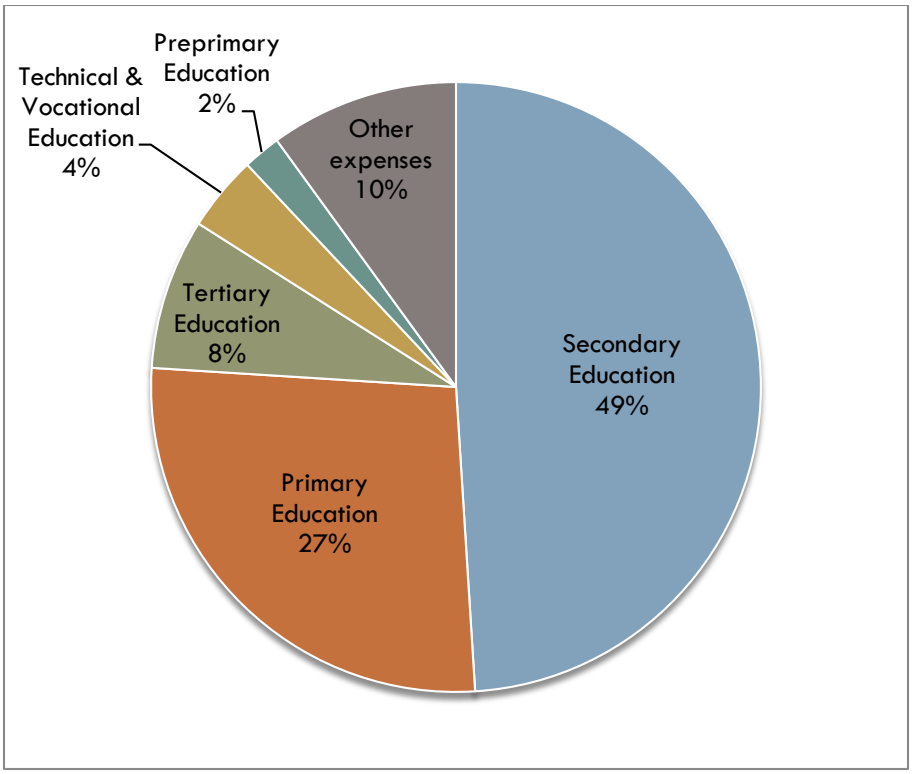
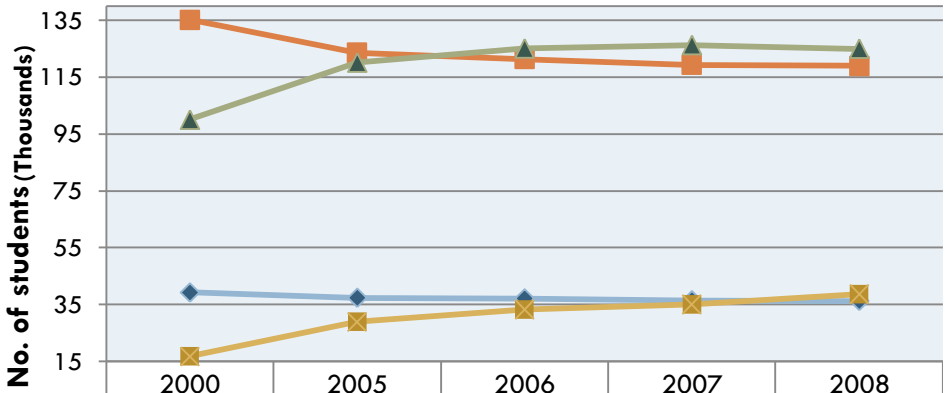


Table 13.1: Enrolment in pre-primary, primary, secondary and tertiary institutions, 2005-2008



	2000	2005	2006	2007	2008
Pre-Primary (aged 3)	39232	37356	37129	36467	36242
Primary (aged 5-12)	135237	123562	121387	119310	119022
Secondary (aged 11-19)	100143	120132	125081	126279	124998
Tertiary (incl. Distance learning)	16735	28868	33230	35023	38623

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

Actions have been taken in adapting the education system according to the needs of the Mauritian society and in integrating sustainable development at different levels of the formal sector. Similarly, synergies have also been created with different stakeholders, for more concerted, collaborative and integrated efforts for capacity building in the field of sustainability.

Since 2005, the following initiatives and strategies have been taken:

Policies and Strategy documents

- ☐ Education and Human Resources Strategy Plan (2008 - 2020)
- ☐ National Curriculum Framework (Pre-primary 2009)
- ☐ National Curriculum Framework (Primary) September 2006
- ☐ National Curriculum Framework (Secondary) November 2009
- ☐ Special Education Needs and Inclusive Education in Mauritius 2006
- ☐ Human Resources, Knowledge and Arts Development Fund (set up in 2008)

Pre-primary sector

In 2008, the Pre-School Trust Fund was replaced by the Early Childhood Care and Education Authority (ECCEA). This aimed at bringing a more efficient intersectoral service delivery that would contribute to the emergence of a 'Centre of Excellence' for the region.

A National Curriculum Framework for Pre-Primary Education has been prepared in 2009 and pre-primary educators are regularly trained to ensure that young children at pre-primary level have the opportunity to develop their skills for primary schooling. Furthermore, in line with Government's inclusion policy, children coming from the poorest and most disadvantaged families are provided with the necessary accompanying measures to sustain their retention in pre-primary schools.

Primary sector

As far as possible, Government is providing equal opportunities for all students entering primary schools by improving the standards of low performing schools. In order to upgrade the performance level of those schools, several projects have been adopted such as: holistic educational approaches, school-community partnerships, active parent involvement, fund-raising models for school improvement projects, provision of meals and health care services to students.

Secondary sector

Since 2005, the new development in national compulsory secondary education till the age of 16 has promoted equal access to secondary education. While, the number of state secondary schools with modern infrastructure and equipment has increased, focus was also laid on technical and vocational training.

Tertiary sector

As at July 2008, 44 private institutions are offering tertiary-level programmes locally mostly in niche areas like Information Technology, Law, Management, Accountancy and Finance. A majority of these private institutions operate on a part-time basis and their programmes are awarded by overseas institutions. These are being offered through franchise agreements whereby the overseas institutions provide programme materials and/or tutorial support.

Curriculum reforms and review

Curriculum reforms at the pre-primary, primary and secondary levels have been introduced and the National Curriculum Frameworks have laid down the foundation for a sustainable Mauritian society of the 21st century. These emphasize on continuous and lifelong learning by developing competencies and skills of the young Mauritian.

As from April 2009, a Technical Committee has been set up by the Ministry of Education, Culture & Human Resources to work on the content and integration mode of Sustainable Lifestyles in the curriculum. Curriculum Guidelines have been produced to guide the writing of primary school textbooks. Furthermore, in line with the recommendations of the Mauritius Strategy and the 'Maurice Ile Durable' concept, tertiary education institutions have mainstreamed sustainable development into their programs. For instance, the University of Technology Mauritius (UTM) has set up a School of Sustainable Development and Tourism.

Advocacy and sensitization programs for the attainment of curricular objectives

A Co-curricular and Extra-curricular activities' unit has been set up. The latter is aimed at helping students broaden their understanding of real life concerns and providing them with a range of learning opportunities to improve academic attainments.

The Ministry of Education also works in close collaboration with other State and Non-State actors to scale up sustainability concerns and build capacity. In line with the UN Decade of Education for Sustainable Development and the MDGs, both primary and secondary schools have embarked on projects and programs such as the School Footprint Initiative, sensitisation and awareness programmes on global and local environmental challenges. Such initiatives are aimed at promoting a culture of environmental resilience and self-reliance in students; make them more aware of what is at stake so that they make informed decisions to shape their future.

Ongoing capacity building for teachers

Both pre-service and in-service teacher education programmes have been reoriented to integrate Education for Sustainable Development (ESD) as well as environmental issues and environmental education processes. These are further supplemented through action learning and awareness.

Mainstreaming Sustainable Development in the education sector

A number of new courses and modules have been introduced at diploma, degree, and post-graduate levels related to sustainability. Research and development in Capacity-building and sustainability education is another field where higher education institutions are taking keen interest. R&D projects are carried out in collaboration with various Ministries, the private sector and international organizations.

LESSONS LEARNT AND GOOD PRACTICES:

Special education needs

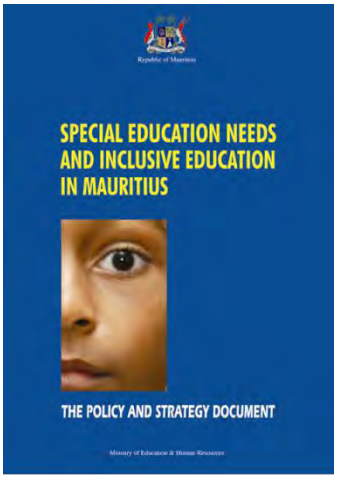
Equal opportunities are also provided to children who are at the risk of being excluded and marginalized. In this regard, a policy and strategy document on special needs education has been adopted in 2006 and comprises measures to bring children with disabilities at par with their peers in the mainstream.

Gender parity

Gender parity is another area where Mauritius has achieved considerable success for a more stable and just society. Our schools have ensured the learning achievements of girls and the strengthening of life-skills, they are made more assertive, they learn negotiation and decision-making skills whereby facilitating the environment for informed career choices. At the Pre-Vocational level, for example, girls today may choose from a host of trade subjects which previously were the preserves of boys only. The policy on gender parity has not only successfully led to the breaking of gender stereotypes in textbooks but also in teachers' attitudes and expectations.

Active learning for behavioural change

Behavioural change takes place over a long period of time and active participation in project work and school-based activities encourage learning about environmental and sustainability processes. Projects on environmental, human rights and health concerns have helped create a positive reflex towards the state of the planet and our vulnerabilities. Implementation is underway.



Setting up of the Human Resource, Knowledge & Arts Development Fund (2008)

In 2008, the above Fund was set up to:

- ☐ Finance the setting up of physical infrastructure (buildings, equipment and various facilities) for post-secondary education
- ☐ Projects to equip individuals with access to information, knowledge, technology, training and skills
- ☐ Provide loan schemes and scholarships to students
- ☐ Set up the Second-Chance Programme by January 2009 for young people under the age of 21 who are not in full-time education or full-time employment with a view to providing them with basic numeracy and language skills, life training skills and the provision of psychological and social back up
- ☐ Finance the full cost of internet access for poor families participating in the National e-inclusion Foundation
- ☐ Undertake projects and programmes to encourage and support local artists and to stimulate the growth of the creative and fine arts industry
- ☐ Organise national competitions and provide cash prizes and opportunities for international exposure to local artists

EFFECTIVENESS OF IMPLEMENTATION:

- ☐ To implement the fundamental principles underlying ESD, a host of emerging issues like human rights, climate change, health care, HIV/AIDS, environment, gender, poverty alleviation, sustainable lifestyles and others have been integrated in a cross-curricular and trans-disciplinary manner in the curriculum. Teaching and learning resource materials have been developed for the primary level.
- ☐ Alongside capacity building and empowerment of teachers, the links between formal, non-formal and informal education sectors are being improved such that the right types of supporting mechanisms can be spearheaded.
- ☐ The new curricula advocate a more interactive, participatory and experiential pedagogy for making learning more meaningful and effective.

SPECIAL CONSTRAINTS AND CHALLENGES:

■ Pre-Primary sector

While the prime objective is to ensure that all children start primary schooling on an equal footing, the competencies of the teaching staff have always been a matter of concern, since most pre-primary schools have been operating before any uniform regulations were set up. This has been overcome through the following measures:

- ☐ The Mauritius Institute of Education has been running a Teacher's Proficiency Certificate and a Teacher's Certificate Course in Early Childhood Education
- ☐ The Mauritius College of the Air, as from January 2008, has been conducting a Proficiency Course in Training and Supervision of ECD
- ☐ The Mauritius Institute of Education, as from January 2010, has started a Teacher's Diploma Course in ECD

Additionally, special attention is being given to:

- ☐ Those children who do not attend pre-primary schools due to absolute poverty
- ☐ A new Curriculum Framework has been prepared to ensure readiness for primary schools.
- ☐ The setting up of a regulatory framework to overcome disparity in pre-schools.
- ☐ The adoption of pro-active measures for the early detection of children with special needs and finding means to address these.

■ Primary sector

The final national examination for the primary sector is highly competitive and the structure, learning content and examination system do not adequately recognize whether children possess different learning styles and talents. Each year, around 20% failure rates is recorded at the primary level. Barrier to success at primary level is closely linked to poverty, non involvement of parents in the education of their children and on the fact that parents cannot afford private tuition.

Creative subjects have been sidelined and the child's personal development sacrificed to the goal of acquiring information. The assessment does not identify the quality of pupil learning, but rather the quantity of pupil learning.

It is therefore critical to address the problem of high failure rate at the end of the primary cycle and in this context, review the purpose of primary cycle examinations. Furthermore, reliance on private tuition especially in upper primary education is a deep rooted culture in Mauritius and Government is taking some measures to move towards its gradual phase out.

While there are provisions for special schools, support is needed for the integration of children with special education needs in the regular school system.

■ Secondary sector

The secondary school system is a rigid and inflexible structure that very often does not leave much choice to students in terms of subject orientation. Even though secondary school educators have a first degree,

there is a criticism to the effect that these teachers are more prone to teach the more able learners rather than mixed ability classes.

Regarding pre-vocational education, the latter has been negatively branded and is always associated with primary education failure. Although conceived to provide an 'alternative' option for students who had failed their primary schooling or exceeded the age limit to attend primary school, there is a perception that technical and vocational education is fit for the academically less able. It is crucial that a suitable blending of academic and technical education be create with the relevant pathways to higher education.

Tertiary sector

Mauritius depends solely on its human capital and while the tertiary education sector has witnessed major expansion and diversification, the national priorities remains the increase in participation in tertiary education and widen access to tertiary education. There is also the need to improve relevance of tertiary education and make it more responsive to the needs of the labour market as well as to enhance the quality of tertiary education to attain international standards.

Curriculum development

Curriculum development is a continuous, complex and contested process. It takes a long time to develop and implement to see the results especially in the affective domains of learning. This long gestation period does not always seem to respond the pressing and short term needs of society. As a result, an overall review of the system, which takes into consideration current as well as new and emerging issues, is essential.

Education for Sustainable Development

There is also a dearth of technical expertise in curriculum development with sustainability education focus and teacher-training capacity to transact with such materials. Building capacity in teachers in the existing system to transact with ESD curriculum materials is a daunting task given that the number of teachers and the time frame for holding these training courses. Institutional coordination and enforcement of new educational policies in matters of capacity-building and ESD is not only time-consuming but also leads to inadequate implementation due to the top-bottom perception. This problem is compounded with a lack of institutional capacity and inadequate reporting tools and techniques.

One of the biggest challenges is to develop institutional mechanisms that will continue to press the ESD agenda even after the UN Decade of ESD is over. Indeed, it has been noticed-as is the case for International Days-the focus gets dissipated once the ceremonials surrounding the celebrations are over. Ensuring that the concerns of ESD remain high on the (local and international agenda) even after the official ending of the DESD stays as a challenge, especially if the financial tap is closed.

A number of projects and activities being carried out in schools and other educational institutions by other Ministries and NGO's lack cohesion and fail to integrate the formal school curriculum. Budgetary constraints can and do prove significant hurdle in the implementation of projects and programs and hamper initiatives.

RECENT TRENDS AND EMERGING ISSUES:

Education and Human Resources Strategy Plan 2008-2020

The Ministry of Education, Culture and Human Resources has prepared a 12-year Strategy Plan for Mauritius ensuring access to learning opportunities and training at all levels, fostering innovation and generating new knowledge for the socio-economic and sustainable development of the nation. The draft Education & Human Resources Strategy Plan 2008-2020 emphasizes the importance of building flexible and integrative structures that encompass both the education and training sectors in order to create the enabling environment for the acquisition of new skills and training within the lifelong learning framework. This will imply revisiting the qualifications systems that will recognize the experience and knowledge acquired by students in the classroom, the workplace or elsewhere.

Assessment of learning outcomes

More effort needs to be placed on baselines and developing indicators of learning outcomes in the areas of sustainability education and teacher-training. The outcomes of education programs for sustainable development need to be seen more realistically as short-term knowledge and life skills acquisition, medium-term behavioural intentions and outcomes, and long-term contribution to sustainability goals. The effectiveness of the interventions needs to be assessed based on the level of outcome which was built into the design of the intervention. Too often life-skills interventions are judged to be ineffective and consequently rejected on the basis of the outcome though they were not designed to build capacity for an explicit behaviour. The relationship between learning outcomes and intervention measures is too complex in the area of sustainable development and requires thorough pedagogical grounding and capacity-building of curriculum developers and educators.

Linking ESD to the curriculum

School-based efforts in piloting projects and initiatives in ESD need to be closely linked to curricular reforms and the education sector-wide approaches to ensure sustainability. Shared underlying principles and differences in strategic approaches between formal/curriculum-based interventions and extra-curricular and out-of-school approaches need to be recognized. Curriculum approaches using sustainable development methodologies to deal with specific emotional, social, economic and bio-physical goals may benefit from being a stand-alone subject or integrated into a main carrier subject to ensure that the specific determinants for the related behaviours are ensured in a structured manner over time.

Capacity-building to meet the SIDS vulnerabilities should emerge from the education sector when the concepts of sustainable development are deeply ingrained into the mind and psyche of each citizen. The role of educators and their pedagogical grounding into the methodologies of sustainable development with research-based actions should be encouraged and recognized. The role of the teacher-training Institute and other institutions of higher learning is crucial in transforming classrooms into real microcosm of society

Multi-sectoral collaboration

Intensive, concerted and cohesive multi-sectoral collaboration will consolidate the existing structures of collaboration and alleviating the burden of funding by one institution. The contribution of CSR may guide actions in capacity-building and education for sustainable development.

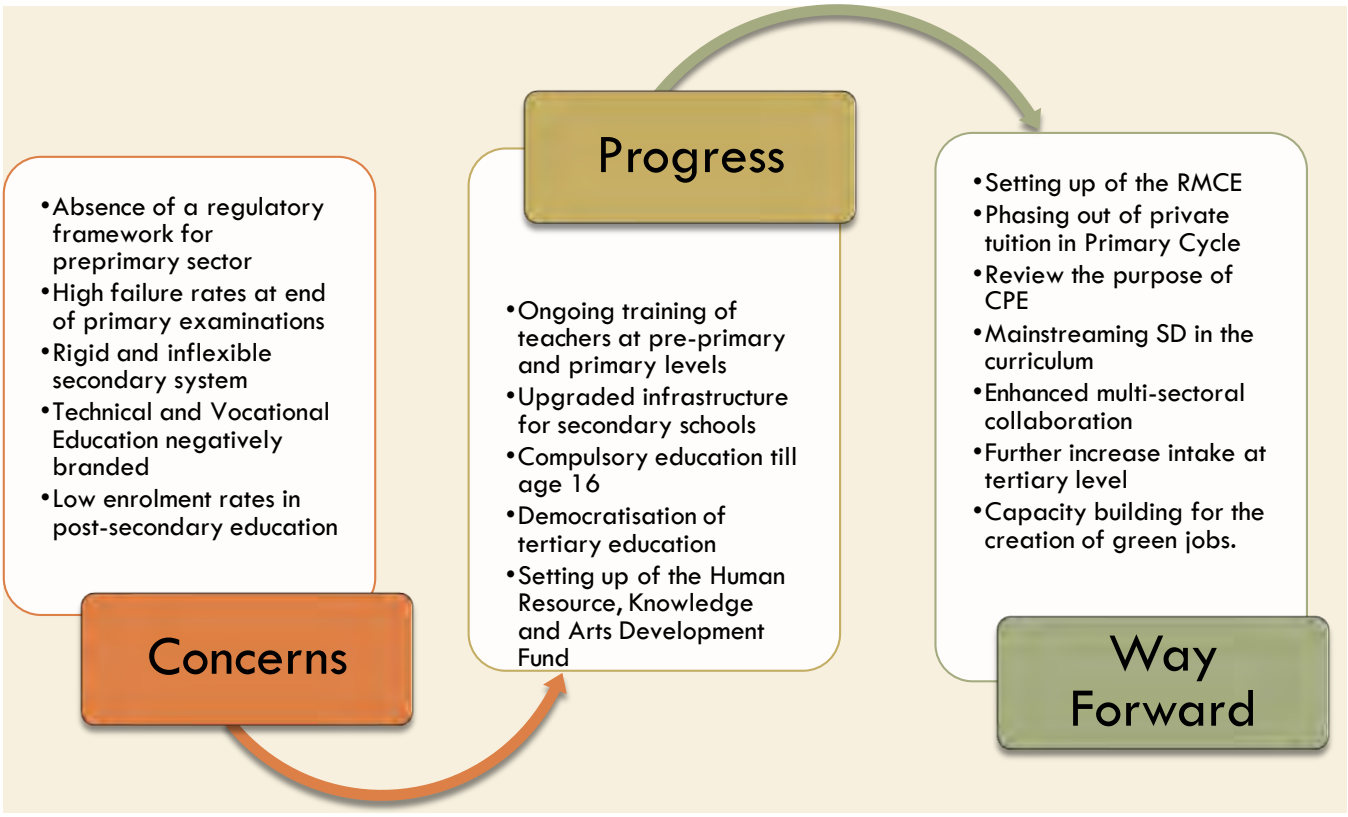
CONCLUSION AND WAY FORWARD:

The Ministry of Education is mainstreaming sustainable development processes across the levels and sustainable capacity development remains high on its agenda. This has been clearly spelt out in the Education and Human Resources Strategy Plan 2008 - 2020. Intensive sustainability programs will be incorporated in the education processes make schools become living models of green society. Furthermore, to materialise the Maurice Ile Durable concept and create green jobs in the fields of renewable energy in line with Government's vision, it is essential to improve the both the quantity and quality of training dispensed at all levels.

In this line, more dynamic avenues of co-operation and collaboration with other Ministries, the private sector and civil society will be established to increase students' knowledge and experience. Teachers' capacity will be built to enable them transact with a more meaningful curriculum. Research and development programs at tertiary level in the field of sustainable development and capacity development will be further encouraged to assist in policy intervention and implementation.

The Mauritian Government is currently working with various bilateral and multilateral partners to mobilize support for the creation of a Regional Multidisciplinary Centre of Excellence (RMCE). The latter is a regional initiative driven by Mauritius and developed in consultation with the EU and World Bank as well as regional blocs. The purpose of the RMCE is to build capacity to formulate and implement regional economic development strategies and policies within the countries of the Region encompassing the Common Market for Eastern and Southern Africa, the East African Community, the Indian Ocean Commission, the Inter Governmental Authority on Development and the Southern Africa Development Community.

SUMMARY:


Concerns
•Absence of a regulatory framework for preprimary sector
•High failure rates at end of primary examinations
•Rigid and inflexible secondary system
•Technical and Vocational Education negatively branded
•Low enrolment rates in post-secondary education
Progress
•Ongoing training of teachers at pre-primary and primary levels
•Upgraded infrastructure for secondary schools
•Compulsory education till age 16
•Democratisation of tertiary education
•Setting up of the Human Resource, Knowledge and Arts Development Fund
Way Forward
•Setting up of the RMCE
•Phasing out of private tuition in Primary Cycle
•Review the purpose of CPE
•Mainstreaming SD in the curriculum
•Enhanced multi-sectoral collaboration
•Further increase intake at tertiary level
•Capacity building for the creation of green jobs.

CHAPTER 14: SUSTAINABLE PRODUCTION AND CONSUMPTION

National Programme on Sustainable Consumption and Production (2008-2013)

"Achieving More with Less"

CHAPTER 14: SUSTAINABLE PRODUCTION AND CONSUMPTION

INTRODUCTION:

Since the Rio Earth Summit (1992), right up to the Mauritius SIDS Meeting (2005) and beyond, the challenge posed by unsustainable modes of production coupled with changing consumption patterns have been highlighted in regional and international fora. Sustainable Consumption and Production (SCP) has been singled out as one of the main elements of sustainable development, as it is a cross-cutting concept in our daily lives. By rethinking the way we consume and produce, and through more responsible behaviour, we can improve our quality of life with fewer resources and less environmental impacts.

Islands are inherently resource-constrained. Mauritius is a net importer of most commodities, both for national consumption or for transformation prior to export. These range from petroleum products, coal, staple food (rice, wheat/flour, cereals, part of the fruits and vegetables) to the vast majority of raw materials, goods and equipment (e.g. vehicles, computers, tools, cotton, cloth, drugs).Thus, our competitiveness and quality of life is directly linked to judicious use of resources.

The analysis of local production and consumption trends shows that the environmental impacts from production and consumption activities have grown over the last two decades. If we maintain similar patterns of consumption and production, these impacts are expected to intensify in the next decades. Current and projected production and consumption patterns are influenced by a number of driving forces, including rising per capita incomes, demographics and accompanying changes in lifestyles. Technology, institutions and infrastructure also play an important role in influencing consumption and behaviour.

Transforming Mauritius into a more sustainable island, a '*Maurice Ile Durable*' is one of the most promising strategies to address our vulnerabilities so that we can further enhance our resilience to the compounding effects of multiple exogenous crises.

Maurice Ile Durable

A sustainable Mauritius is one that produces and uses goods and services efficiently, and in so doing causes fewer adverse effects on natural systems and on human health

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

In order to make Mauritius more resource efficient, a combination of legal, policy and economic instruments have been put in place in the past 5 years. They aimed at improving the competitiveness and productivity of the country, protecting the quality of life of its citizens as well as preserve our

environment. Despite brining about positive results, the actions were isolated and highlighted the need for a concerted approach.

SCP initiatives implemented (2005-2009)

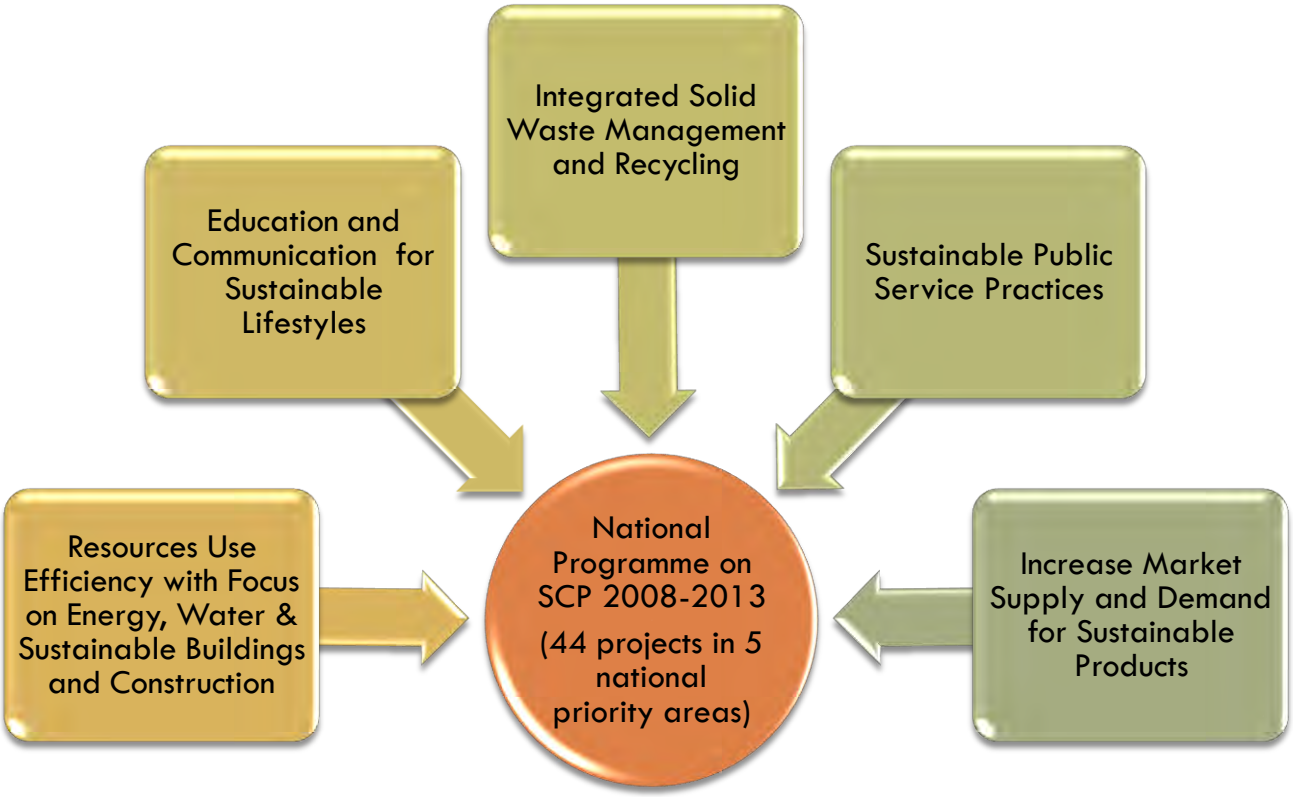
- A regularly reviewed tariff structure for water, electricity and wastewater designed to discourage excessive use of water and electricity
- Reduced age limit for buses so as to increase passenger safety and improve vehicular emissions
- Reduction of sulphur content in diesel from 2500 ppm to 500 ppm as from August 2010
- Repeated sensitisation programmes on media for water and electricity conservation.
- National replacement campaign of conventional bulbs by Compact Fluorescent Lamps (CFL) in residential dwellings
- Phasing out of parking on sand dunes in coastal areas to combat coastal erosion
- Monthly reviewed fuel pricing system to reflect international market prices of fossil fuel and coal
- Introduction of levy on imported petroleum products and coal
- Subsidy on domestic solar water heater
- Incentives for gears and boats to encourage artisanal lagoon fishermen to shift to deep sea fishing
- Protection of natural resources, islets and environmentally sensitive areas as well as allowing for balanced coastal development
- Cheaper and improved access to telecommunications facilities, including promotion of e-Government facilities (such as application for jobs in the civil service, for scholarships, for complaints, for tax returns) and online banking facilities.
- Free transport for primary and secondary students to attend school.
- Green school project aimed at encouraging waste segregation and recycling in schools
- Collection and recycling of PET bottles, paper, glass, textile wastes and scrap metals by private companies/SMEs and one NGO
- Levy introduced on plastic carry bags, which has resulted in lowered use of plastic bags and the picking up of reusable alternatives, mostly paper and cloth bags
- Proclamation of the Public Procurement Act which promotes green procurement
- Private sector and civil society initiatives targeting environmental responsibility and sustainable development initiatives.

LESSONS LEARNT AND GOOD PRACTICES

No matter how innovative Individual policies and activities should be integrated so as to effectively bring about wholesale changes in consumption and production patterns. Considering the cross-sectoral nature of consumption and production patterns, systematic, coordinated and integrated programmes are essential to make SCP a reality. The critical elements of an effective SCP strategy should link long-term vision to medium-term targets and short-term action.

The National Environment Policy 2007 provides an array of national targets, strategies and policy instruments to promote Sustainable Consumption and Production at the national level. These have been translated into a dedicated programme.

In collaboration with the United Nations Environment Programme (UNEP), Mauritius has developed its National Programme on Sustainable Consumption and Production for the period 2008-2013. Its implementation requires the collaboration of various stakeholders: public, private, NGOs, academia as well as the active participation of the whole population at large.



The opportunities and benefits that the National SCP Programme will offer to Mauritius are:

- ☐ Decouple economic growth from use of natural resources e.g. by increasing resource efficiency, changing consumption patterns and dematerializing
- ☐ Change consumption patterns, involving both technological shifts and behavioural change
- ☐ Increase in demand and supply of sustainable products and services in the market
- ☐ Promote/adopt more sustainable lifestyles and consumption choices

EFFECTIVENESS OF IMPLEMENTATION

To date, though Mauritius has instituted various legal, policy and economic instruments geared towards more sustainable and consumption patterns, these have unfortunately not been developed in a sufficiently coherent manner or have been driven by isolated strategies or programmes. To respond to the gaps identified, the dedicated National SCP Programme has been approved by Cabinet on 22 August 2008 and is instrumental in promoting synergies among the key development sectors.

The implementation of the National SCP Programme is progressing, but still a lot needs to be done. Lack of funds for project implementation is a serious impediment.

Furthermore, rational and effective use of scarce financial resources is critical for the survival and prosperity of a small island like Mauritius. With the introduction of the Medium Term Expenditure Framework and the Programme Based Budgeting, expenditure in the public sector is undertaken with clearly defined outputs and performance indicators. This system, which relies on accountability and transparency, has also recently been extended to local authorities. The introduction of the Performance Monitoring System to assess the productivity of public officers is a complementary means of ensuring that the civil service effectively delivers as a true facilitator and enabler of services.

In 2009, UNEP has assisted Mauritius to implement the first SCP project under its National Programme. *YouthXChange* is a UNEP initiative geared at sensitising and training youth as trainers in SCP. Some 70 young persons have benefitted from this project and are expected to act as agents for change.

The Rainwater Harvesting project intends, through an analysis of the local situation and demonstration projects, to promote rainwater harvesting as a valuable means of supplementing municipal water for domestic and agricultural uses as well as in ground water recharge.

In order to measure progress in implementation of the National Programme on SCP and to follow the trend in SCP, appropriate indicators are being developed with funding from UNEP.

SPECIAL CONSTRAINTS AND CHALLENGES

Over the past decade, consumption and production have drastically increased in Mauritius. The main constraints and challenges are lack of resources and inadequate technology and know-how.

- **Energy -** The share of imported fossil fuels in the total energy requirement increased from 62% in 1992 to 81% in 2008. The increase in electricity consumption is at a sustained rate of 5%. The annual imported energy bill of Mauritius has approximately trebled over the past 5 years. The intensity of energy use is 0.54 tonnes of oil equivalent (toe) per 1000 USD of GDP, as compared to 0.19 toe per 1000 USD in OECD countries. There is a huge potential for better energy productivity.

- **Water -** Mauritius is classified as a water-stressed country. Water demand has increased by 89.7 % from 1990 to 2008. During the period 1993 to 2007, the domestic per capita consumption of water has risen from 141 to 162 litres per day. If more effective management is not introduced, demand threatens to outstrip supply within 50 years. With climate change, further decrease in the overall amount of rainfall is expected.

- **Land use and Buildings -** From 1996 to 2008, the population density increased from 560 to 644 per km^2. Mauritius has one of the highest population densities in the world, which is expected to rise by nearly a further quarter before levelling off in the middle of this century. This, together, with rising living standards, will put increasing pressure on the finite land space available. Housing and infrastructure development, new investment sectors, sugar sector reforms and tourism/IRS developments are bringing profound modifications to our land regime.

- **Transport -** The vehicular fleet has been growing at an average annual rate of around 5%. From 1990 to 2008, the total number of vehicles has gone up from by 65%. Traffic congestion is a serious problem and the total cost to the economy of congestion is estimated to be about 1.3% of GDP. The number of vehicles per 1000 population rose from 272 in 2007 to 285 in 2008, representing an increase of 4.8%.

- **Wastes -** Daily per capita waste generated increased from 0.7 in 1997 to nearly 1.0 Kg in 2008, such that our annual waste generated amounts currently to about 400,000 tonnes. All wastes are presently landfilled. Recycling rates are still very low. Only about 9 % of paper, 3% of plastics and 31% of textiles are recycled.

Waste segregation collection point operated by a local NGO 'Mission Verte'
(Source: http://missionverte.com)

- **Food production and consumption -** On average, the total food requirement of the country is estimated at 686 000 tonnes annually, with a local production meeting only 23% of our consumption. The projected increase in tourist arrival and demographic expansion are expected to raise annual demand for food crops by some 125 000 tonnes. Between 2008 and 2011, 1 937 arpents of new lands would be devoted for food production (1 237 arpents in Mauritius and 700 arpents in Rodrigues for food crop, meat and milk production). In 2006, the total amount of fertilizers and pesticides consumed by the agricultural sector (sugar cane and food crops) was 61 266 tonnes and 2 000 tonnes respectively. Organic farming is presently very limited in Mauritius.

- **Funds –** The slow take off of the SCP projects can solely attributed to lack of funding, which is the only argument implementing agencies put forward during the coordination meetings which is steering the SCP programme implementation. Only projects which have managed to secure external funding (from UNEP or under GEF projects) are being implemented. Discussions are being held with some development cooperation partners to enlist their support.

RECENT TRENDS AND EMERGING ISSUES:

The recent multiple crises (health, food, energy and financial) have been eye-openers. Government has taken a number of bold measures to improve the resource efficiency, productivity and competitiveness of the country. It is planned to have a National Cleaner Production Centre in Mauritius in the near future, to advise industrialists on more efficient production processes. Some ongoing SCP projects which promise significant improvements in the near future are on sustainable public procurement (SPP), development of rainwater harvesting systems, environmental reporting in

Government Departments and energy efficiency. There is significant interest locally and among Development Partners for Sustainable Buildings and ecolabeling.

Mauritius is the leading pilot country in the implementation of the Marrakech Task Force (MTF) on SPP Approach, with support from UNEP. The Public Procurement Office (PPO) completed the SPP Status Assessment and has submitted the first draft of the Market Readiness Analysis. The PPO has also confirmed that the legal framework in Mauritius is compatible with sustainable public procurement.

Sustained sensitisation campaigns in schools have been carried out on issues like water and energy conservation, composting, biodiversity conservation have been undertaken, whereby primary school children have been taught the basics of responsible behaviour. A major awareness raising campaign is being carried out in primary schools under the Green School Project whereby children will be segregating their waste aimed at recycling purposes. Numerous other sensitization campaigns are continuously carried out by many Government agencies. Over the past 5 years, a new trend is being observed, whereby private firms are also engaging in mass sensitisation on efficiency, green products and stewardship. The school compost project, which is being implemented, aims at inculcating basic skills to children, who are viewed as agents of change.

The primary school Year 5 (Std V) curriculum is being reviewed to integrate concepts related to Education for Sustainable Development and & Sustainable lifestyles.

A number of private initiatives are ongoing by local authorities, the private sector and NGOs on environmental sensitisation, waste management, energy conservation or biodiversity conservation.

Collection of batteries and mobile batteries for recycling (Source: htpp://www.orange.mu)

To make Mauritius a Sustainable Island, a 'Maurice Ile Durable', the biggest challenges are:

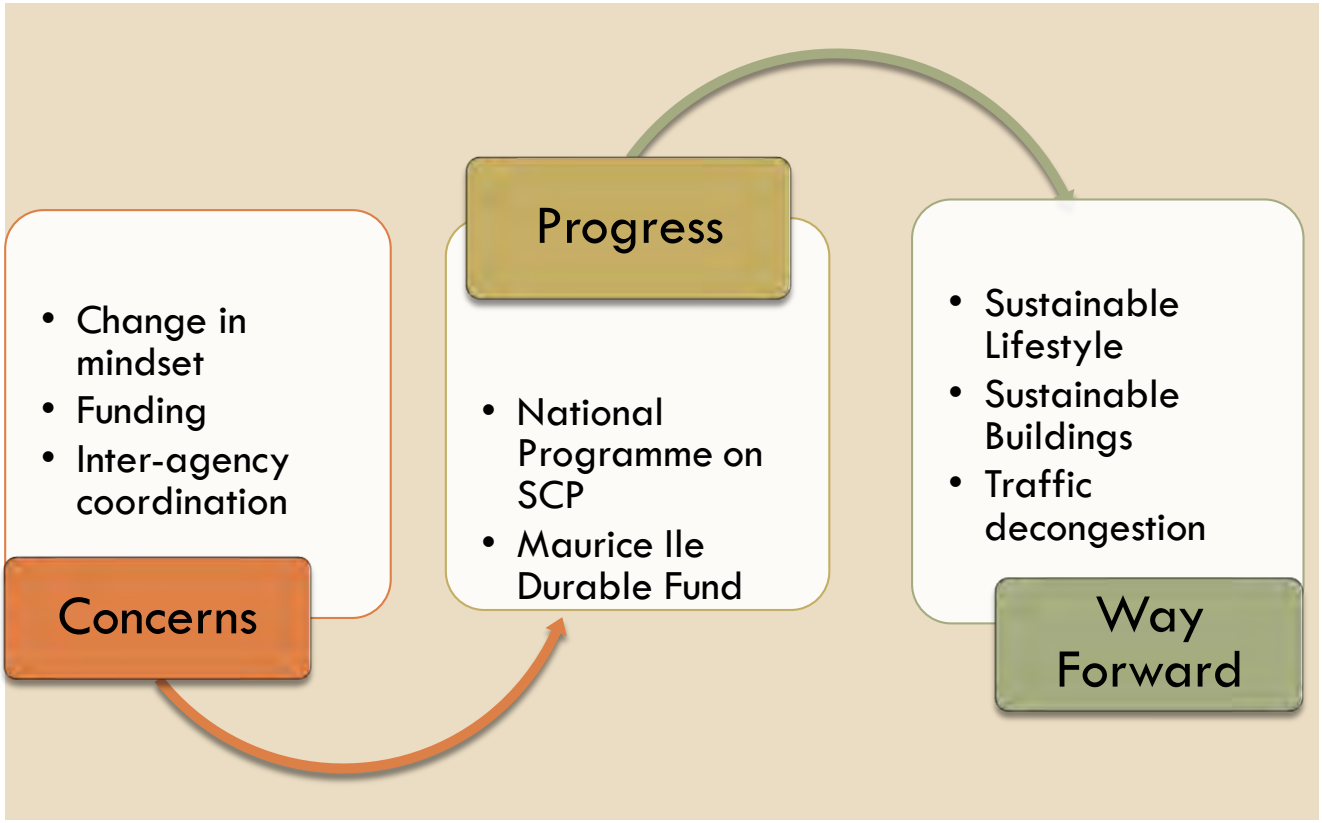
- ☐ To initiate and complete the project on sustainable buildings, so that new constructions follow clear guidelines.
- ☐ To change the mindset of the general public towards living more sustainable lifestyles
- ☐ To address the traffic congestion problem.

CONCLUSION AND WAY FORWARD

The national strategy is to mainstream SCP in our everyday lifestyles, in production patterns and in the way consumers make choices, with community involvement and enhancement of stewardship at all levels. Tax policy is a powerful tool for sustainability since it influences individual and institutional investment decisions. One avenue to be explored is to shift our tax policy so that, without increasing the overall tax burden, it would encourage employment and economic opportunity, while discouraging environmentally damaging production and consumption decisions. A major criterion, however, is that disproportionate burden should be avoided on lower-income individuals and families.

Sustainable lifestyle concept is being disseminated through awareness raising. Education for Sustainable Development is being integrated in school curricula. Coordination among all organisations needs to be reinforced.

SUMMARY



CHAPTER 15: NATIONAL AND REGIONAL ENABLING ENVIRONMENTS

2010 Budget Speech

"As we shape the recovery, we must also consolidate the social progress that we have worked so hard to achieve and sustain the vision of Green Mauritius. These are the three pillars of future development"

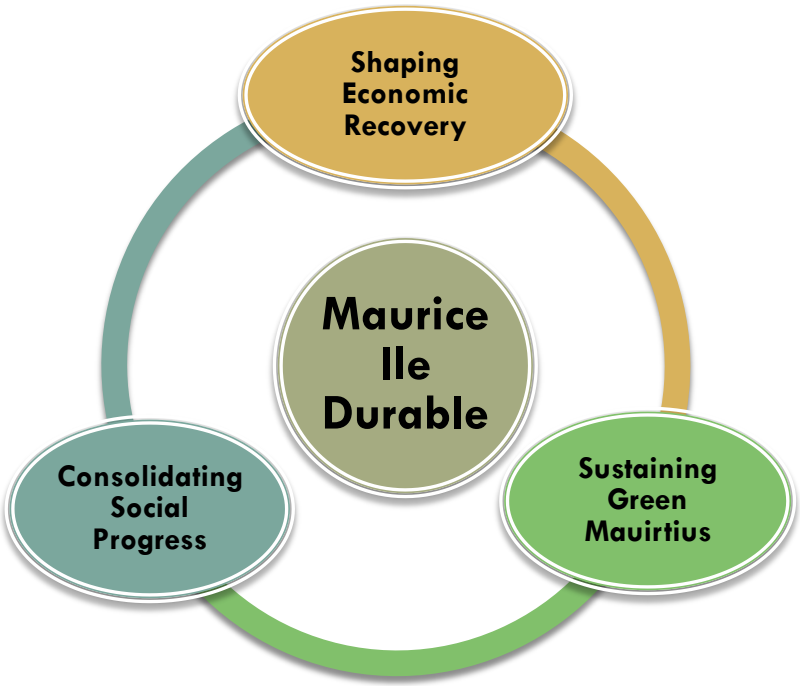
Chapter 15: National and Regional Enabling Environments

INTRODUCTION

In Mauritius, the institutional framework to support sustainable development is dynamic. It has been evolving since its inception in the early 1990s. Initially, public opinion very often interchanged the concepts of environmental protection and sustainable development. Almost two decades of awareness raising and stakeholder involvement in shaping the destiny of the nation have brought about a determinant change in the enabling framework for sustainable development. Multi-stakeholder consultation to support decision-making is a common practice in Mauritius.

In 1996, Vision 2020 (A long –term perspective study for the Republic of Mauritius), was undertaken with the collaboration of major stakeholder groups. This culminated into the document entitled 'Into the 3rd Millennium – A National Strategy for Sustainable Development'. The core development trajectory was thus laid down and has paved the way for the emergence of new sectors like ICT, the consolidation of service-related activities and the enhanced diversification of the economy.

Since 2005, the approach adopted has been the mainstreaming of the principles of sustainable development in sectoral policies, strategies and action plans. In 2008, the long-term vision of '*Maurice – Ile Durable*', commonly referred to as MID, was announced by the Prime Minister as a means of promoting sustainable development in the Republic.



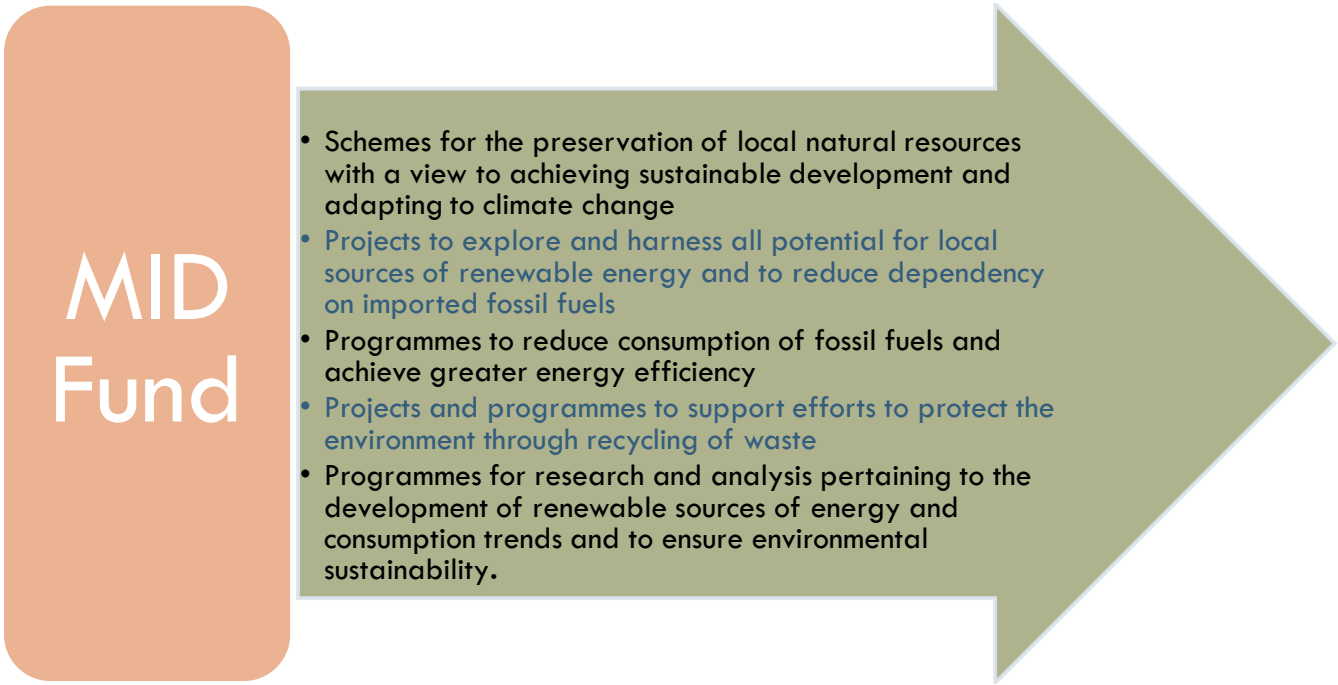
LESSONS LEARNT AND GOOD PRACTICES:

Given the country's small size, fragile and sensitive ecosystems, and the importance of the environment for its economy, sustainable development is an underlying principle in any sector strategy. In fact, major emphasis is being devoted to sustainable development through the concept of Maurice Ile Durable (Sustainable Mauritius). The development trajectory envisioned for Mauritius intends to substantially improve the quality of life of our citizens. In this regard, the reform strategy embarked upon since July 2005 focuses on the implementation of a series of concurrent and successive measures. Some results are already visible, other impacts being more in the longer term. The table below summarises some of the recent policies implemented to promote sustainable development.

Policy Instruments	Current Government Priorities
	Economic Instruments
Taxes, subsidies	☐ MID levy, to be paid into the MID Fund - 15 cents per litre on all petroleum products, 15 cents per kilo on LPG and 15 cents per kilo of coal imported. ☐ Subsidies on domestic Solar Water Heaters via the MID Fund ☐ Excise duty of Rs 1.00 per PET bottle and aluminum can used for soft and alcoholic drinks as from May 2009 ☐ Levy on some polluting activities such as stone crushing plants and to ensure the environmentally sound management of goods like tyres
Preferential tariffs and trade policies	☐ Financial incentives which include reduction by half of taxes, excise duties, road tax and registration fees on hybrid vehicles and electric vehicles ☐ Elimination of customs duties on tyres with energy saving and emission reducing certification. ☐ Removal of duties in Solar Water Heaters ☐ To promote natural refrigerants with 0 OPD (Ozone Depleting Potential) and low GWP (Global Warming Potential) through higher customs duties (40%) as a disincentive and no duty on natural refrigerants (e.g. ammonia or hydrocarbons)
Polluter- Pay-Principle	☐ As from July 2008, Road Tax is based on both the polluters pay and the ability to pay principles. ☐ Increase in penalties and fines for environmental offences
	Changing Consumer Behaviour
Education and public information	Development of Maurice Ile Durable module for both primary and secondary schools.
Consumer Information	Sensitisation by private companies

- **Maurice Ile Durable Fund:**

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



Incorporating Sustainability into Poverty Reduction Measures:

Based on the World Bank international poverty lines of $1 and $2 a day, absolute poverty remains negligible in Mauritius. Recent field studies have indicated that there is a geographical dimension to poverty. Pockets of poverty prevail in some specific suburban and coastal regions in Mauritius and in the Island of Rodrigues. Specific groups have thus remained marginalised despite the fact that Mauritius is a Welfare State with free health and free education services as well as an impressive array of social services, universal old-age pension and safety nets, and although considerable progress has been achieved on the economic front over the past two decades.

The country has attained most of the targets related to MDGs, with the exception of those relating to HIV/AIDS, gender equality and unemployment where efforts are ongoing through specific sector strategies, like the Empowerment Programme and economic and legal reforms. A Special Committee for the Eradication of Absolute Poverty has been set up, which comprises all stakeholders, including the public sector, the private sector and the NGOs to look into the specific needs of the poor, provide urgent assistance and lend support to the children and the unemployed in these pockets of poverty. The overall objective is to eradicate all cases of absolute poverty in the country within a span of seven to ten years.

Moreover, concrete efforts are ongoing to assist the poor and bring them in the mainstream of productive activities through a number of programmes supported by both local and international agencies. The focus is on the implementation of activities relating to social infrastructure, community development, income generating activities and educational as well as technical assistance to empower the most vulnerable groups and provide them with facilities to improve their living conditions.

Social Safeguards

On and above the poverty reduction measures, social benefits are provided by the Welfare State in terms of free schooling up to secondary level, free public transport to students to attend school, free public transport to handicapped and old aged citizens, free health care facilities or universal old age pension, amongst others.

State support is provided to eligible NGOs, including socio-cultural organisations and religious bodies, which are privileged partners in social work in view of their proximity and close relationship with the beneficiaries of their respective spheres of intervention (e.g. drug rehabilitation, adult literacy, teenage pregnancy, HIV/AIDS, etc.).

Further to multistakeholder consultations which have enabled the incorporation of sustainability principles, national policies or strategies on Gender, Youth, Disability, Education, Human Resource Development, have been developed and adopted.

The Empowerment Programme provides for the training and reskilling of vulnerable fragments of the workforce and the unemployed. Temporary unemployment benefits have been introduced. During the period of crisis, Government has introduced a rescue package for companies facing closure so that jobs are saved.

Environmental Management

In order to ensure an ecologically sustainable development, since 2004/2005, various policies and strategies have been revised or developed and are under implementation, such as:

- ☐ National Environment Policy
- ☐ National Environmental Strategies
- ☐ National Programme on Sustainable Consumption and Production
- ☐ National Biodiversity Strategy and Action Plan
- ☐ National Invasive Alien Species Strategy
- ☐ Islets Strategic Plan, accompanied by Islets Management Plans
- ☐ Outline Energy Policy
- ☐ National Energy Policy and Action Plan
- ☐ Long-Term Energy Strategy
- ☐ Hydrology Master Plan
- ☐ Strategic Environment Assessment of the Multi Annual Adaptation Strategy of the Sugar Sector Reform

- Rodrigues Integrated Development Plan

In addition, legislative reviews have been carried out to enable more stringent control, a certain level of decentralised enforcement and licensing to the local authorities for development projects, evolution of the environmental assessment process so as to facilitate business operation for those entities with minimal environmental impacts whilst imposing their self-adherence to pre-set environmental guidelines. Fixed penalties for some environmental offences have been introduced and have acted as a strong deterrent against some environmentally irresponsible behaviour by the general public. Prosecution of environmental offences is being reinforced through dedicated staff. The Environmental Appeal Tribunal is building its expertise since its establishment in the 1990s.

In 2008, mandatory interagency post monitoring, through a post-EIA/PER Monitoring Committee, was established to ensure compliance with EIA Licences /PER Approval granted.

Policy coordination

In view of previous experience in development planning and decision-making, policy decisions need to be taken using a holistic, integrated and coordinated approach. Consultations on issues of national interest are very often initiated by major groups, such as the MID seminar organized by the University of Mauritius in March 2009. It is in this perspective that an integrated and consultative approach was used for major new areas like :

- Democratize the economy
- Ease doing business especially for SMEs
- Pursue public sector reforms (introduction of PMS and PBB)
- Identify new pillars: ICT and BPO, Health, Property development

MID Seminar, University of Mauritius, 16 March 2009 (Official launching by the Deputy Prime Minister and Minister of Renewable Energy and Public Utilities)

National Network for Sustainable Development

The Environment Protection Act provides for a National Network for Sustainable Development (NNSD), under the chairmanship of the Honourable Minister of Environment. This network is a forum for discussion and consultation on harmonisation of the various sectoral, economic, social and environmental policies and plans operating in Mauritius, as well as on the quality and state of the environment. The NNSD embodies the spirit of consultation and stewardship, and emanates from a recommendation by the UN Commission for Sustainable Development for a national consultative mechanism on sustainable development. The principles of the NNSD are based on:

- Good governance and transparency
- Importance to have broad-based participation and collaboration of all stakeholders

- Need to promote a sense of ownership and responsibility among all stakeholders

Initially, the NNSD comprised 87 representatives from Government institutions, parastatal bodies, local authorities, associations of professionals, the private sector and NGOs. However, it proved impractical in view of its too large membership. In 2008, the membership was reviewed to one delegated representative of each sector so as to make the proceedings more functional.

EFFECTIVENESS OF IMPLEMENTATION

The Government of Mauritius has introduced two main public management reforms which are the Performance Management System (PMS) and the Programme Based Budget (PBB) in 2006 and 2007 respectively. These frameworks were aimed at making the public service more transparent and to promote more efficient and effective government operations. In fact, these initiatives have helped to establish a strong link between the resources used to deliver public services (the inputs) and the outcomes of these services. Thus, government funds are now increasingly being spent in a more transparent and accountable manner, with all budgetary allocations and expenditures are easily accessible on the Government portal. Non-state actors, especially the private sector, are being encouraged to adopt good governance practices and regulations are being promulgated in areas where voluntary improvements were not forthcoming.

The Mauritius Country Strategy Paper (CSP) has been prepared by the EC in close consultation with the World Bank as part of the harmonisation agenda. It includes a shared diagnosis and common results matrix. The two institutions have also agreed to joint implementation, through coordinated budget support operations, as well as to close coordination of supporting analytical work, including joint evaluations and a mid-term review.

SPECIAL CONSTRAINTS AND CHALLENGES

Mauritius, like most SIDS, have inherent natural and structural vulnerabilities. Our remoteness from our main markets, the limited land available, an ageing population, consumerism, a small internal market are examples of what we have to face up to.

In the wake of the economic diversification in areas such as business process outsourcing, knowledge management, specialised health care, land-based oceanic industry, property development, logistics and financial services, there is the political will to make Mauritius a major service provider, not only locally, but in the region. However, we are facing a capacity gap and lack of skilled workers in specific sectors such as Business Process Outsourcing.

Furthermore, our internal transport system is not responding to our development needs as traffic congestion is estimated to be costing Rs 3 billion ($ 100 million) to the economy annually. Our manufacturing and agricultural sectors are not sufficiently diversified and are still too concentrated on few products and markets.

Sustainable management of our natural assets competes with infrastructural development, especially in a SIDS where land availability is constrained. Protection of environmentally sensitive areas, availability of

affordable and adapted technology, encouraging stewardship at all levels and empowering local authorities for decentralised enforcement pose logistical, financial and capacity constraints.

RECENT TRENDS AND EMERGING ISSUES

Nation building is ongoing, especially in a young country like Mauritius, which became independent only 40 years back. National security, especially in the current international context, needs constant attention and cooperation with other countries is being reinforced. Strengthening the economic reforms engaged since 2005, enhancing poverty alleviation and economic empowerment measures, as well as promoting sustainable production and consumption patterns are the challenges awaiting us. Climate change, food security and energy price volatility will need to be addressed in a concerted manner, taking into consideration the wider multilateral opportunities and challenges. Regional integration needs also to be further pursued.

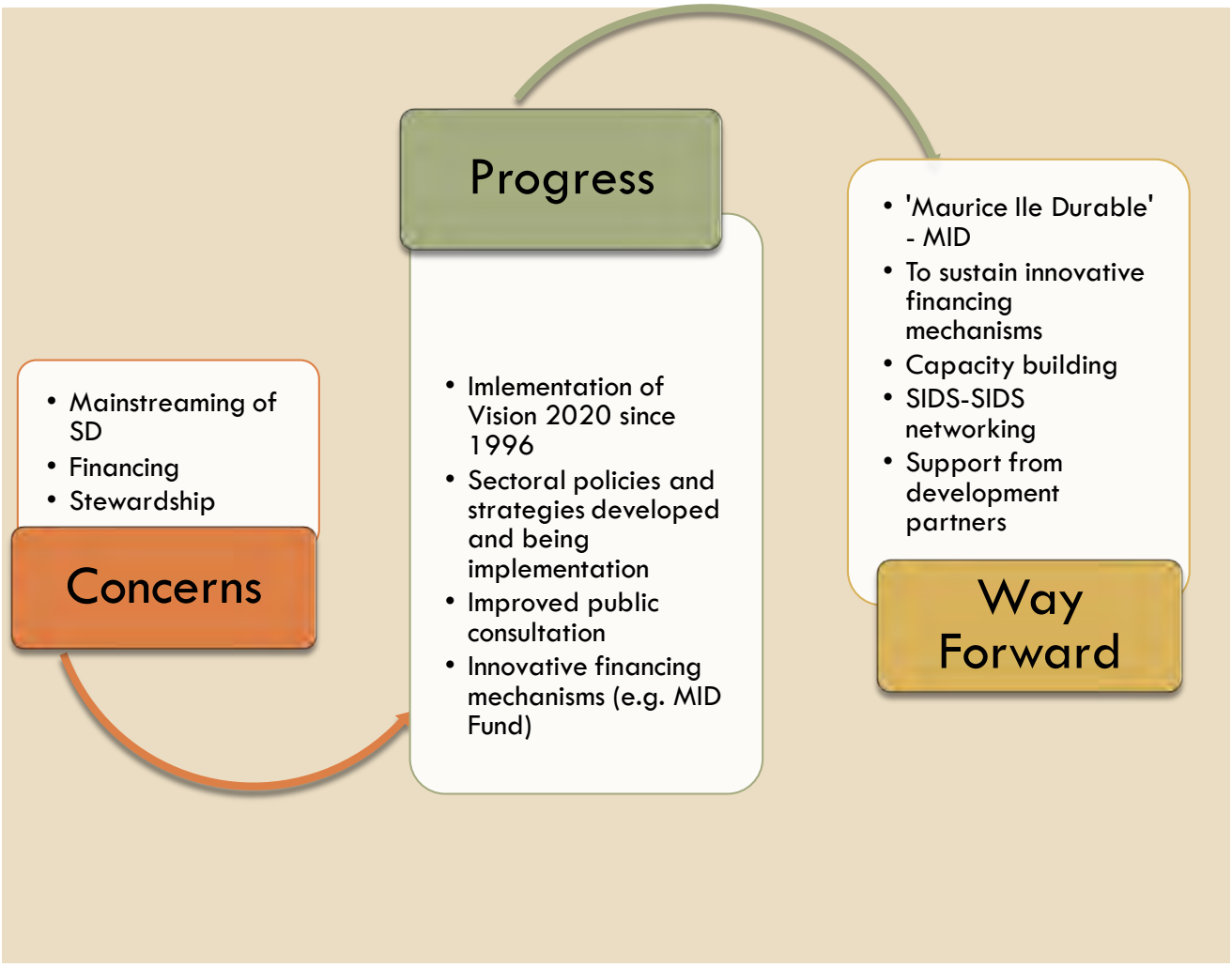
To fight exclusion and poverty, the Empowerment Programme was endowed initially with Rs 5 billion ($ 160 million). Furthermore, a statutory corporate responsibility is applicable to all profitable firms. Under this initiative, those firms need to either spend 2% of their profits on CSR activities or transfer the amount not spent to Government. The joint public-private sector committee has already published operational guidelines for CSR activities and defined the areas of intervention for CSR activities.

South-South collaboration represents significant avenues of cooperation and needs to be actively promoted. Intra and inter regional SIDS collaboration needs to be reinforced for a common positioning at the WTO.

CONCLUSION AND WAY FORWARD

As most Small Island Developing States (SIDS), Mauritius is not endowed with sufficient natural resources and lacks the necessary technical expertise in the field of sustainable development. Hence, there is an essential need to build capacity to have stronger institutions with the proper legal framework. The forthcoming national consultations, to define the policy and strategy of 'Maurice – Ile Durable', would enable the population to voice out their aspirations and expectations of the development pathway of our nation. Capacity building, South-South cooperation, networking among SIDS and the fulfillment of pledges by developed countries are required.

SUMMARY


Progress
• Mainstreaming of SD
• Financing
• Stewardship
Concerns
• Imlementation of Vision 2020 since 1996
• Sectoral policies and strategies developed and being implementation
• Improved public consultation
• Innovative financing mechanisms (e.g. MID Fund)
• 'Maurice Ile Durable' - MID
• To sustain innovative financing mechanisms
• Capacity building
• SIDS-SIDS networking
• Support from development partners
Way Forward

CHAPTER 16: HEALTH

Mauritius Strategy for Implementation

"Health is a key determinant of sustainable development as identified through the internationally agreed development goals, including those contained in the Millennium Declaration."

Chapter 16: Health

INTRODUCTION

Free healthcare is a foundation of our Welfare State. The national health strategy is both preventive and curative. Since 2005, spending on the public health sector has increased by 85% to reach more than Rs 7.4 billion (about $ 250 million) in 2010. These funds for the public health sector are directed to health delivery system, services and personnel, as well as population control measures.

But the health sector of Mauritius, like in most SIDS, also faces daunting challenges in its endeavour to converge towards the Millennium Development Goals; these include HIV/AIDS, cardiovascular-related diseases, diabetes and other non-communicable diseases, and preparedness to respond effectively to national, regional and international outbreaks. In 2008, diabetes and cardiovascular diseases taken together, accounted for 57.8% of all deaths. The prevalence of diabetes in Mauritius, one of the highest in the world; has increased from 19.5% in 1998 to 23.7% in 2009.

On the other hand population growth, a vital factor in the sustainable development equation, has been quite successfully tackled. Mauritius is renowned for its outstanding achievement in curtailing its population growth rate within a short period of time. The total fertility rate, which dropped sharply from about six children per woman in the 1960's to about three in the 1970's, stood at 1.5 in 2009.

In 2009, an efficient Epidemic Alert and Response system to control the resurgence of communicable diseases has been set up. We have been able to successfully contain the first wave of AH1N1 pandemic, manage the outbreak of dengue fever and control Malaria and Chikungunya. Public-private partnerships are ongoing and bilateral/regional cooperation is on the rise.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

In 2009, investment in health has culminated in 750 cardiac surgeries, 6,500 eye surgeries and sustained the 8.8 millions contacts with government preventive and curative health services.

■ Policies, Strategies and Legislative Framework

Over the last five years, the health policy and legal framework has been updated. For example, the following have been adopted:

- ☐ National Plan of Action for Nutrition (2009-2010)
- ☐ National Sexual and Reproductive Health Policy 2007
- ☐ National Sexual and Reproductive Health Strategy and Action Plan (2009-2015)
- ☐ National Strategic Framework 2007-2011on HIV/AIDS
- ☐ Food Act and Food Regulations 2009
- ☐ Regulations to control tobacco and alcohol consumption

The outcomes are reflected through enterprising strategies, implemented national health policies and programmes, and the country's medium and long term health indicators:

	2000	2008
Estimated resident population as at end of 31st December	1,157,290	1,234,042[1]
Life expectancy at birth (years)[2]	67.4, men 74.6, women	69.1, men 76.1, women
Infant mortality rate per 1000 live births	15.8	14.3
No. of doctors per 10,000 population	9.1	11.4[3]
No. of dentists per 10,000 population	1.2	1.8
No. of pharmacists per 10,000 population	2.1	2.7
No. of qualified nurses/midwives per 10,000 population	24.8	27.5
No. of cases seen by doctors in hospitals, at accide & emergency wards, including sorted/unsorted outpatients clinics	2.7	2.9 million
Attendances at primary health care centres for treatment of common diseases & minor injuries	2.8	3.9 million

[1] Representing an increase of around 6.6% over the 8-year period
[2] In 2008, 6.8% of the population was aged 65 years and over
[3] Representing 1,450 doctors in the Republic

Population and Vital Statistics

At the end of 2008, the estimated resident population of the Island of Mauritius was 1,234,042 as compared to 1,227,075 in 2007, growing at a rate of 0.57%. To maintain an effective population control, the National Sexual and Reproductive Health Strategy and Plan of Action (2009-2015) was prepared with technical assistance provided by the United Nations Population Fund and the UNFPA Thematic Trust Fund for Reproductive Health Commodity Security.

Life Expectancy at birth, 66.4 for males and 74.3 for females in 1997, was estimated to be 69.1 and 76.1 respectively in 2008. The number of deaths registered in 2008 corresponded to a crude death rate of 7.1 per thousand mid-year resident population as compared to 7.3 in 2006 and 6.8 in 2007. In 2008, the maternal mortality rate per 1,000 live births was 0.38 as compared to 0.52 in 1997.

Health Personnel

The health personnel stands at some15, 000 staff. At the end of 2008, there were 1,450 doctors in the Republic of Mauritius, thus one for every 876 inhabitants. Of those doctors, 852 (58.8%) were employed in the public sector. In 1997, there were 1,016 doctors, that is, one for an average of 1,137 inhabitants.

Health Delivery System

In the Island of Mauritius, as at the end of 2008, the total number of beds in government institutions was 3,500 as compared to 3,819 in 2000. In the private sector there were, as at the end of 2008, seventeen private clinics, with a total of 582 beds. The total number of beds in the public and private sectors as at the end of 2008 was thus 4,082, that is, 3.3 beds for 1,000 inhabitants. In 1997, the corresponding ratio was 3.0 beds. In 2007, the bed occupancy was 71.3%, which slightly increased to 72.1% in 2008. For outpatient treatment, an increase of 5.4% has been noted from 2007 to 2008 as compared to a decrease of 3.6% from 2006 to 2007.

Location of public health delivery units (Mauritius and Rodrigues – 2005)

For the private sector, out-patient care was also provided in the private sector, including several clinics and dispensaries on sugar estates. In-patient service is provided in 19 private clinics.

Communicable diseases

HIV/AIDS is the communicable disease requiring most attention, whereas chikungunya, dengue, malaria and Influenza A being ad-hoc, imported and under strict control. The first case of AIDS in Mauritius was notified in October 1987. The HIV/AIDS prevalence (UNAIDS estimate 2007) in the adult population (15-49 years) is estimated at 1.8%. It is said to be a concentrated epidemic as the prevalence is well above 5% among the intravenous drug users who are also nearly 100% co-infected with hepatitis C.

As at the end of 2008, 76.0% of the Mauritians infected were in the age-group 25 to 49 years and 17.9% in the age-group 15 to 24 years. New HIV/AIDS cases are more significant among the male than among the female. Since 2005, surveillance and testing facilities have been enhanced at various points across the country and outreach Voluntary Counselling and Testing (VCT) sessions have been scaled up among the most at risk groups. Data indicate a levelling of the epidemic since 2008. Mauritius has the particularity of having predominance of transmission among Injecting Drug Users (IDUs).

In 2005 (92%) of new cases were detected among IDUs, 86% in 2006, 80% in 2007, 73.3% in 2008 and 75.2% in 2009. It is well known that such concentrated epidemic can rapidly give rise to a generalised one if timely specific measures are not taken. Sexual transmission is on the rise (14% in 2007 to 22% in 2009) and the gradual yearly shift of the Mauritian man to woman ratio (from 8:1 in 2005 to 4:1in 2009) could be heralding the feminisation of the epidemic, which in view of mother-to-child transmission risks needs to be prevented. The number of babies born HIV positive have tripled (from 7 in 2000 to 21in 2009). However all these cases were from mothers who were Intravenous drug users and/or sex workers and who had failed to follow the prophylactic antiretroviral treatment free of user cost during antenatal care.

Non-communicable diseases

Non-communicable diseases, mainly cardiovascular and diabetes, is the major cause of death among the Mauritian population.

Screening for non-communicable diseases (NCDs) is carried out free in public health institutions and by mobile clinics throughout the country for early detection and the prevention of complications related to NCDs. Talks on nutrition and obesity are also delivered by Health Personnel.

Mobile clinic

Private Sector and Public-Private Partnerships

Private health institutions do not receive funding from the State. Long standing partnerships with the public health care service exists, such as for Magnetic Resonance Imagery (MRI) whereby private clinics step in whenever public facilities are overloaded or under maintenance. As from 2009, following an agreement, vision testing have been outsourced by the State to private practitioners, in order to enable eye specialists to focus on more complex treatment. Private companies "adopt a ward" in a public

hospital and endeavour to undertake general maintenance of the ward such as painting or provision of curtains. Since May 2009, a Children Cancer Unit is now operational at the Victoria Hospital to offer specialized care to children suffering from cancer, with support from a private company. As part of its corporate social responsibility, the sponsor has helped six children to date in the treatment of cancer. Since 2005, the number of beds in private clinics has increased by 56% to more than 800. There are now 19 private clinics in Mauritius in contrast to 12 in 2005.

LESSONS LEARNT AND GOOD PRACTICES:

▪ Emerging communicable diseases

Epidemic alert and response has been reinforced after outbreaks of Chikungunya, dengue and Influenza A(H1N1).

▪ Chikungunya

This disease was first reported in 2005 and accounted for more than 3,500 cases during that year. In 2006, 10,072 cases were reported. National clean-up campaigns, massive and continuous public sensitization campaigns, regulatory measures to avoid accumulation of stagnant water (e.g. on roof tops), fogging and distribution of mosquito repellent were undertaken. The private sector was a major partner in this national effort.

Only one (imported) case of chikungunya was reported in 2007 and none in 2008.

▪ Influenza A (H1N1)

In April 2009, in order to prevent the introduction of Influenza A (H1N1), the Ministry of Health and Quality of Life, guided by the World Health Organisation (WHO), promptly took the following measures:

- ☐ Enhanced surveillance at ports of entry i.e. Harbour and Airport, both in Mauritius and Rodrigues.
- ☐ Follow-up of all incoming passengers from countries at risk by Health Inspectorate for a period of 10 days.
- ☐ Earmarking of Isolation wards in all hospitals and Setting-up of Isolation Cubicles in Rodrigues.
- ☐ Stockpiling of antiviral drugs and purchase of personal protective equipment.
- ☐ Sensitization of the population through the Media (Radio, TV and press).

The action plan on pandemic influenza was updated, whereby all measures that had to be taken during the containment phase as well as during the mitigation phase were elaborated.

■ Immunisation

Only data for vaccinations done in the public sector is available. In Mauritius, the Immunisation Coverage Rate as a percentage of live births for the period 2000 to 2008 evolved as per the following Table:

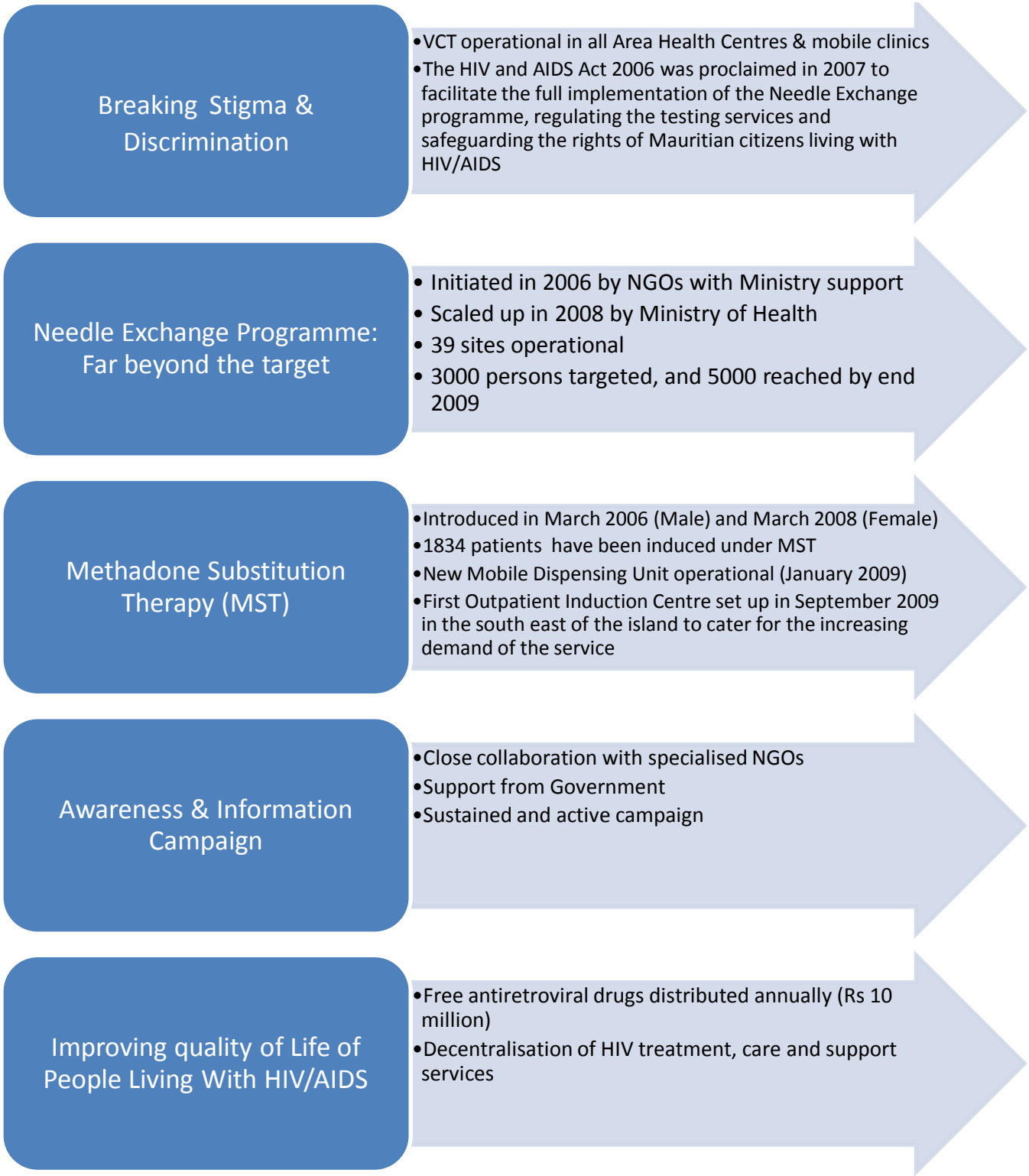
Table 16.2: Immunisation Coverage Rage in public sector (2000-2008)

Year / Vaccin	2000	2005	2006	2007	2008
BCG	87.2	90.1	89.3	89.2	89.3
D.P.T, Hep B & Hib(3rd dose)	87.3 *	87.4*	89.6	87.3	95.6
Polio (3rd dose)	87.4	87.9	89.8	87.4	95.8
MMR	84.3	87.9	92.2	90.0	88.7

* without HIB

Mauritius hosted the Task Force on Immunization (TFI) in December 2008, which aimed at advising the region on issues related to immunization and to share the Mauritian success story on health and child immunization. 200 local and foreign participants from such countries as Angola, Burkina Faso, Gabon, Kenya and Nigeria attended the Meeting.

HIV/AIDS



A National AIDS Committee with a National AIDS Secretariat has been set up at the Prime Minister's Office. The Committee ensures the implementation of activities under the National Strategic Framework (NSF) 2007-2011 and other policies, and liaises with key actors at national, regional and international levels to ensure availability of sufficient resources to achieve the targets set. Mauritius managed to secure eligibility for access to the Global Fund in 2008 and is about to start the implementation of its first grant

(round 8) amounting to around 7.0 million Euros which has been earmarked for a 5-year period, for the implementation of HIV/AIDS programmes based on the National Strategic Framework 2007-2011.

Training programmes

Each employee is important in the delivery of a quality health service. Health & Safety at work and the importance of good communication skills and customer care are needed. Various departments of the Ministry of Health are implementing quality management tools, namely ISO 9001:2008. Regular staff training programmes are organized. In 2008, 383 Health Personnel were successfully trained at the Central School of Nursing.

Training programme for new recruits

Bilateral/Regional Cooperation

Bilateral and regional cooperation needs to play a more important role in the improvement of delivery of health services. Many Mauritians have recourse to specialized health care not available locally in other countries, such as Reunion Island, India and South Africa. 17 foreign medical teams visited Mauritius and 371 complex surgeries in different specialties were performed in 2008.

Mauritius has an excellent collaboration with a hospital in Reunion Island for the mounting of clinical attachment of medical and paramedical staff in the management of people living with HIV/AIDS. One University in France offers Diploma courses (related to HIV and AIDS) for medical practitioners in the region.

Cape Verde Declaration

Cape Verde meeting participants

The WHO organized a two-day meeting in Cape Verde in March 2009 to discuss the burden of disease, health systems responses and challenges, emergency preparedness and responses, as well as Non-Communicable Diseases and Primary Health Care. The Cape Verde Declaration was adopted by the African Health Ministers of Small Island States, including Mauritius. The Cape Verde Declaration urges Member States to appoint a national focal person to work with WHO for follow up on actions. It will also help to develop a mechanism to ban the advertisement of alcohol and cigarettes in the public health interest.

International Diabetes Conference in Mauritius

In collaboration with WHO, an International Conference on Diabetes and Associated Diseases was held in Mauritius in November 2009 to mark the World Diabetes Day.

Indian Ocean Commission

The 7th Colloque on HIV and AIDS for the Indian Ocean islands was held in Mauritius in November 2008. Its main objectives were to update the knowledge and management, share best practices and experiences and reinforce cooperation among Member States of the Indian Ocean Commission with regards to HIV and AIDS. There were 450 participants from Medical and Paramedical groups, Civil Society, Religious bodies, Representatives of intergovernmental organizations (UN system & IOC) and people living with the virus. Experts shared their experiences and new advances and approaches in the fight against HIV and AIDS. The 8th Colloque was held in Reunion Island in 2008 and was attended by a national delegation including a multisectoral delegation from Rodrigues supported by the UNRC office.

Regional Training in Medical Emergencies under the 'URSIDA' Project was undertaken for nursing personnel from member states of the Indian Ocean Commission.

Mauritian competencies

Most Mauritian doctors are trained abroad. Two faculties of medicine and two schools of dentistry are now offering courses to Mauritian and foreign students. A number of Mauritian health professionals migrate to mostly Europe, Canada and Australia. In January 2010, Mauritian cardiac surgeons have carried out heart surgeries in Botswana whilst training their counterparts there.

EFFECTIVENESS OF IMPLEMENTATION:

Structured population control resulted in the population of Mauritius being about 1.2 million in 2000 instead of 2.7 million as was projected in the1960's.

School Health

During the year 2008, the nursing staff responsible for school health visited schools as follows:

School Level	No. of schools visited	No. of pupils screened
Pre-primary	556	19,914
Primary	282	69,048 pupils[1]
Secondary and pre-vocational	171 secondary and 17 pre-vocational schools	25,886

[1]33,931 pupils of Standards III, V and VI were submitted to vision tests and 1200 of them with defective vision were referred to specialists.

Dental Health

In 2008, government dental clinics (static and mobile) provided services to 325,245 persons, out of which 19.5%, were of primary schoolchildren, 2.8% were of pregnant women and nursing mothers, and 3.3%

were of pre-primary school children. Fluoride was distributed to 28,073 children and a total of 27,309 children and adults were exposed to oral health education.

SPECIAL CONSTRAINTS AND CHALLENGES:

Free public health requires much investment in infrastructure, equipment, personnel and training, especially in nationally-identified areas of concern.

2009 (Population 1.2 million)
• 24% of the +30 population suffers from diabetes • 30% suffer from high blood pressure • 38% are overweight or obese • 90% of women and 75% of men do no physical exercise • 800 patients undergo dialysis annually • 400-500 cardiac surgeries annually • 2500 angiographs and 400 amputationsannually • 175 ophthalmological surgeries weekly

In 2010, a significant part of the Rs 7.5 billion ($250 million) budget for the public health sector would go towards:

- Construction of the new Dr A.G. Jeetoo Hospital expected to be completed in 2010 (Rs 2 billion/$67 million).
- New equipment (Rs 200 million/$7 million)
- Renovation and extension of hospitals and other health care facilities (Rs 556 million/$19 million).

Physical health

Physical exercise

Demonstration of Tai Chi

In view of the high incidence of

high blood pressure and diabetes among the population, physical activities such as yoga, aerobics and physical exercise are held to encourage people to adopt a healthy lifestyle.

Non-Communicable Diseases

The high level of deaths associated with non-communicable diseases, mostly high blood pressure and diabetes, is cause for serious concern. In 30 years (1976 to 2006), the percentage of deaths caused by diabetes has increased by 7-fold. Deaths caused by diabetes represented 3.2% in 1976, but shot to 22.6% in 2006. Taken together, diseases of the circulatory system and diabetes accounted for 59.0% of all deaths in 2007 and 57.8% in 2008 as compared to 31.1% in 1975 and 45.7% in 1990.

Substance Abuse (Tobacco, Alcohol and Illicit Drugs)

One of the 8 health warnings on packets of cigarettes

More than 160 countries, including Mauritius, have already ratified the WHO Framework Convention on Tobacco Control which puts an obligation on Parties to have the required "health warnings describing the harmful effects of tobacco use" on packages of tobacco. In Mauritius, the new tobacco Regulations 2008, on labelling and packaging amongst others, are in force since 2009. Mauritius is the only country in the world where health warnings occupies 65% of the total surface area of the packaging of cigarettes.

Disaster Preparedness

In 2008, the existing arrangements as regards to the running of hospitals during cyclonic periods, torrential rains, tsunamis and other natural disasters have been reviewed and updated. There is an urgent need to address the issue of preparedness in Mauritius as a result of recent meteorological observations and forecasts. Improved planning and preparation are therefore necessary to safeguard health facilities and to ensure that they continue to provide health care during and after emergencies.

Pharmaceuticals

In October 2008, a Pharmaco-vigilance Unit was set up at Flacq Hospital on a pilot basis to detect sub-standard medicines and errors in medications. Intellectual Property Rights cause drugs to be expensive. Mauritius has access to generic drugs at lower cost and may engage in the production of generic drugs for the regional market in the near future.

RECENT TRENDS AND EMERGING ISSUES:

Our population is ageing, with new implications for economic and social policies. Provision must be made for greater demand for diverse health care. A research unit will be set up to study the ageing population phenomenon and to make policy recommendations on how best to meet the needs of our elderly. A Carers' Strategy and Action Plan will be prepared to address all issues relating to the need of our elderly population for carers services. Women seeking employment would be trained by the National Empowerment Foundation in elderly care, and would be certified and registered as professional careers.

Other diseases, such as asthma, are increasing. 36.6% of all new cases of chest diseases diagnosed during 2008 were asthma, which may be related to increasing levels of dust, allergies and air pollution. In 2008, 44.8% of mental and behavioural disorders treated in public hospitals were due to the use of alcohol, whilst schizophrenia was responsible for 32.2% cases.

More than 1400 new cases of cancer are registered each year in Mauritius. 12% of all deaths in 2008 were due to this disease. To address this issue, the Ministry of Health and Quality of Life has developed a National Cancer Control Programme and Action Plan 2009-2012.

With the increased use of chemicals, pollution, vector-borne diseases mostly spread through international travel and mutation of microorganisms, environmental health issues are becoming issues of increased concern for Mauritius. Blood transfusion, blood products as well as tissue and organ transplant will be shortly regulated.

Since October 2008 following the Melamine food scare, a Food Alert system is in place with the setting up of a Central Flying Squad Unit, which also looks into aspects of Environmental Sanitation and Food Hygiene, prevention of diseases and health promotion issues.

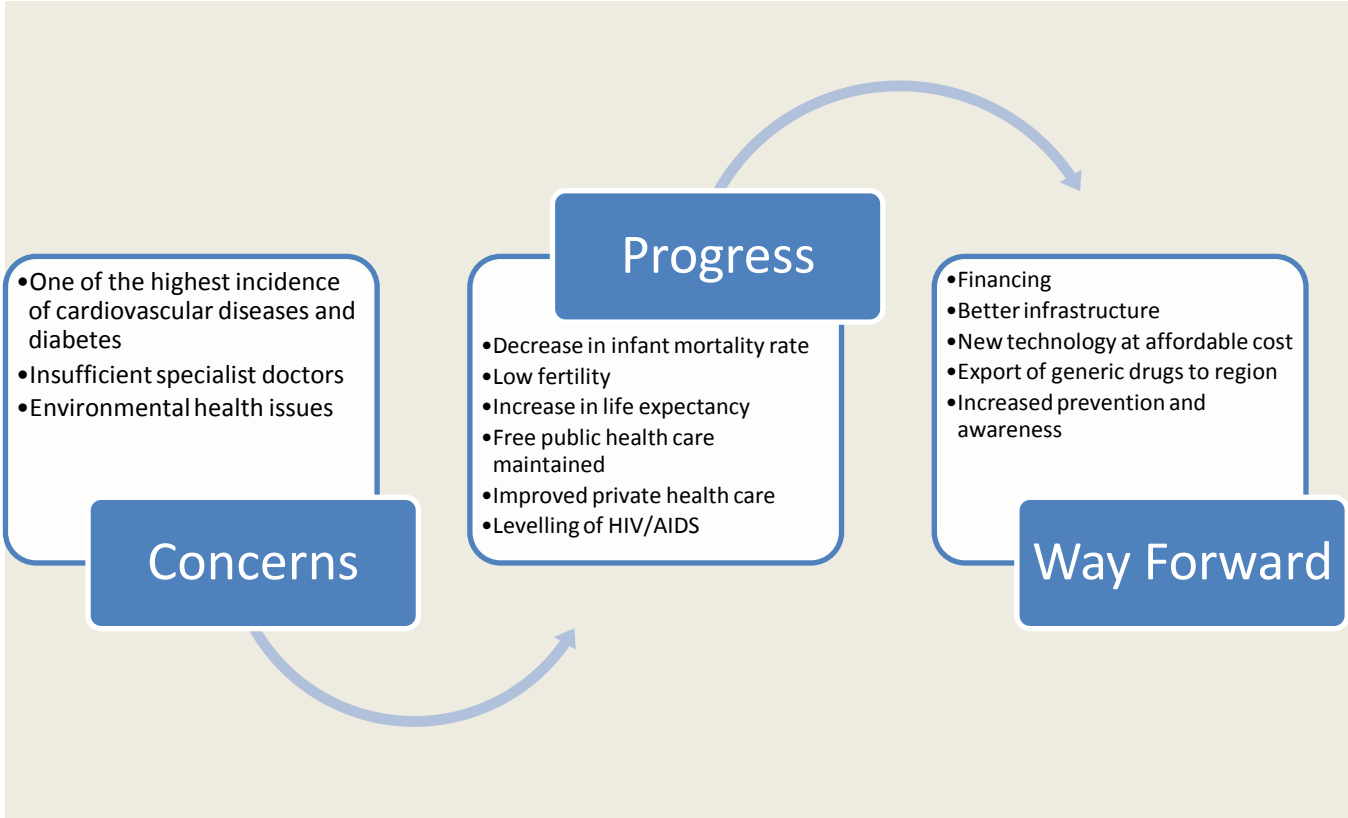
CONCLUSION AND WAY FORWARD:

The Mauritian health care sector is aiming at the provision of quality and timely health services, cost reduction, increase in customer satisfaction and development of medical tourism. The fact that public health is free of user cost to beneficiaries and is funded from various taxes equates to finding innovative means of sourcing funds to further improve the quality of public health care available in the country. Bilateral and regional cooperation needs to be strengthened. Mauritius can expand the provision of

health-related training and facilities to countries of the region, whilst building on transfer of competencies and technology from more developed countries.

Quality health services have been strengthened with a view to providing world class services to Mauritians as well to foreign clients. New entrants in the private health arena, such as one in partnership with world-renowned health service providers, are opening new avenues for Mauritians as well as for the emergence of medical tourism. This clearly demonstrates that the private sector needs to continue investing in state-of-the-art medical facilities so as to further develop the health hub. Accompanying health insurance packages need to accompany this process.

SUMMARY:



CHAPTER 17: KNOWLEDGE MANAGEMENT AND INFORMATION FOR DECISION MAKING

Anton Chekhov

- Russian playwright & master of the modern short story 1860-1904

"Knowledge is of no value unless you put it into practice"

Chapter 17: Knowledge management and Information for Decision Making

INTRODUCTION

Knowledge Management has continuously evolved since the 2005 Mauritius Meeting. New strategic thrusts have been initiated in various fields to enhance effective decision making process. To this effect, data gaps and information collection and analysis methodologies have been revised with a view to integrating the new and emerging economic, social, environmental and cultural issues. As a knowledge hub, Mauritius has been leapfrogging in its vision to be always abreast of new developments in knowledge management. This has been possible through constant and dynamic human resource development strategies and accelerating growth in the ICT sector. Indeed the development in the ICT sector has proved to be the right enabler in boosting up the economy for effective decision making.

The ICT sector has made a steady headway across all sectors of the economy, namely: manufacturing, wholesale and retail trade, communications, business services such as call centres, software development, website development and hosting, multimedia, IT consulting and disaster recovery. In 2005, Mauritius ranked first in Africa and 52nd at the global level, in the area of E-government readiness, although its global rank shifted to 58th in 2008. Over the past 5 years, the average growth rate of the ICT sector has been around 11% and its contribution to the economy in 2008 stood at around 5.4% of the GDP.

The sector, which has been predominantly focused on Business Process Outsourcing and IT Enabled Services, is now shifting towards the development of exportable services. The National ICT Strategic Plan 2007-2011 sets the framework for Government and private sector interventions in order to position the sector as the fifth pillar of the economy. The implementation cost of the 124 projects under the Plan is estimated at around US $ 30 million and a significant number of these projects have been or are being implemented.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

LEGISLATIVE AND INSTITUTIONAL FRAMEWORK

The legislative and institutional frameworks for the sector have been strengthened. Enacted in 2005, the Data Protection Act has been fully proclaimed in December 2008 and further amendments have been made as part of the Stimulus Package to enhance the image of Mauritius as a safe destination for undertaking Business Process Outsourcing/IT Enabled Services activities. The Electronic Transaction Act was amended in April 2009 through the setting up of a National Public Key Infrastructure for the safe, trustworthy and fault free electronic transactions. This infrastructure, through the use of digital signatures, enables secured applications such as procurement and Online Income tax returns. Further legislations for instance, the Child Online Protection Bill, the Intellectual Property Rights Bill and the Spam Control Bill as well as amendments to existing ICT related legislations, are being actively worked out to consolidate the policy and the regulatory framework of the ICT sector.

INFRASTRUCTURAL DEVELOPMENT

Over the past few years, the infrastructural development of the ICT sector has proceeded at an unprecedented rate. The Ebene Cybercity, which comprises around 380,000 m^2 of high standard space, has created over 8000 jobs for school leavers and professionals in the IT sector. It is anticipated that the ICT sector will create a further 10,000 jobs over the next two years and investments would have totalled around Rs. 16 billions (around $ 0.5 billion USD). A second infrastructure project, the Rose Belle Business Park, is presently being developed in the southern part of the island. Similarly, Government is providing an enabling environment for the development of data centres for activities such as recovery services and knowledge process outsourcing. The estimated investment is around Rs. 300 millions ($10 millions USD).

■ Universal Service Fund

A Universal Service Fund has been established to bring higher penetration of telecommunication services among the population, in line with Government objectives on social and economic inclusion. Other ICT related projects currently being implemented include wider access to internet services to bridge the digital divide, community E-empowerment to support socio-economic projects and poverty alleviation.

CYBERSECURITY

To fight the growing incidents of cybercrime and promote a safe and trusted Information Society, a National Information Security Strategy was elaborated for Mauritius as part of the National ICT Strategic Plan 2007-11. Mauritius is thus among the few countries in the world that have such an Information Security Strategy. The main objective of the National Information Security Strategy is to build trust and security in the use of ICTs. The National Information Security Strategy also includes measures for reporting and handling cybersecurity incidents at the national level.

The major information systems deployed in Government handle critical data and processes, requiring rigorous IT security audits. Several information security awareness sessions have been carried out with stakeholders. Moreover, a National Cybercrime Prevention and Protection Committee has been set up under the Information and Communication Technologies Authority to combat cybercrimes.

Some of the main projects that have already been initiated under the National Information Security Strategy are:

- ☐ The setting up of the national Computer Emergency Response Team (CERT-MU) by the National Computer Board,
- ☐ The elaboration of a Child Safety Online Action Plan,
- ☐ The development of information security guidelines for SMEs,
- ☐ Setting up of the public key infrastructure and
- ☐ Promotion of Information Security Standards at national level by CERT-MU.

Legislations pertaining to combating anti-spam and protection of children on the Internet have also been prepared in 2009. CERT-MU, is currently working on a policy for protection of critical information infrastructures from disruptions from cyber attacks. The policy would be finalised in 2010.

CERT-MU has already carried out training sessions on ISO 27001 Information Security Standards and BS 25999 Business Continuity Planning and Disaster Recovery Standard for some 65 IT professionals in both

public and private sectors and some 800 professionals have attending the technology update sessions on cyber security. Some 4,000 secondary school students have been sensitised by CERT-MU on best practices when using the Internet.

SETTING UP OF DATABASES:

Land use database

A Land Administration, Valuation and Information Management System (LAVIMS) will be operational as from July 2010 and will comprise a national digital cadastre and an Integrated Information Management System linking deeds registration and valuation.

Environment Information System

An Environment Information System has been developed with an initial set of 32 core indicators on various environmental issues. The database will be operational in mid 2010.

General Data Dissemination System

Mauritius has subscribed to the General Data Dissemination System (GDDS) of the IMF and now intends to graduate to the Special Data Dissemination Standard (SDDS). The primary focus of the GDDS is to improve data quality and covers macroeconomic, financial and socio-demographic data. On the other hand, the SDDS is a standard which focuses on the dissemination of frequent and timely macroeconomic and financial data. The four institutions responsible for the dissemination of data required by the SDDS are the Central Statistics Office, the Ministry of Finance and Economic Empowerment, the Bank of Mauritius and the Stock Exchange of Mauritius.

HUMAN RESOURCE DEVELOPMENT:

Internet and Computing Core Certification (IC3) Project

This project aims at providing a quarter of the Mauritian population with computer literacy and proficiency skills using the internationally recognized IC3 course, developed by the Cyber Learning Foundation. Since 2006, some 100,000 participants have completed the training.

Primary Schools

Government has provided each of the 275 primary schools in Mauritius and Rodrigues with PCs to ensure that the children are no longer deprived of basic ICT facilities. Efforts are under way to equip these schools with full-fledged computer laboratories. At the end of March 2008, the percentage of primary schools providing Internet access to students increased to 6.0% from 5.9% in 2007. The number of students per computer registered improved to 38 in 2008 compared to 63 in 2007.

Secondary schools

All state and private secondary schools have been provided with free broadband Internet access. At the end of March 2008, the percentage of secondary schools providing Internet access to students decreased

slightly to 93.6% from 94.1% in 2007. The number of students per computer was 24 in 2008. The number of students examined in ICT at School Certificate level increased by 1.2% to 4,624 in 2008 from 4,571 in 2007. The number of students examined in ICT at Higher School Certificate level in 2008 was 933 representing 10.5% of all students examined at HSC level compared to 920 or 10.8% in 2007.

■ Tertiary education level

The number of students enrolled in ICT or an ICT-dominated field at tertiary level was 3,448 in 2008/2009 compared to 3,700 in 2007/2008.

■ Community Empowerment Programme (CEP)

In order to transform Mauritius into an Information Society, Government has implemented the Community Empowerment Programme to enable the creation and sharing of information and knowledge for community development. This project is a joint public-private partnership comprising Government, UNDP, Mauritius Telecom and Microsoft. The CEP consists of the Development of a Community Web Portal, identifying the application and use of ICT for social development. It empowers the local community with ICT skills and free Internet access through computer clubs on a regional basis. All women's and youth centres and 93 post offices have been equipped with ICT infrastructure under the CEP.

REGIONAL COOPERATION:

■ Pan African e-Network Project

A country agreement was signed between Mauritius and India to participate in the PAN African e-Network Project in which India has contributed more than USD 120 million to the 53 countries of the African Union in the setting up of tele-education, tele-medicine facilities and a Very Very Important Person (VVIP) node in each of the African countries. The project thus also provides for communication through videoconferencing among Heads of States of the African Union. The tele-medicine facility and the VVIP node have been successfully set up and are equipped with state-of-the-art infrastructure.

LESSONS LEARNT AND GOOD PRACTICES:

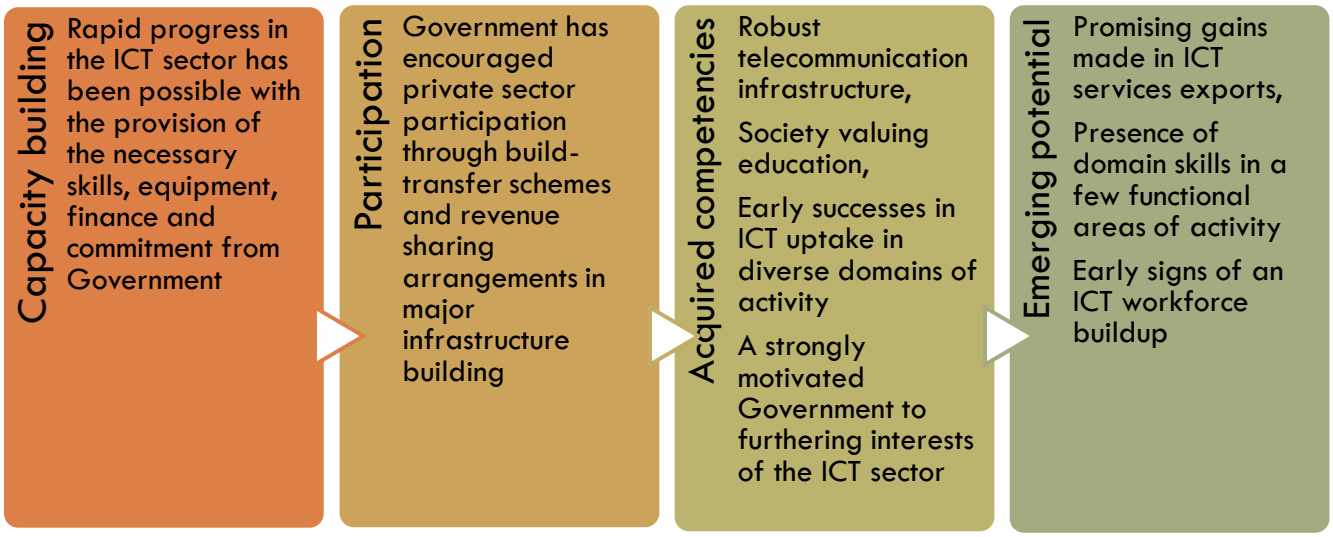
Today, there is practically no socio-economic activity in Mauritius where ICT is not present. Regular hosting of ICT events at the regional level has also engendered a perception of Mauritius being significantly active in the ICT arena.

Encouraging achievements have been made in many areas, namely:

- ☐ IT Enabled Services and IT services catering to offshoring nations of the world.
- ☐ Banking and financial services.
- ☐ A growing rate of ICT penetration in society.
- ☐ Reasonable levels of skills are being imparted in the educational institutions.

- E-Government projects are being implemented to make Government services more accessible for citizens and businesses. A number of high impact interactive e-services have been developed for citizens and business. These eServices include: applications for the social and well-being of our citizens, women courses, registration of environmental complaints, vacancies in government and appointment for vehicle examination, amongst others. There are currently 53 eServices that allow for the submission of online applications and all online transactions are encrypted and secured.

EFFECTIVENESS OF IMPLEMENTATION:



SPECIAL CONSTRAINTS AND CHALLENGES:

Mauritius faces several constraints and challenges in realising its ICT vision. These are as follows:

- Restricted supply of quality ICT manpower to keep pace with this highly evolving sector and to meet the challenges from international competitors. Mauritius still needs to the required steps to boost productivity, quality and technology.
- Optimal levels of collaboration are needed not only between sectors but also among entities in a sector itself.
- A steep cultural resistance to online transactions, owing primarily to ICT being a part of everyday life.
- A less than required acceptance of ICT not only as a career choice by the society, but also as a stream at par with the other tracks of the economy.
- Challenges engendered by convergence and continuous growth of new wireless devices and services.

RECENT TRENDS AND EMERGING ISSUES:

- For effective decision-making in the AIMS region, there is the need to establish a Regional Information and Database Centre, to promote the development of databases, sharing of data

and information on Indian Ocean's specific SIDS issues and also to improve Early Warning in the Indian Ocean.

- ☐ Collaboration between Indian Ocean SIDS should be enhanced to develop vulnerability indexes for the region.
- ☐ Mauritius also faces completely new security challenges such deliberate malicious attacks with the intention of paralyzing critical socio-economic areas.
- ☐ Extreme weather conditions can also accentuate our vulnerabilities, which in turn can have an impact on the scope of risk.

CONCLUSION AND WAY FORWARD:

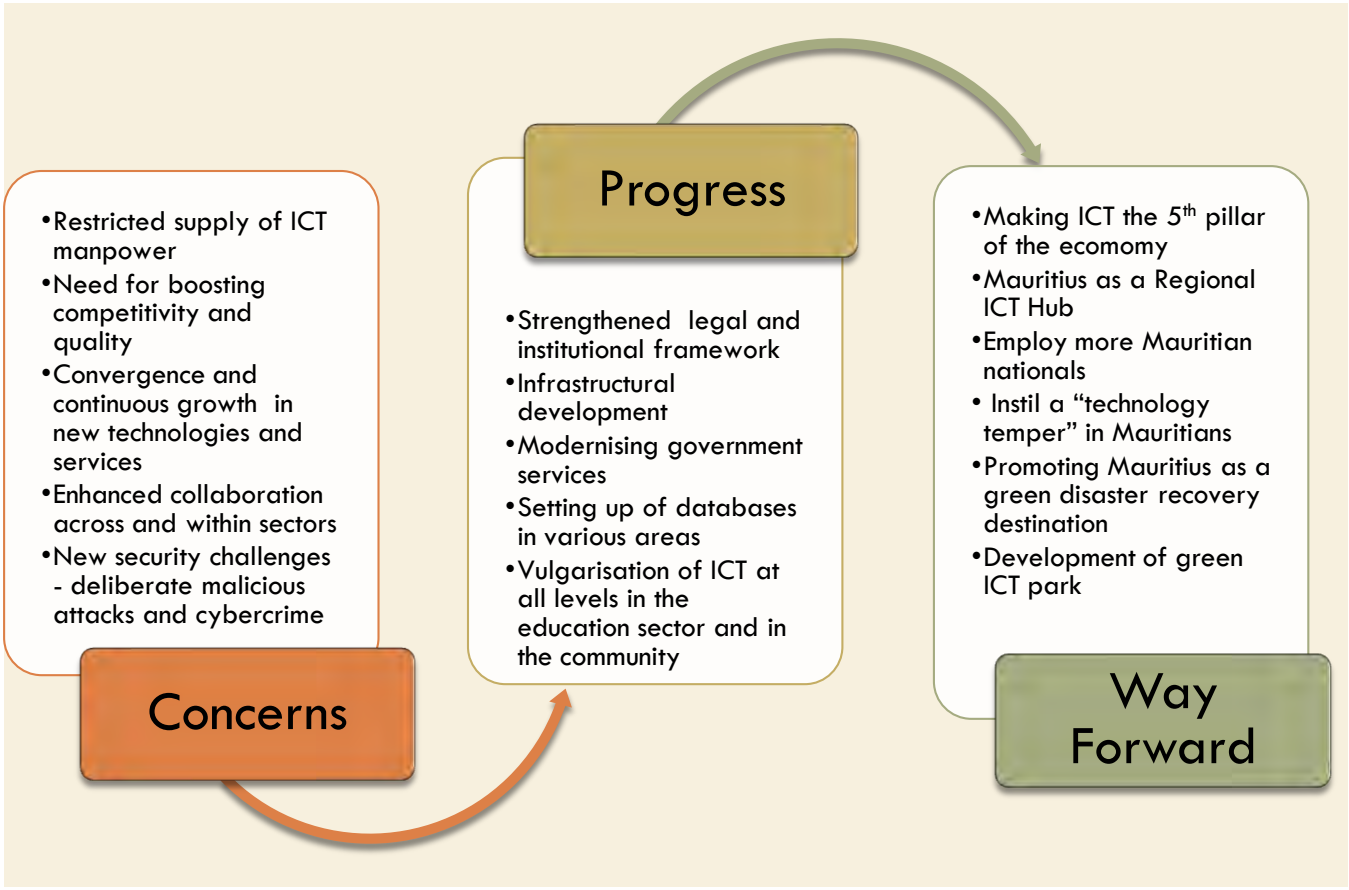
The vision of Government is to make the Information and Communication Technology sector the fifth pillar of the economy and Mauritius a regional Information and Communication Technology Hub. Information and Communication Technology is regarded as a tool that will support business processes in this knowledge-based economy where information will flow within and across economic activities, leading to increase in value added at national level.

Elevating ICT as a pillar of the economy would require interventions in the twin tracks of Information Economy and Information Society. This calls for measures such as making the ICT sector to employ more Mauritians, sustained availability of skilled manpower to power the sector and facilitate contribution from the ICT sector into the Mauritian export basket, with initiatives to create an information society with an increased adoption and usage of ICT among citizens and generally accepting ICT as a stream of professional persuasion at par with others.

To transform itself into a Regional ICT Hub, Mauritius must emerge as a leader in some identified select areas of ICT where expertise does not substantially exist in the region and must be increasingly seen as a preferred centre of ICT skills, expertise and employment in the region. This also calls for cooperation with other countries of the region to boost its IT skills.

A number of initiatives have been taken so as to converge concretely towards these visions. Mauritius has been successfully promoted as a green ICT disaster recovery destination. With the introduction of a new fibre optic cable and the concrete development of a green ICT park, Government is confident that Mauritius will soon start having internet data centres re-allocated on the island. Well-known companies like Reliance from India will soon start their operation both on Wymax and data centres in Mauritius. Mauritius is also encouraging the software development sector so that it may create further niche markets.

SUMMARY:


Concerns
•Restricted supply of ICT manpower
•Need for boosting competitivity and quality
•Convergence and continuous growth in new technologies and services
•Enhanced collaboration across and within sectors
•New security challenges - deliberate malicious attacks and cybercrime
Progress
•Strengthened legal and institutional framework
•Infrastructural development
•Modernising government services
•Setting up of databases in various areas
•Vulgarisation of ICT at all levels in the education sector and in the community
Way Forward
•Making ICT the 5th pillar of the ecomomy
•Mauritius as a Regional ICT Hub
•Employ more Mauritian nationals
• Instil a "technology temper" in Mauritians
•Promoting Mauritius as a green disaster recovery destination
•Development of green ICT park

CHAPTER 18: CULTURE

United Nations Educational, Scientific and Cultural Organisation

"Cultural diversity is a driving force of development, not only in respect of economic growth, but also as a means of leading a more fulfilling intellectual, emotional, moral and spiritual life."

Chapter 18: Culture

INTRODUCTION

Mauritius is at the crossroads of all major religions of the world (Buddhism, Christianity, Hinduism and Islam) and is well known as the quotable model of a rich and harmonious cultural diversity, as the Country's multi-ethnic population originated from China, England, France, India, Madagascar, Pakistan and the African mainland. Coupled with a long history of peace, political stability and democracy, the cultural diversity of Mauritius has contributed to the survival and fostering of traditions and to the promotion of sustainable development. For instance, out of the fifteen yearly public holidays, eight are religious festivals of diverse beliefs. The abolition of slavery and the arrival of indentured labourers are also national holidays, to commemorate the plight of the people from the African mainland, India, Madagascar and South-east Asia during the colonial rule. This clearly illustrates that while national unity was a challenge, post independence; the barriers between the various communities are melting down with increased understanding.

Since the 2005 Mauritius Meeting, Government has taken a series of measures, including economic instruments, to promote art and culture and foster the growth of a creative arts industry. There have been major milestones in the cultural heritage history of Mauritius, especially in 2006 and 2008 with the inscriptions of two sites of national importance on the World Heritage List. Both sites are directly related to the arrival and vicissitudes of the island's early people, namely the slaves and immigrants. The restoration and management plans of both sites are actively ongoing and they will also offer substantial economic opportunities through cultural tourism and industries.

CONCRETE ACTIONS TAKEN AND IMPLEMENTATION PROGRESS:

■ World Heritage Sites

Mauritius has two World Heritage Sites which has been inscribed by UNESCO, namely the Aapravasi Ghat and Le Morne.

☐ Aapravasi Ghat World Heritage Site

In 1834, as it was about to abolish slavery across its colonies, the British Government selected the island of Mauritius to be the first site for what it called 'the great experiment' in the use of 'free' labour to replace slaves. Between 1834 and 1920, almost half a million indentured labourers from India thus arrived at the Aapravasi Ghat [Immigration Depot in Hindi] in Mauritius' harbour to work in the sugar plantations of Mauritius, or to be transferred to Reunion Island, Australia, southern and eastern Africa and the Caribbean.

The Aapravasi Ghat historical site is an important symbol of Mauritian identity since the ancestors of more than 70% of present day Mauritian population arrived on the island through this immigration depot. As its buildings are among the earliest explicit manifestations of what was to become a global

economic system and one of the greatest migrations in history, the Aapravasi Ghat was inscribed on the World Heritage list by UNESCO in July 2006,. It was, at that time, the only World Heritage Site among the Mascarenes Islands.

- **Le Morne World Heritage Site**

Le Morne Cultural Landscape, a rugged mountain in the southwest of Mauritius was used as a shelter by runaway slaves, or maroons, through the 18th and early years of the 19th centuries. The remoteness of Le Morne and its very steep slopes, provided a sanctuary for the maroons to hide away from the colonists and the militias sent to hunt them down.

The oral traditions associated with the maroons, have made Le Morne a symbol of the slaves' fight for freedom, their suffering, and their sacrifice, all of which have relevance to the countries from which the slaves came - the African mainland, Madagascar, India, and South-east Asia. Le Morne holds great importance in the history and memory of Mauritius. It guards the memory not only of shared suffering through the slave trade, but also reminds us of suffering of all those who have experienced oppression of human kind. This majestic monument of nature, this cultural landscape was proclaimed a World Heritage Site by UNESCO in 2008.

Slave Route and the Slave Route Monument Project

One of the major objectives of the Slave Route Project is to create a greater awareness of the important role the slave trade and slavery played in the shaping of Mauritian history. The Slave Route Monument was unveiled on 1st February 2009 to mark the 173rd anniverssary of the Abolition of Slavery at Le Morne. This monument illustrates the links between the Mascarenes, Madagascar, the African Continent and India on the Slave Route in the Indian Ocean following the recommendations of UNESCO.

National Heritage Fund

The mission of the National Heritage Fund (NHF) is to valorise and promote the national tangible and intangible heritage of Mauritius. Since 2005, the following projects have been undertaken by NHF:

- Archaelogical Campaign on Le Coureur Shipwreck
- Conservation of Donjon St Louis

- ☐ Inventory of tangible heritage of Mauritius
- ☐ Inscription of the Immigration Archives on the UNESCO Memory of World Register
- ☐ Recording of building in the Aapravasi Ghat buffer zone using photogrammetry techniques
- ☐ Archaeological Survey and Mapping of Mauritius
- ☐ Archaeological Survey on Ile de la Passe

Festival Kreol

Government organizes the Festival International Kreol on a yearly basis. The aim of this festival is to lay emphasis on the value and beauty of the Creole culture, language, cuisine, art, music and dance. Moreover, this annual festival also sees the participation of regional artists from Rodrigues, Reunion Island, Seychelles and at times artists from the Pacific SIDS. Additionally, Regatta competitions are also organized in traditional fishing villages to promote the local culture.

LESSONS LEARNT AND GOOD PRACTICES:

The Cultural Industries and Government Incentives

Locally, cultural activities, including religious festivals and culture-related programmes in the tourism sector, have generated economic activities in trade, commerce and among performing artists. Undoubtedly, such events generate significant culture-related economic opportunities and give local artists the opportunity to express themselves and to promote the multi-ethnicity of the island.

The management plans of the two World Heritage Sites of the island fully take on board their economic developments associated with the local cultural industry. In the case of the Le Morne World Heritage Site, one of the key components of the management plan is to offer economic opportunities to the village communities, such as the development of crafts and local products.

Protection of Intellectual Property

The sudden development of modern means of communication has made it practically impossible for an author to exercise his rights individually. Piracy is a serious threat for the cultural industry in Mauritius. Each year, artists face a loss of Rs. 50 million. However, during since the past five years, the Anti-Piracy Unit has been strengthened and as at February 2009, some 175 piracy related cases have been sent to the law courts; 150 cases are still being investigated by Police and about a hundred culprits have been convicted. Furthermore, 1.4 million CDs and sleeves, seized by the Anti-Piracy Unit in 2003 and 2007, have been destroyed.

Similarly, several sensitization campaigns have been carried on the negative impacts of piracy, namely: loss of revenue for the artist, loss of money invested by the producer and editor, as well as loss for the collective management society.

EFFECTIVENESS OF IMPLEMENTATION:

There is strong political will to develop the cultural industry and support local artists. This has been possible through duty exemption on equipment and the elimination of the entertainment tax. Government's present policy is for to further support the emerging culture industry and this has been translated into the current national budget, which stands as follows:

- ☐ Provision of a contingency of Rs. 2 million to the Human Resource, Knowledge and Art Development Fund specifically for artists performing in the tourism sector, such as in coastal hotels.
- ☐ To broaden the scope of opportunities for artists, all construction projects costing more than Rs. 50 million ($1.7 million USD) will henceforth be solicited to invest at least 1% of their projects on artistic work.
- ☐ Companies providing entertainment services to hotels through artists will henceforth contribute to a Welfare Fund for the benefit of the artists.
- ☐ Over and above the respective Management Plans for the two World Heritage Sites, the Human Resource, Knowledge and Art Development Fund will seek proposals from artists on the best ways and means to create an artistic corridor between the two sites.
- ☐ To encourage drama performance by local artists, the Fund will meet part of the rental costs of theatre halls.
- ☐ The island's unique photography museum, which houses a rare collection of 18th to 20th century photographs, will receive a substantial grant to support its efforts in the preservation of the photographic heritage of Mauritius.
- ☐ To help promising artists, Government has set up an International Development Grants Scheme to enable them to receive training and experience abroad, and a Marketing Development Grant.
- ☐ Government intends to convert the Granary - a historic and massive building overlooking the harbour, into a 'Cultural and Artistic Boulevard' which will provide exhibition for artistic works.

SPECIAL CONSTRAINTS AND CHALLENGES:

The culture industry is still an emerging one and therefore the challenges facing this industry are complex and multi-faceted. For instance, budgetary constraints is a commonality taking into account that the various aspects comprising the cultural industry. However, government is steadily developing strategies, plans and concrete budget-based programmes to alleviate these constraints.

Despite the fact that there are a couple of award schemes for the publication of creative writings, local writers and playwrights still face difficulties in publishing their works. Sculptors, painters, dancers, photographs and film-makers, all face daunting challenges to financially support their work.

The two World Heritage Sites of the island pose interesting challenges with regard to the implementation of their full-fledged management plans but steady headway is being made. The desired buffer zone around the Aapravasi Ghat World Heritage Site for instance, conflicts with the existing features and activities that surround the site in the capital city and this challenge remains to be overcome. Similarly development around Le Morne cultural landscape can affect the already fragile biodiversity of the site.

RECENT TRENDS AND EMERGING ISSUES:

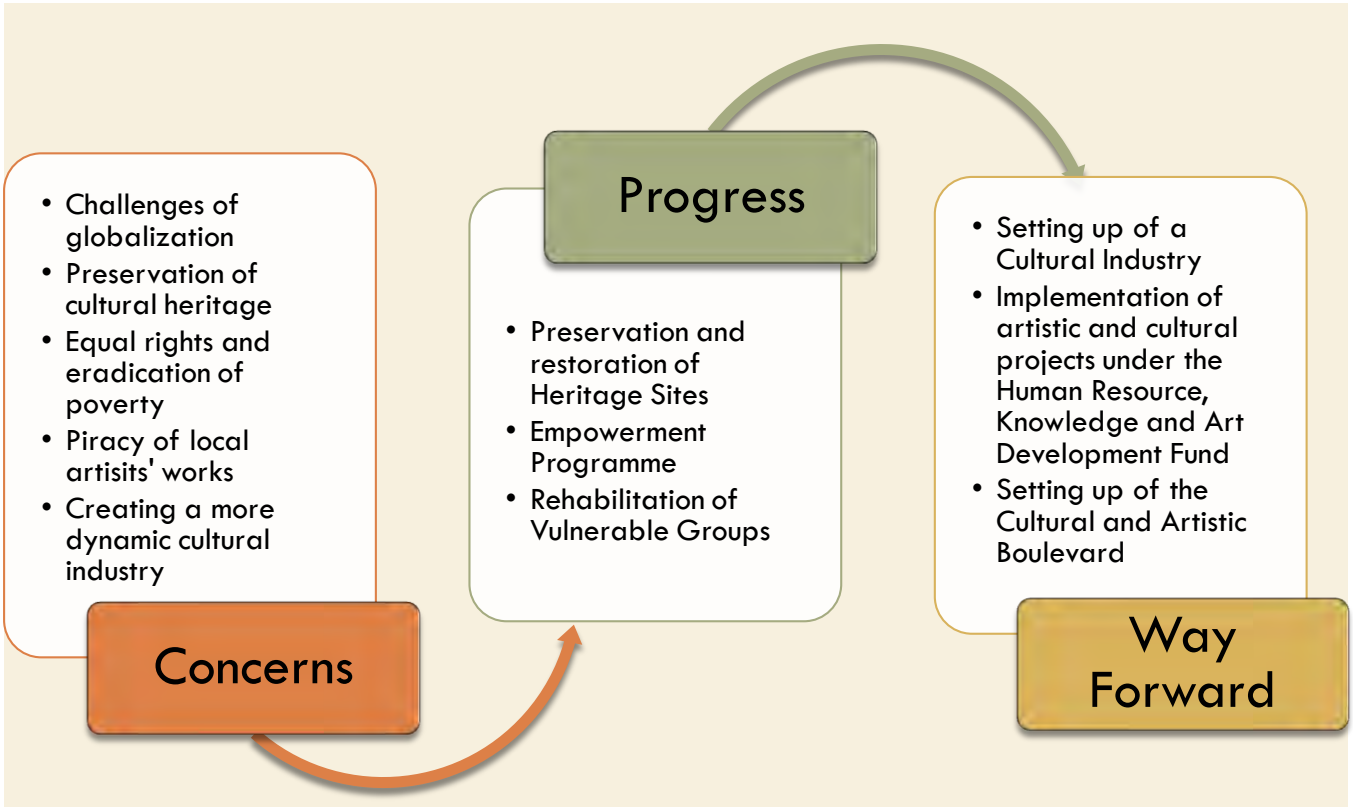
- ☐ A full inventory of the historical sites and intangible heritage of Mauritius needs to be carried out.

- ☐ Preparation of Risk Preparedness Plan for all cultural sites
- ☐ Development of cultural tourism
- ☐ Development of a Mauritian cultural industry focusing on music, art, the literary and culinary arts, fashion, festivals, theatre and film, sports, among others
- ☐ Strengthening of capacities to detect new technologies used in piracy

CONCLUSION AND WAY FORWARD:

As Mauritius keeps pace with globalization, it is essential that ancestral values and deep rooted beliefs not be jeopardised. The policy of Government is therefore to enhance the quality of life of its people, to eradicate poverty, to give the equal rights to all and to promote the cultural heritage of the various ethnic groups. This will be possible by venture capital and access to credit for small and medium-sized cultural enterprises and initiatives as well as through the establishment of culture support funds.

SUMMARY:



CONCLUSIONS & RECOMMENDATIONS

Secretary-General Ban Ki-moon

AOSIS Summit on Climate Change, September 2009

"Globally, Small Island Developing States have among the highest ratio of economic losses from disasters and other climate impacts."

CONCLUSIONS & RECOMMENDATIONS

Mauritius is a fervent advocate of multilateralism. Mauritius has been proactive in various regional, multilateral and international fora. The country has signed key treaties in relation to labour laws, environmental laws, aviation laws, disarmament, human and children's rights amongst others. It plays a leading role in a number of initiatives, in particular to support the cause of Small Island Developing States (SIDS). It is also taking a lead role in consultations with donor countries and international organisations under the Aid for Trade Initiative, which will support the efforts of developing economies and LDCs to adjust to the new liberalised trading environment.

Mauritius is an active member of the UN, Bretton Woods Institutions, Commonwealth, African Union, the Non-Aligned Movement (NAM), the Indian Ocean Commission (IOC), the Common Market for Eastern and Southern Africa (COMESA), the Southern African Development Community (SADC) and the Organisation Internationale de la Francophonie. Mauritius is also a founding member of the Indian Ocean Rim - Association for Regional Cooperation (IOR-ARC) and a member of the Africa, Caribbean and Pacific (ACP) group of countries.

Mauritius maintains good and friendly relations with its nearest neighbours, has participated in conflict resolution efforts in the region (e.g. Comoros) and contributes to peacekeeping efforts at the African Union level.

MAURITIUS MEETING 2005

SIDS represent 51 UN Member States. Yet they still face difficulties in making their concerns taken into consideration in the global development agenda. Despite having insignificant impacts in terms of trade, GHG emissions, ecological damage, financial flows and transboundary pollution, SIDS are the most vulnerable and at risk.

Because we are convinced that solidarity is of paramount importance to successfully address SIDS issues, Mauritius hosted the International Meeting for the Further Implementation of the Barbados Programme of Action for the Sustainable Development of Small Island Developing States. The Mauritius Declaration and its Mauritius Strategy for Implementation (MSI) both highlight SIDS vulnerability and the commitment of the international community to accompany SIDS in their development efforts. Promises have not been substantially fulfilled.

In an attempt to develop a conceptual framework for the mainstreaming of the MSI, an expert meeting was held in April 2007 under the aegis of UNDESA. Experts from the three SIDS regions highlighted the need to adopt a synergistic approach in the implementation of the MSI and the MDGs, in order to capitalise on visibility and funding availability.

Intra as well inter regional SIDS collaboration needs to be facilitated, including through the urgent setting up of the SIDS roster of experts and the vulnerability index, as provided for in the MSI.

OFFICIAL DEVELOPMENT ASSISTANCE (ODA)

Developed countries had agreed provide 0.7% of their gross national income (GNI) as ODA by 2015, and committed to increase annual aid flows to about $155 billion per year by 2010. According to the UN report on *Strengthening the Global Partnership for Development in a Time of Crisis*, ODA rose by about 10% in 2008 to $119.8 billion and the share of ODA in the gross national income (GNI) of donor countries improved as well (from 0.28% in 2007 to 0.30% in 2008). However, although development assistance rose to record levels in 2008, donors are falling short by $35 billion per year on the 2005 pledge on annual aid flows made by the G8 in Gleneagles, and by $20 billion a year on aid to Africa. The 2008 confluence of steep recession and food shortages, the expected spread of pandemic influenza AH1N1 in 2009, the continuing impact of climate change and the fact that most of the recent increase in ODA has been limited to a handful of post-conflict countries, are factors impeding progress on realization of the MDGs and the MSI for most SIDS.

CLIMATE CHANGE

Climate Change is a daunting threat to which SIDS like Mauritius need to adapt. Because of the horizontal dimension of climate change, Mauritius is setting up a Climate Change Unit to coordinate climate change activities in the country. A climate change policy and legislative framework as well as Mitigation and Adaptation Plans need to be prepared. The international community could consider supporting such initiatives in Mauritius as well as on a regional basis.

Access to affordable and SIDS-adapted technology and financing would catalyse the greening of SIDS economies, create green jobs and enable them to embark on a greener trajectory where sustainable patterns of production and consumption are favoured.

ECONOMIC REFORM STRATEGY & CAPACITY DEVELOPMENT

The new global realities have taught us the importance of having a resilient economy. The reforms in public finance have enabled us to implement a stimulus package without having recourse to a surge in deficit and public sector borrowing as has happened in many countries. Our fiscal deficit was 3% of GDP for the financial year July 2008/June 2009. Due to the positive outcomes of our reforms, we have been able to postpone an external loan from the African Development Bank that was negotiated as a contingency measure to face the crisis. Moreover, Government has taken advantage of good investments, frontload infrastructure projects and make early repayments of loans.

Despite the recession, Mauritius has continued to attract record levels of Foreign Direct Investments (FDIs). During 2008 and 2009, FDIs amounted to more than Rs 17 billion ($565 million) and Net International Reserves were rising to reach more than Rs 100 billion ($3300 million). Investment as a share of GDP increased to 25.4% in 2009 in spite of a difficult environment while inflation stood at 2.5%, the lowest since 1988. Unemployment has been contained at 7.4% while 8400 net jobs have been created.

Companies operating in Mauritius should become more outward-looking, with special emphasis on the regional markets. There must also be more investments in the services sector to increase productivity and improve the earning capacity of our workforce by going into higher value addition.

The two most decisive factors for future growth in Mauritius will be infrastructure and human resource development. Government has a Rs 200 billion ($6600M) plan for infrastructure investment for the next ten years, with the expectation that most of it will be frontloaded and that a substantial amount of that investment will be through public private partnerships. The private sector therefore has a critical role to make it happen, as do development partners.

The ten-year economic reform programme, to put the economy back onto a growth path of over 6% in the longer term, relies on external resources, including under the Aid for Trade Initiative. The Mauritius Multi-Annual Adaptation Strategy 2006-2015 for the sugar sector forms an integral part of this comprehensive ten-year economic reform programme which the EC supports through the EC Accompanying Measures for Sugar Protocol Countries.

Efforts will be maintained to improve our business and investment climate so as to offer the best environment for trade and FDI. Government is committed to joining the league of top 10 countries in the world for doing business.

ENVIRONMENTAL PERFORMANCE

Environmental experts at Yale and Columbia Universities released their biannual Environmental Performance Index (EPI) at the 2010 World Economic Forum. The index ranks 163 nations according to their performance on 25 indicators that fall into ten policy categories.

In the last evaluation in 2008, Mauritius was ranked 59th. In 2010, Mauritius has been ranked 6th with an EPI score of 80.6. Mauritius is the first SIDS in this 2010 ranking. This ranking gives due recognition to the individual and collaborative efforts made by Government, the private sector and the population at large to protect and sustainably manage our environmental assets.

New strategies recently adopted or nearing finalisation for the sustainable management of the coastal zone, for the energy sector, on sustainable production and consumption, on marine resources, on environmentally sensitive areas, inter alia, require funding to be successfully implemented. Only this will enable the country to maintain or even strengthen its environmental performance.

MAURICE ILE DURABLE

In 2007, the vision of 'Maurice Ile Durable' was announced by the Prime Minister. With support from the UNDP, the consultation process for the development of the National Policy for a Sustainable Mauritius (Maurice Ile Durable - MID) is currently ongoing.

The aim is to solicit the views of stakeholders from the public and private sectors and develop a National Vision on sustainable development and its social, environmental and economic implications in Mauritius. Through a draft White Paper which is expected to be completed by mid-2010, a National Policy for MID will then follow.

The Maurice Ile Durable (MID) is a long-term vision aimed at promoting sustainable development. The main thrust of the MID is to make Mauritius a world model of sustainable development. This includes minimising dependency on fossil fuels through increased utilisation of renewable energy and a more efficient use of energy in general. The protection of the environment and the social dimension of development are also important aspects of MID.

MULTILATERAL GOVERNANCE REFORMS

Multilateral institutions were set up to respond to specific needs. With time, especially in the current international context, they need to adapt to a radically changing world so as to remain efficient and effective in the delivery of their services.

Mauritius has been actively advocating for special treatment for SIDS within the multilateral systems. Although the UN recognises SIDS as a special category requiring specific solutions, other intergovernmental agencies do not have operational frameworks dedicated to the SIDS category and to their needs.

FINANCING AND DEVELOPMENT COOPERATION

Mauritius' development challenges go well beyond the reaching of the MDGs and focus on successfully guiding Mauritius to the next level of development. Mauritius aspires to become:

- ☐ A thriving, a competitive and modern society, where the population enjoys a high standard of living
- ☐ The region's leading centre for international financial services, including banking, insurance and other consultancy services
- ☐ A liberal and well-regulated Cyber Island with state-of-art Information Technology infrastructure and a supporting physical and social infrastructure. Future projects: a network of mass transit system, jobs nearer to residence.
- ☐ An essential node in the variety of international and regional network flows allowing Mauritius to create its niche in international profit bearing flows.

- ☐ A centre of excellence in education and health.
- ☐ An ecologically well-balanced economy ensuring that higher growth is environmentally sustainable.

At the United Nations General Assembly in 2008, Mauritius pointed out that the 'arbitrary GDP criteria applied to determine the eligibility for securing concessional finance disqualifies most SIDS from accessing much needed funds for important infrastructure development' and that 'it is absolutely necessary in this regard that SIDS are treated as a distinct category.'

SIDS and the international community need to agree on urgent setting of a dedicated window for SIDS, such as for Climate Change Adaptation or under the Global Environment Facility.

The UNDESA SIDS Unit needs to develop a plan for better coordination of financing and mobilization of financial resources to support SIDS in the implementation of the MSI.

Donor support and technical assistance from international organizations can boost national initiatives, e.g. towards regional food security, through appropriate financing schemes to fund private sector initiatives and public-private sector partnerships.

The implementation of the full range of global commitments can effectively advance economically and environmentally sustainable growth in SIDS. This growth needs to imperatively mitigate climate change while addressing the social, educational and health-related shortcomings associated with poverty.

International collaboration has never meant so much than in this era of globalisation and transboundary environmental challenges.

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