



REPUBLIC OF MAURITIUS

**First National Report
of the Republic of Mauritius**

**to the
United Nations Convention to Combat
Desertification (UNCCD)**

November 2004

Acronyms and Abbreviations Used in this Report

AgM	Agriculture Service – Mauritius
AgR	Agriculture Service – Rodrigues
AREU	Agricultural Research and Extension Unit in MoAFTNR
AS	Agricultural Services (MoAFTNR)
CSO	Central Statistical Office
EPA	Environmental Protection Act
ESA	Environmentally Sensitive Area
FLIS	Forest Land Information System
FoA of UoM	Faculty of Agriculture of the University of Mauritius
FoLM of UoM	Faculty of Law and Management / University of Mauritius
FoSSH of UoM	Faculty of Social Studies and Humanities / University of Mauritius
FSC	Farmers Service Corporation (MoAFTNR)
FS	Forestry Service (MoAFTNR)
FSM	Forestry Service – Mauritius (MoAFTNR)
FSR	Forestry Service – Rodrigues
GEF	Global Environment Facility
GIS	Geographic Information System
GoM	Government of Mauritius
GPS	Global Positioning System
KM	Knowledge Management
LIS	Land Information System
LMIS	Land Management Information System
M&E	Monitoring and Evaluation
MAURIS	Mauritius Natural Resource Information System
MIE	Mauritius Institute of Education
MoAFTNR	Ministry of Agriculture, Food Technology and Natural Resources
MoEPCA	Ministry of Economic Planning and Corporate Affairs
MoE	Ministry of Environment
MoHL	Ministry of Housing and Lands, Small and Medium Enterprises, Handicraft and the Informal Sector

MSIRI	Mauritius Sugar Industry Research Institute
NAP	National Action Programme
NBSAP	National Biodiversity Strategy and Action Plan
NCB	National Coordinating Body
NCSA	National Capacity Self Assessment
NDS	National Development Strategy
NPCS	National Park and Conservation Service (MoAFTNR)
NRSC	National Remote Sensing Centre (MoAFTNR)
NYFC	National Young Farmers Club
OGA	Onion Growers Association
PGA	Potato Growers Association
PGRU	Plant Genetics Resource Unit
PRSP	Poverty Reduction Strategic Plan
RRA	Rodrigues Regional Assembly
SGP	Small Grants Program (UNDP/GEF)
SLM	Sustainable Land Management
UNCCD	United Nations Convention to Combat Desertification
UNDP	United Nations Development Programme
UNEP	United Nations Environment Programme
PDF/A	Project Development Fund/A
RAP	Regional Action Programme
SRAP	Sub Regional Action Programmes
NFP	National Forest Programme
NRM	Natural Resource management

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INTRODUCTION

The Republic of Mauritius comprises the islands of Mauritius, Rodrigues, St Brandon and a number of outlying smaller islands, which have a total land area of 2,045 km².

Mauritius has a moderate tropical climate characterized by a hot, humid summer and a cooler and drier winter. Being situated in a sub tropical zone and by virtue of its climate, desertification is not relevant to Mauritius. However, it is prone to droughts, although no lengthy drought has yet occurred.

Mauritius faces economic and environmental vulnerabilities that constitute the special challenge to the sustainable development of small Islands Developing states (SIDS). Due to its small surface area and the increasing population rate, Mauritius has to cope with acute pressure due to urbanization, intensive agricultural practices, reduction in forests area and overgrazing. Overexploitation of our limited land resources has led to a reduction in soil fertility and production rates causing land degradation problems.

Mauritius signed the UNCCD on 19 March and ratified it on 11 January 1996. The focal Ministry is the Ministry of Environment and the National Focal Point is the Conservator of Forests of the Forestry Service (Ministry of Agriculture, Food Technology and Natural Resources). Mauritius is in the process of formulating a

National Action Programme. This is the first National Report being submitted by the Government of Mauritius to the UNCCD Secretariat.

Since Mauritius ratified the UNCCD Convention, a lot of initiatives have been undertaken to address the issue of Sustainable Land Management, both at the institutional and field levels.

Following the decision of the Global Environmental Facility (GEF) assembly to consider its activities against land degradation as a window for funding under its Operational Programme *15, Mauritius had made a request for support to its SLM activities. The GEF has approved a PDF/A (in acronyms) project for the elaboration of a medium-sized project for identifying the capacity needs of Mauritius for Sustainable Land Management. The medium-sized project has been finalised and will be submitted to GEF shortly. The capacity building for Sustainable Land Management for Mauritius is given in Annex D. A list of completed, ongoing and projects in the pipeline is given in Annex E.

1. Summary

1.1. Focal Point Institution

Information on the UNCCD focal point is presented in this table:

Name of UNCCD focal point	Seemadree Appanah PAUPIAH Conservator of Forests
Address	Botanical Garden Street

	Curepipe Mauritius Tel. No (+230) 675 4966 (Direct) (+ 230) 6751746 Fax No. (+230) 6743449 E-mail: moa- forestry@gov.mail.mu
Country specific websites relating to desertification	None

1.2. Status of NAP

The status of the NAP is presented in the following table:

Date of Validation	Not validated
NAP reviews	None
NAP has been integrated into the PRSP (<u>acron</u>)	No
NAP has been integrated into the national development strategy	No
NAP implementation has started	No
Expected NAP validation	December 2005
Final draft of NAP exists	No
Formulation of draft NAP is underway	No
Basic guidelines for NAP have been established	No
Process has only been initiated	Yes
Process has not yet started	Yes, it has started

1.3. Member of SRAP/RAP

Mauritius is not yet a member of any sub-regional or regional action programs

1.4. Composition of the NCB(acronyms)

Composition of the NCB has been identified and is in the process of being finalized.

1.5. NGOs Accredited to the Process

No NGO has as yet been accredited to the process. No NGO National Coordinating Committee has been created.

1.6. Acts and Laws Passed Relating to UNCCD

Mauritius has several laws that relate to land degradation and sustainable land use. No specific Acts or laws have been passed in direct relation to obligations under the UNCCD.

1.7. The Consultative Process

No formal partnership agreements have yet been signed within the framework of UNCCD but consultative meetings have been initiated with stakeholders.

1.8. Projects Related to UNCCD

Two projects are currently underway that will explicitly build capacity for implementing the UNCCD.

Name of Project	Project Implemented within the framework of the NAP/SRAP/RAP ?	Project Implemented within the framework of...	Time-frame	Partners Involved	Overall Budget
1. PDFA – Capacity Building for Sustainable Land Management in Mauritius (including Rodrigues) – Project objective to develop a Medium Size Project	No (because they don't exist yet) but very much within the framework of implementation of UNCCD	UNDP/GEF support	July 2004 to August 2005	UNDP/GEF/ GoM and other local partners	US\$45,000

	proposal(GEF approval awaited)					
2.	National Capacity Self-Assessment (including an assessment of capacity needs for SLM)	No, but the NCSA will assess capacity needs for 3 conventions including the UNCCD	UNEP/GEF support	July 2004 to August 2005	UNEP/GEF/ GoM and other local partners	US\$14 6,150

2. Strategies and Priorities Established

Mauritius has a number of national plans/policies/strategies that relate to land degradation and sustainable land use. They are presented in the following table. However, none of these documents were prepared to explicitly take into account the UNCCD and none of them have been modified since their establishment to harmonize them with the implementation of UNCCD.

National Plans or Strategies	Harmonization with UNCCD*	Remarks	Linkages with NAP/ UNCCD/ NFP/NCB **
National Development Strategy (2003)		The NDS aims, amongst other things, to: <i>“Encourage economic growth in the conurbation, the country side and the coast, whilst maintaining and enhancing the quality of the environment and striving for a more sustainable pattern of development”</i> . The NDS provides summary policy guidance whose purpose is to act as an interim development control	

		tool, pending the revision of relevant Local Development Plans (outline Schemes) and consolidation of existing Planning and Design Guidelines issued by the Ministry of Housing and Lands and the Ministry of Tourism (in Tourism Zones).	
Environment Investment Programme II		This has identified a range of issues pertaining to land management including those which specifically address the identification and delineation of Environmentally Sensitive Areas (ESAs)	
National Physical Development Plan (NPDP – 1994)		Updated in 2003	
National Environment Action Plan for Mauritius (1990)		First identified land degradation as an important problem in Mauritius.	
National Environmental Strategies (NES – 2000)		Identified the abatement of land degradation as one of the principal national environmental priorities	
Non-Sugar Sector Strategic Plan (MoAFTNR -- 2003)		Accords a high priority to sustainable land management	
Mauritius Tourism Development Plan, approved			

(MT -- 2002)			
National Biodiversity Strategy and Action Plan (NPCS of MoAFTNR -- 2001)			

*No formal harmonization has been done up to now but however many institutions have been involved.

**Not established

3. Institutional Measures Taken to Implement the Convention

Indicator	Evaluation Parameters	Evaluation	Remarks
The NAP as part of the national economic and social development and environment plans	<ul style="list-style-type: none"> • Making the NAP coherent with other environmental strategic and planning frameworks • Linkages of the NAP with national, intra-regional and local approaches 	As work on the NAP is only just now being initiated, there is not yet any NAP to integrate and link into these frameworks and approaches.	The preparation of the NAP will be done as an integral part of the UNDP/GEF/Govt-funded Capacity Building for Sustainable Land Management in Mauritius (including Rodrigues) project. The project has started early 2005 and the NAP will be completed by the end of 2005. Preparation of the

			NAP shall be funded by Government. (Financial support will be sought from the Global Mechanism and the Secretariat for the implementation of the NAP)
Linkages achieved with subregional and regional actions programmes	<ul style="list-style-type: none"> • Development of programmes of a subregional or regional character • Strengthening of scientific networks • Government's agreement 	No linkages have yet been established with subregional and regional action programmes and scientific networks for the purpose of advancing sustainable land management strategies.	These linkages will be explored and developed in 2005 as part of the development of the NAP.
Established and functional national coordination body (NCB)	<ul style="list-style-type: none"> • Legal status • Resources • Cross-cutting and multi-disciplinary character • Composition and mode of operation 	No NCB has been established but a list has been proposed.	NCB will be established in early 2005 as part of the development of the NAP.
Institutional framework	<ul style="list-style-type: none"> • Measures adopted to 	Desertification is not the appropriate term for	The UNDP/GEF project will

<p>for coherent and functional desertification control</p>	<p>adjust or strengthen the institutional framework</p> <ul style="list-style-type: none"> Measures to strengthen existing institutions at the local and national levels 	<p>Mauritius. Land degradation is the main problem here. Mauritius will focus its efforts under the UNCCD towards the development of capacities and viable systems for sustainable land management. No institutional framework has yet been developed for coordinating and harmonizing sustainable land management actions. Institutional awareness raising of the types, causes of land degradation, priority setting and identification of SLM options was done as part of the UNDP/GEF participatory project formulation currently underway, but no formal capacity building for SLM has yet been undertaken.</p>	<p>concentrate primarily on building institutional capacities for SLM. Numerous institutional capacity needs are identified in the Root Cause (of land degradation) Matrix for this project – this is presented in Annex B. Measures to build capacity and strengthen both government and civil society institutions are detailed in the project logframe in Annex C.</p>
<p>Coherent and functional legal and regulatory framework</p>	<ul style="list-style-type: none"> Cross-analysis of environmental and other relevant legislation should, in 	<p>Several legal and regulatory constraints to SLM were identified as part of the UNDP/GEF SLM project design. They are presented in the Root Cause Matrix in Annex B. State</p>	<p>The new UNDP/GEF SLM project shall review, restructure and strengthen the land lease systems putting a strong emphasis on SLM.</p>

	<p>particular, form a basis for ensuring greater responsibility by the local population and for ensuring an appropriate land tenure system.</p> <ul style="list-style-type: none"> • Measures to adapt current legislation or introduce new enactments. 	<p>ownership of both agricultural and grazing lands on Rodrigues combined with a dysfunctional lease system (agricultural lands) or no lease system at all (grazing lands) are the main root causes of the most serious problems of land degradation on the two islands. Clearing of State forests for deer pastures on land leased for deer ranching on Mauritius is not properly regulated. Regulatory systems for preventing encroachments onto State forest lands, river reserves and mountain reserves and other State lands on Mauritius are very weak. No thorough cross-analysis of legislation in respect to UNCCD has yet been done and no new legislation or regulatory measures specifically targeting SLM have yet been introduced.</p>	<p>Land Information systems will be developed (Forest Service/Mauritius) and strengthened and integrated with remote sensing tools for use in strengthening regulatory systems for encroachments, river and mountain reserves, deer pastures and so on. A new FAO-funded forestry policy and action plan, both integrating SLM from their conception, will be developed over the next two years.</p>
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4. The Participatory Process in support of the Action Program

Indicator	Evaluation Parameters	Evaluation	Remarks
Effective participation of actors in defining national priorities	<ul style="list-style-type: none"> • Methods of participation of various actors in regular consultations, meetings and regular exchange of information in mailing and e-mailing networks. • Gender balance of actors involved in defining NAP priorities • Representation of various actors in national priority identification 	<p>The first major step towards the development of a participatory approach for SLM was taken as part of the UNDP/GEF project development. Many stakeholders were consulted directly during the identification of forms and land degradation and their causes and the identification of SLM options. A local stakeholders' workshop for Rodrigues was held in August 2004. The overall results were all then presented, debated and refined at a very well-attended stakeholders' workshop in September 2004. The list of participants and the institutions and civil society groups they represent is presented in Annex D. The gender balance of both workshops was significant.</p>	<p>Stakeholder participation will be formalized and greatly strengthened in 2005 with the development of the NAP and the launching of the UNDP/GEF SLM project. One of the first steps will be the establishment of a National Coordination Body. The SLM project will place a major emphasis on the identification of best practices for SLM, whatever their origins. These will be identified from both "traditional" and "modern" techniques. An issue of major concern to many stakeholders is the pending loss of the</p>

	<p>on processes</p> <ul style="list-style-type: none"> • Nature and scope of information, education and communications • Extent of uptake of <ul style="list-style-type: none"> • Local concerns at the national level • Results of national consultations at the local level 	<p>Open access, uncontrolled overgrazing of pasture lands on Rodrigues was identified as the highest priority problem of land degradation. Unsustainable agriculture in the non-sugar sector is a significant problem on both islands and deforestation is primarily a problem on Mauritius. Wildfire induced land degradation on the northwest facing, subhumid mountain slopes of Mauritius is a particular problem.</p>	<p>sugar subsidy from the European Union. Sugarcane agriculture is one of the most sustainable land uses at present, but its economic viability will be seriously threatened in the near future. This will be especially true on the most marginal and poorly accessible lands. The UNDP/GEF project will assist in the identification and promotion of ecologically and economically viable SLM alternatives to sugarcane.</p>
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5. The Consultative Process in support of the National Action Program

Indicator	Evaluation Parameters	Evaluation	Remarks
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<p>Effective support from international partners for cooperation</p>	<p>Degree of participation from international partners</p>	<p>The Government of Mauritius and the National Focal Point for the UNCCD have recently taken a proactive stance in seeking out the support of international partners to confront the problems of land degradation under the umbrella of the UNCCD. When the new Land Degradation GEF operational program area was approved in late 2003, Mauritius was one of the first to develop SLM concepts and to seek project development funding. The UNDP/GEF SLM capacity building project design is nearly completed. It should be one of the first projects to be funded under this new “window”. The project design has adopted an open approach to the identification and analysis of all forms of land degradation on both islands (Mauritius and Rodrigues) as well as for the identification of SLM mitigation measures. It is believed that the design and implementation process are critical steps for</p>	<p>Two donor funded initiatives will complement the UNDP/GEF capacity building project at the field level.</p> <ul style="list-style-type: none"> -The Government of Mauritius has requested the assistance of the European Union for the preparation of a “participatory decentralization” approach to natural resource management on Rodrigues. Unlike past approaches on Rodrigues, this new project will work directly with non-governmental civil society natural resource user groups. -The UNDP/GEF small grants program has shown a strong interest in supporting SLM efforts in the field.
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	Establishment of an informal consultation and harmonization process for actions between partner countries.	The NCB has been created. Communications and collaboration among the UNCCD, NFP and UNDP and FAO has been very good to date. No other formal mechanisms for consultation and harmonization have yet been established at the local, national or international levels.	One of the key components of the UNDP/GEF Project will be the development of capacities for knowledge management for SLM. This will consist of gathering, analyzing and synthesizing data and information on SLM and of sharing and communicating the results with concerned SLM stakeholders, ranging from the field resource user to high-level decision-makers. This is envisioned to operate primarily at national level but it is hoped that it could be linked in the future into regional and sub-regional programs.
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6. The Measures Taken or Planned within the Framework of the NAP

Indicator	Evaluation Parameters	Evaluation	Remarks
Adequate diagnosis of past experience	Synthesis and evaluation of activities undertaken in	The NAP process has only just been initiated but will take into	The Knowledge Management component of the new UNDP/GEF project will place a major

	the field of combating land degradation	consideration the given indicators.	emphasis on the identification of lessons learned and best practices for SLM. A key document to be exploited is the final evaluation of the recently completed EU Anti-Erosion Project on Rodrigues. One of the key lessons learned was the need to foster bottom-up participation towards SLM – a lesson that is being addressed in the formulation of the new EU-funded Decentralized Participation project for natural resource management on Rodrigues.
Established technical programmes and functional integrated projects to combat desertification/ Land Degradation	Inventory, adaptation and integration of projects under way within the NAP process. Measures: -For natural resources conservation -To enhance knowledge on land degradation	Same as above	UNDP/GEF Small Grants Programme has already indicated a strong interest in working closely within the future NAP framework and with the new SLM project. Contacts have been initiated to establish a framework of collaboration with the new EU project for Rodrigues. It will be the responsibility of the NFP to ensure that such an integrated approach be

	<p>and SLM</p> <p>-For monitoring and evaluating the effects of land degradation and drought</p> <p>-To improve the economic environment</p>		<p>mainstreamed with other future initiatives.</p> <p>Several agencies are developing GIS-based land information systems (LIS). The new UNDP/GEF project will develop standards and protocols for sharing information and will build new capacities, especially in the Forestry Service.</p> <p>The UNDP/GEF project will develop systems for monitoring:</p> <ul style="list-style-type: none"> • Soil loss and forage quality of pasture/range lands • Soil loss and soil fertility maintenance • Deforestation <p>The UNDP/GEF project will put considerable emphasis on analyzing the economic and financial viability/profitability of existing land use systems and on identifying SLM alternatives that are economically and financially viable.</p>
Action programmes implemented in	Identification of new actions and planned	The Forestry Service initiated a new experiment two years ago to	The principal concern is the cost of this approach being used and its replicability. Other

<p>compliance with priority fields set out in the Convention</p>	<p>measures -Specific actions to strengthen the national capacity to combat land degradation, in particular at the local level</p>	<p>attempt fire control and reforestation of badly degraded mountain slopes in the subhumid zone of Mauritius. It is based on the use of firebreaks and the plantation of indigenous species to reforest slopes on Signal Mountain above Port Louis.</p>	<p>potential options identified during the UNDP/GEF project identification include: a)very early partial controlled burns at the beginning of the dry season (to prevent destructive, full-dry season fires) and, b) the intentional overgrazing by grazers (as opposed to browsers) to greatly reduce fire risks and to favour the already abundant natural regeneration of woody species. The entire UNDP/GEF SLM project is geared at capacity building. See the logframe in Annex C.</p>
<p>Effectiveness of measures in local capacity building</p>	<p>Degree of responsibility in NRM at the local level.</p> <ul style="list-style-type: none"> • Degree of decentralization • Involvement of actors in the monitoring and evaluation 	<p>Capacity building for SLM that is undertaken specifically under the UNCCD has not yet begun. However, key findings from the preparation of the UNDP/GEF SLM Project that relate to the parameters specified are the following: A major cause of</p>	<p>Local management of coral reef and lagoon fisheries has very recently been introduced in Rodrigues through a GEF Small Grant. Preliminary results are very promising. The opportunity for adapting such an approach for the management of range/pastures on Rodrigues should be investigated closely.</p>

	<p>process</p>	<p>land degradation identified in Rodrigues is the open access grazing in the absence of responsibility for range/pasture management. All pasture land belongs to the State but access is open to all, there is no lease system and no pasture/range management system.</p> <p>* A major step towards decentralization was taken two years ago with the granting of autonomy to Rodrigues and the creation of the Rodrigues Regional Assembly (RRA). RRA is now responsible for natural resource management on the island.</p> <p>* Monitoring systems are yet to be developed. The role of local</p>	
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		actors/stakeholders in these monitoring systems is yet to be defined.	
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7. Financial Allocations from National Budgets

Indicator	Evaluation Parameters	Evaluation	Remarks
Adopted financial mechanisms	Measures to facilitate access of local actors to existing sources of funding	Government does provide funds both in the capital and recurrent budgets. Funds are provided at the level of various public actors	The UNDP/GEF project will provide training/capacity building for the development of projects in project proposal writing for NGOs and user groups. Under this framework, two sources of funding specifically targeted are the EU Decentralized Participation Project for Rodrigues and the GEF Small Grants Program.
	Working out new, adapted method to mobilize internal and external resources	GEF funding has been mobilized for two projects including co financing on the part of the government.	
	Analyze flows of investment in sustainable land management	No such measures yet undertaken	The UNDP/GEF project will assist Government to develop an SLM investment plan.
NAP financing	Indicate mobilization of national resources	The Government will finance the preparation of the NAP.	Funds will be sought from the Global Mechanism (including GEF and other sources) for the

	Contribution of the Global Mechanism Amount of financial resources available		implementation of the NAP.
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8. Review of Benchmarks and Indicators Utilized to Measure Progress

Indicator	Evaluation Parameters	Evaluation	Remarks
Operational mechanisms for monitoring and evaluation	<ul style="list-style-type: none"> • Establishment and/or strengthening of national environmental monitoring and observation capacities. • Information systems of land degradation/ SLM at the national level • Main actors' access to available information • Mechanisms for consultation concerning an analysis of results • Regular production of results • Feedback on evaluation for programme 	None of these have yet become operational	All of these will begin in 2005 with work on the NAP and with the launching of the UNDP/GEF SLM capacity building project.

	management		
Scientific and technical <i>land degradation</i> control activities	<ul style="list-style-type: none"> Listing, adapting integrating scientific and technical activities into the NAP 	Work on the NAP has only now been initiated.	As documented above, the new UNDP/GEF project will integrate scientific and technical tools and institutions into SLM capacity building activities.
Implementation of the recommendations of the Committee on Science and Technology	<ul style="list-style-type: none"> Not listed 	Not yet begun	

Annex A: UNCCD Country Profile – Republic of Mauritius

This UNCCD country profile has been provided by: Forestry Department of Mauritius

Name of Focal point institution/ ministry/office: Forestry Department/ Ministry of Agriculture, Food Technology and Natural Resources

Date: 8.11.04

Mailing address: Forestry Service Head Quarters
Botanical Gardens Street
Curepipe
Mauritius

Telephone: (230) 675-4966

Telefax: (230) 674-3449

E-mail: moa-forestry@gov.mail.mu

Biophysical indicators relating to desertification and drought

1. Climate

1.1 Index of aridity	2.4 - 3.5*
1.2 Normal rainfall	2100mm annually
1.3 Rainfall standard deviation	350mm

***Please refer to annexure*

8.1. Sub-national areas	mm

Source: Digest of Agricultural Statistics 2003, June 2004; Central Statistical Office; Ministry of Finance and Economic Development, Republic of Mauritius

3. Water resources

3.1 Fresh water availability (million m3)	184Mm3
3.2 Fresh water resources per capita (m3)	155m3
3.3 Agricultural water use (million m3)	1.1Mm3
3.4 Industrial water use (million m3)	5.0Mm3

Source: Digest of Agricultural Statistics 2003, June 2004; Central Statistical Office; Ministry of Finance and Economic Development, Republic of Mauritius

4. Energy

Consumption

4.1. Energy use per capita (kg oil equivalent)	0.66toe
4.2 Agricultural energy use per hectare (millions of BTU)	256.4toe

Production

4.3. Energy from renewable excluding combustibles renewable and waste (% of total supply)	2.1%
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Renewables – Consumption by sector

4.4 Industry (% of total renewable consumption)	Nil
4.5 Residential (% of total renewable consumption)	18832000toe
Agriculture (% of total renewable consumption)	Nil

Source: Economic and social indicators, Oct 2002; Housing and population Census; Issue 393; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

5. Types of land degradation

Type of Degradation	1990-1999		2000-2003	
	Million ha	Percent of total area	Million ha	Percent of total ha
Over-grazing				
Unsustainable agriculture				
Deforestation				
Sub-humid mountain slopes degraded by fire				

6. Rehabilitation

Lands under rehabilitation	1990-1999	2000-2003
Rehabilitation of degraded cropland (sq. km)	Not available	Not available
Rehabilitation of degraded rangeland (sq. km)	Not available	0.2
Rehabilitation of degraded forestland (sq. km)	Not available	0.7

Source: Digest of Agricultural Statistics 2003, June 2004; Central Statistical Office; Ministry of Finance and Economic Development, Republic of Mauritius

Socio-economic indicators related to desertification and drought

7. People and economy

7.1 Population (Total)	1180178
Population: Urban (percent of total)	42.6%
Population: Rural (percent of total)	54.4%

(Remaining 3% are Mauritian staying abroad)

7.2 Population growth (annual %)	0.9%
7.3 Life expectancy (years)	71.75
7.4 Infant mortality rate (per 1000 live birth)	14.6
7.5 GDP (Current US\$)	4422.42M*
7.6 GNI per capita (Current US\$)	5043.39M*
7.7 National poverty rate (% of population)	10.6
7.8 Crop production (metric tons)	5310236*
7.9 Livestock production (metric tons)	33609*

Source:

Economic and social indicators, Oct 2002; Housing and population Census; Issue 393; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

Economic and social indicators, March 2003; Labour force, employment and unemployment; Issue 402; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

Economic and social indicators, March 2003; Population and vital statistics; Issue 405; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

Economic and social indicators, Aug 2004; Education Statistics; Issue 464; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

8. Human development

8.1 Primary education completion rate (% age group)	63%
8.2 Number of women in rural development (Total development)	13800*
8.3 Unemployment (% of total)	10.2%
8.4 Youth unemployment rate (age 15-24)	54.3
8.5 Illiteracy rate (% age 12 and above)	14.95
8.6 Illiteracy male (% age 12 and above)	Not available
8.7 Illiteracy female (% age 12 and above)	Not available

Source: Economic and social indicators, Aug 2004; Education Statistics; Issue 464; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius

9. Science and technology

9.1 Number of scientific institutions engaged in desertification-related work (total number) 4*

*

1.1PET = 1100-1600 & P= 3900 Mm³

2.2 Agriculture (46.4) + Forest (30.6)

2.3 Agriculture + Roads + Built- up areas

7.5 & 7.6 Calculated at current market prices

7.8 Includes industrial crops (sugar cane, tobacco & tea)

Effective area under cultivation

<i>Crops</i>	1999	2000	2001	2002	2003
Sugar cane	78,98 1	76,96 2	76,47 8	75,50 1	74,11 7
Tea	671	670	660	680	681
Tobacco	403	397	383	340	379

7.9 Includes fish from coastal areas

8.2 Number of women working in the agricultural sector (agriculture, hunting, forestry & fishing sector)

9.1 Consists of Min. of Agriculture, Mauritius Sugar Industry Research Institute, Agricultural Research & Extension Unit and University of Mauritius

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The document attached provides the available data on annual rainfall in the different regions as well as the different recorded rainfall at the different stations.

Land under irrigation, 2000-2003

Region	Overhead	Surface	Drip	Total
North	5173	756	1012	6941
East	3015	-	174	3189
Center	732	85	-	817
West	4030	1151	166	5347
South	4756	40	529	5325
<i>Total 2003</i>	17706	2032	1881	21619
Total 2002	17028	2372	1822	21222
Total 2001	17119	2723	1789	21631
Total 2000	15951	2020	1535	19506

10. Data sources

1. Digest of Agricultural Statistics 2003, June 2004; Central Statistical Office; Ministry of Finance and Economic Development, Republic of Mauritius
2. Economic and social indicators, Oct 2002; Housing and population Census; Issue 393; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius
3. Economic and social indicators, March 2003; Labour force, employment and unemployment; Issue 402; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius
4. Economic and social indicators, March 2003; Population and vital statistics; Issue 405; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius
5. Economic and social indicators, Aug 2004; Education Statistics; Issue 464; Central Statistical Office, Ministry of Economic Development, Financial Services and Corporate affairs, Republic of Mauritius
6. Human Development Reports 2003; http://hdr.undp.org/statistics/data/cty-f_MUS.html; UNDP
7. Hydrology Data Book 1992-1995, Dec 1997; Water Resources Unit; Ministry of Public Utilities, Republic of Mauritius

Annex B: MAURITIUS LAND DEGRADATION ROOT CAUSE MATRIX

Items in italics in the column “Potential Corrective/Mitigating Measures” are those that have been integrated into the project logframe. Items in italics in the column “Potential Corrective/Mitigating Measures” are those that have been integrated into the project logframe. Items in italics in the column “Potential Corrective/Mitigating Measures” are those that have been integrated into the project logframe. Items in italics in the column “Potential Corrective/Mitigating Measures” are those that have been integrated into the project logframe.

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
<p>1. Overgrazed, eroded range/pasture lands of decreased productivity and forage quality</p>	<ul style="list-style-type: none"> Soil erosion – mostly in the form of sheet – removing the most fertile top soil Decrease in pasture quality and productivity through loss/decrease of 	<ul style="list-style-type: none"> Open access grazing with little or no control on the number of cattle, sheep and goats grazed on common pastures (This problem used to be compounded by absentee ownership of livestock) ; Land tenure: land is owned by the state and livestock are owned by a multitude of individual livestock herders ; Government agents have little or no incentive to develop and implement sustainable pasture management systems ; There is no established mechanism, such as a lease system, for controlling herder/livestock access to range/pasture lands. Scant human resources with training in extensive pasture/range management and with the capacity to conceive, test and adaptively modify pasture management systems 	<ul style="list-style-type: none"> <i>Development of functional, equitable lease system that provides incentives for SLM and disincentives for overgrazing ;</i> <i>Development of capacities for monitoring and enforcing compliance with terms of the lease</i> <i>Development of a leasing system for State-owned pasture lands</i> Development of framework of good governance and civil society oversight of lease system Privatization of pasture lands
			<ul style="list-style-type: none"> <i>Human resource capacity development for participatory pasture/range management</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
	<ul style="list-style-type: none"> • preferred forage spp. • Soil compaction by livestock • Increased runoff rate increasing severity of flooding • Decrease in infiltration resulting in reduced spring and dry season stream flow • Sedimentation of dams and 	<ul style="list-style-type: none"> • Tradition of top-down approaches to pasture management that do not involve herders as key actors and decision makers ; • Insufficient training in participatory approaches that can capitalize on indigenous technical knowledge of local herders and that can involve them as the key principal actors in testing pasture management systems ; • No proven models for sustainable, productive pasture/range management ; 	<ul style="list-style-type: none"> • <i>Capacity development for participatory approaches for SLM/pasture management ;</i> • <i>Inventories of traditional knowledge on pasture management</i> • Direct involvement of herders as key actors and decision makers in the conception and testing of sustainable pasture management models ; • Adaptive management approach that uses results of M&E system • <i>A knowledge management approach that synthesizes lessons learned, develops and tests hypotheses and adaptively modifies management</i>
		<ul style="list-style-type: none"> • No solid information on the economic and financial costs and benefits of proper pasture management systems – especially the financial costs and benefits to the herders ; • Poorly developed understanding and support for extensive pasture management from authorities/decision makers ; 	<ul style="list-style-type: none"> • <i>Develop capacities for economic and financial valuation of pasture use/management options ;</i> • <i>Awareness raising for authorities and decision makers</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
2. Deforestation	<ul style="list-style-type: none"> lagoons (less severe than believed) Loss of habitat/biodiversity Loss of vegetative cover resulting in soil erosion Sedimentation of lagoons and coral reefs, sedimentation of Port 	<ul style="list-style-type: none"> Forest plantations on Rodrigues are protected from grazing by metal fences that are rapidly rusting away with little possibility of replacement. If not replaced, they may become open access and suffer once again from overgrazing. Clearing for pasture (and firing lanes?) on deer ranches (Mauritius only) <ul style="list-style-type: none"> On State land leased for deer ranching <ul style="list-style-type: none"> No system for monitoring forest clearing for pastures No accurate maps of lease lands Few incentives for enforcement On privately owned forest land <ul style="list-style-type: none"> Clearing for deer pastures or other uses is unregulated or weakly regulated 	<ul style="list-style-type: none"> Development of grazing systems that do not require fencing ; Development of multiple use SLM systems that generate adequate benefits to cover the cost of maintenance or replacement of fencing
			<ul style="list-style-type: none"> <i>Awareness raising on forest loss</i> <i>Develop remote-sensing based system for monitoring forest clearing for pastures on state-land and for forest conversion on private land</i> <i>Diffusion of monitoring results to general public and decision makers</i> <i>Develop Forest Service capacity for enforcement of regulations on pasture clearing on lease land</i> Develop forest management systems that combine pasture clearing with reforestation systems Develop regulations governing forest clearing on private land

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
	<p>Mathurin et Port Louis</p>	<ul style="list-style-type: none"> • Clearing/conversion on privately owned land • Clearing of forest land and conversion to other land uses, especially agriculture, in largely unregulated in Mauritius • The extent and nature of this problem is not known because Forestry Department has no accurate forest cover maps, nor forest information system or monitoring capacity for privately owned forest lands • Lack of awareness of general public/decision makers • Clearing/conversion on State forest lands • Encroachment by adjoining private land owners • No monitoring system • Boundary markers lost/not visible – boundaries not marked 	<ul style="list-style-type: none"> • <i>Assessment of the nature and extent of the problem (using remote sensing/GIS)</i> • <i>Assessment of the sustainability and environmental impacts of the alternative land uses</i> • <i>Awareness raising</i> • <i>Participatory Development of appropriate regulations where needed</i> • <i>Use of remote sensing to identify sites of obvious or potential encroachment</i> • <i>Field checks by forest officers</i> • <i>Enforcement</i>
	<ul style="list-style-type: none"> • Clearing for settlements • Clearing for housing • Clearing by squatters 		<ul style="list-style-type: none"> • <i>Development of land information system</i> • <i>Land use planning and zoning</i> • <i>Enforcement of zoning provision and land use restriction</i> • <i>Increased transparency in the land allocation/ permitting systems</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
		<ul style="list-style-type: none"> • Cross-cutting root causes: <ul style="list-style-type: none"> • Forest Dept does not have accurate, up-to-date maps of forest cover by cover type, ownership, condition, etc • There is no computerized Forest Information System (FIS) combining forest type, land ownership, forest condition, etc. • Lack of political will • Insufficient trained manpower • Economic/financial incentives for forest protection/sustainable use are not developed • Sustainable forest management systems are not developed • Capacity for enforcement is weak 	<ul style="list-style-type: none"> • <i>Participatory definition of FIS needs</i> • <i>Develop capacity for accurate forest cover mapping using remote sensing and ground truthing</i> • <i>Develop GIS-based FIS capacity with data on forest type, land ownership, forest condition, etc.</i> • <i>Use these tools to analyze causes of forest loss on private and to develop appropriate measures</i> • <i>Awareness raising for decision makers, general public</i> • <i>Develop tools and capacity for economic and financial analysis of costs and benefits of forest use/management options and identification of economic/financial incentives for sustainable management of forests</i>
3. Eroded, unproductive and/or	<ul style="list-style-type: none"> • Erosion causes loss of fertility, 	<p>Unsustainable vegetable gardening and mixed cropping</p> <ul style="list-style-type: none"> • Land tenure – nearly all cropland on Rodrigues is State-owned and the land lease system is 	<ul style="list-style-type: none"> • <i>Development of an equitable, functional leasing system for agricultural land.</i> • <i>Development of incentives (such</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
abandoned agricultural lands	<p>decrease of soil depth, decrease in soil organic matter and water holding capacity, and leads to deposition of sediments in lagoons, reservoirs, check dams ;</p> <ul style="list-style-type: none"> • Depletion of soil phosphate and other 	<p>largely dysfunctional. Insecurity of tenure is a major disincentive to investments in sustainable agriculture.</p> <ul style="list-style-type: none"> • Tradition of top-down approaches towards soil conservation measures ; • Poor development of participatory approaches to agricultural extension ; • Practice of agriculture on sloping land without adequate soil and water conservation measures contour (bands of vetiver, terraces, mulching, etc) ; • Inadequate use of soil amendments leads to depletion of nutrients. This is especially true on non-commercial cropland on Rodrigues. • Phosphate depletion has been shown to be an acute problem at La Ferme in Rodrigues ; • Financially marginal agriculture, especially on Rodrigues, does not generate enough profit and incentives for investments in sustainability. • Cultivation right up to river banks • Improper use of chemical fertilizers 	<p><i>as Agricultural Development Certificates) for leasees to adopt sustainable, soil conserving practices and disincentives for destructive practices ;</i></p> <ul style="list-style-type: none"> • Analysis of pros and cons of privatization of agricultural land on Rodrigues • <i>Identification and synthesis of best practices for sustainable agriculture and their integration into agricultural development strategies and extension programs ;</i> • <i>Development of strategies to improve the profitability of agriculture thereby making investments in sustainable agriculture more feasible ;</i> • Studies on soil nutrient depletion and development of capacities for soil testing to identify needs for soil amendments. • Development of systems whereby

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
	<p>nutrients leads to loss of fertility and productivity and limits the choice of crops that can be grown</p> <ul style="list-style-type: none"> Diminished levels of soil organic matter and loss of water-holding capacity and degraded soil 	<p>Sugar cane plantations</p> <ul style="list-style-type: none"> Some small planters and estate planters still burn residues and plow to replant, leaving soil exposed to heavy rains Many planters use bulldozing to rake out topsoil and pile soil and residues Mechanization and heavy equipment causes soil compaction. The severity of this phenomenon is contested ; Sharecroppers (metayeurs) have little incentive to invest in soil conservation/sustainable agricultural practices Ecological sustainability is dependent on the financial sustainability – this is largely dependent on the sugar subsidy from the EU ; The pending reductions or loss of the sugar subsidy may lead to major changes in land use, 	<p>downstream beneficiaries of erosion control and increased infiltration contribute to the costs of investments in sustainable practices.</p> <ul style="list-style-type: none"> <i>Remote sensing based monitoring and enforcement of regulations requiring vegetation strips left on each side of steam courses</i> <p>Sugar cane plantations</p> <ul style="list-style-type: none"> <i>Synthesis of best practices for sustainable sugar cane cultivation and their integration into extension packages</i> Fiscal incentives for adoption of best practices Analysis of impacts of mechanization and development of strategies to minimize negative impacts ; <i>Identification of alternative land uses and analysis of the ecological, economic/financial and social sustainability of each in</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
	<p>structure</p> <ul style="list-style-type: none"> • Soil compaction reduces infiltration and inhibits root growth • UNDP study showed severe eutrophication of lagoons in onion-growing watershed 	<p>some of which may be much less sustainable than the present systems of sugar cane cultivation.</p> <ul style="list-style-type: none"> • Cultivation right up to river banks • Improper use of chemical fertilizers 	<p><i>order to identify the SLM practices to be encouraged through policy, regulations and incentives.</i></p>
4. Severe degradation from fire on	<ul style="list-style-type: none"> • Repeated fires have converted natural forest to 	<ul style="list-style-type: none"> • Use of fire is considered to be the principle cause of the past degradation of these sites from forest to grassland or savanna grasslands and fire is the principal impediment at present preventing the reforestation of these areas. If closed canopy 	<ul style="list-style-type: none"> • <i>Identification and testing of innovative options for minimizing frequency and intensity of wildfires – such as grazing by deer or sheep to reduce grass cover</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
steep slopes in mountain rain shadow	<p>grasslands with scattered shrubs</p> <ul style="list-style-type: none"> • Repeated fires prevent the establishment of evergreen woody cover that is resistant to forest fires. • Soil erosion • Diminished groundwater recharge • Excessive/ 	<p>forests could be reestablished, they should be much less susceptible to fire.</p> <ul style="list-style-type: none"> • Slopes were once commonly burned by herders to obtain succulent regrowth from perennial grasses for goats/livestock during the dry season (The importance of this factor has diminished as goat herding has diminished) ; • Other reasons for burning – including criminal burning ; • Limited budget/resources of the land management authority (Forest Department) ; • No economically viable, proven models/techniques/models for restoring these sites to full, evergreen forest cover and for sustainable management of the restored forest. • Municipality contributes nothing towards restoration and sustainable land management. • Squatters established illegally at the base of these mountains • Use of fire as a tool for clearing the land. • Land tenure – Land is owned by the State. Local populations have little incentive to protect 	<p><i>and fire danger or use of very early, light, patchy, partial controlled burns to minimize dry season wildfires.</i></p> <ul style="list-style-type: none"> • <i>Development of multi-disciplinary, participatory, intersectoral approaches including civil society groups;</i> • <i>Development of adaptive management approaches for monitoring fire risk management and reforestation options tested and for modifying techniques accordingly ;</i> • <i>Economic/financial analyses to identify the most cost effective fire control and reforestation systems</i> • <i>Program of awareness raising, fire prevention and control</i> • <i>Enforcement to prevent settlement by squatters ;</i>

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
	<p>rapid runoff rates. Danger of flooding Landslides</p> <ul style="list-style-type: none"> • 		
<p>5. Loss of wetlands (Lack of monitoring system does not allow quantification)</p>	<ul style="list-style-type: none"> • Loss of hydrological functions • Loss of biodiversity 	<ul style="list-style-type: none"> • Strong pressures for development of these economically high value sites ; • Condition/loss of wetlands is not being monitored systematically ; • 2002 Environment Protection Act required EIA for any development of wetlands but lack of monitoring system makes it impossible to analyze how well this law is being respected ; • Many wetlands are on private lands making ground monitoring difficult ; • Institutional responsibilities and regulations for wetlands conservation are fragmented and unclear. 	<ul style="list-style-type: none"> • Awareness raising on importance of wetlands ; • Development of a wetlands conservation strategy for definition of clear institutional responsibilities, mobilization of adequate resources for definition of site-specific priorities; • <i>Integration of wetlands into land information system</i> • <i>Development of wetlands monitoring system using satellite imagery and ground visits and linked with clear enforcement capabilities.</i>
<p>6. Erosion in developed</p>	<ul style="list-style-type: none"> • Deposition of sediments 	<ul style="list-style-type: none"> • Drains in settled areas are often not maintained (blockages) or inadequately designed leading to erosion and property damages during 	<ul style="list-style-type: none"> • Adequate investments in proper design, upgrading and maintenance of drainage systems ;

Type of Land Degradation	Bio-Physical Impacts	Root Causes	Potential Corrective/ Mitigating Measures
ed areas	in streams, lagoons and on reefs	<p>cyclones/heavy rains ;</p> <ul style="list-style-type: none"> Careless construction techniques leave bare soil exposed to heavy rains. <p>Construction on steep slopes without adequate engineering and soil protective measures</p>	<ul style="list-style-type: none"> Development and enforcement of appropriate regulations minimizing risk of erosion from construction sites.

Annex C: Logical Framework for Sustainable Land Management in Mauritius and Rodrigues

Outcomes	Key Performance Impact Indicators	Means of Verification	Critical Assumptions/Risks
<p>Long-Term Goal: The agricultural, pasture, forest and other terrestrial land uses of Mauritius and Rodrigues are sustainable, productive systems that maintain ecosystem productivity and ecological functions</p>			

<p>while contributing directly to the environmental, economic and social well-being of the country.</p>	<p>Project Objective: Capacities for sustainable land management are built in appropriate government and civil society institutions/user groups.</p>		<ul style="list-style-type: none"> • NAP approved by Cabinet • Best practices and guidelines for SLM are broadly disseminated and used for development planning, zoning and agricultural extension. 		<p>Cabinet decisions are published on the Internet Published best practices and guidelines Survey of users</p>		<p>Continued political support for integrating SLM into national development planning</p>
<p>Outcome 1: SLM is mainstreamed into national policies, plans and legislation.</p>	<ul style="list-style-type: none"> • The National Forest Policy and National Forest Action Plans contain specific sections on land degradation and sustainable land management. <i>Baseline:</i> NFP & NFAP not yet started. <i>MT:</i> Work on integration of SLM into NFP in progress • Central government develops and applies guidelines for 	<p>Copies of the NFP and the NFAP Published guidelines</p>	<p>Funding is mobilized for the NFP and NFAP Continued political support</p>				

	<p>integrating SLM into development permits issued by municipalities <i>Baseline:</i> Guidelines don't exist <i>MT:</i> Guidelines under development</p>		
<p>Outcome 2: Human resource capacities needed for SLM are developed.</p>	<ul style="list-style-type: none"> The staff of NRSC, FSM, FSR, MoHL, AREU, UoM and MSIRI have the capacity to integrate new satellite imagery obtained by NRSC into their LISs and to use it for monitoring and or analyses related to SLM. <i>Baseline:</i> Only NRSC has the capacity to integrate imagery into their LIS. No one has the capacity to use for SLM analyses. <i>MT:</i> 15 technicians trained in integration of imagery into LIS. 5 of them have conducted SLM-related analyses using the LIS of their home institution. 	<p>MTR, TAG, PMU</p>	<p>NRSC makes imagery available to all institutions with LIS capability Local and national planning bodies are committed to the integration of SLM considerations into development planning</p>
<p>Outcome 3: Capacities</p>	<ul style="list-style-type: none"> The boundaries of all State- 	<ul style="list-style-type: none"> MTR, 	<p>The various institutions will</p>

<p>for knowledge management for SLM are developed</p>	<p>owned lands have been digitized and are integrated into land information systems of the Forest Service, MoHL, UoM, NRSC and any others that wish to integrate this information.</p> <p><i>Baseline:</i> MoHL has digitized all survey boundaries of nearly all lands (private and public) on a 20km² pilot coastal area in Mauritius.</p> <p><i>MT:</i> Digitization of state lands surveys underway for Mauritius</p> <ul style="list-style-type: none"> • A clearly defined, transparent mechanism will be in place for other government and civil society institutions to gain access to information from the SLM-related land information systems. <p><i>Baseline:</i> No such mechanism exists.</p> <p><i>MT:</i> Draft protocol has been prepared.</p>	<p>PMU project reports, TAG</p> <ul style="list-style-type: none"> • MTR, PMU project reports, SC, TAG • MTR, PMU project reports, TAG 	<p>be willing to collaborate on integrated approaches to sustainable land management and to sharing access to land information systems developed; Government authorities will remain committed to reviewing and strengthening the various lease systems for State-owned land; Government and the key institutions involved will commit the resources needed to maintaining beyond the life of the project, the SLM monitoring and evaluation systems to be developed with project assistance. Government commits the resources necessary for digitizing the land survey/ownership records needed to make the land information systems the most useful for SLM monitoring and planning.</p>
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<p>Outcome 4: The National Action Program for the UNCCD is completed</p>	<ul style="list-style-type: none"> • SLM M&E systems are operational for agricultural, pasture, forest lands and wetlands and operational costs are covered by non-project sources <i>Baseline:</i> No M&E systems exist for these sectors. <i>MT:</i> M&E systems for agriculture and pasture lands are under development and testing. They are functional for monitoring of forest encroachment, river reserves, mountain reserves, clearing for deer pastures, encroachment of wetlands and for expansion of settlements. Negotiations underway for covering recurrent costs. • NAP approved by Cabinet of Ministers 	<ul style="list-style-type: none"> • Cabinet decisions are published on the Internet 	<p>Funds are mobilized</p>
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Outcomes and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
Outcome 1 : Mainstreaming				
Outputs 1.1. Integration of SLM into the new National Forestry Policy and Forest Action Plan	<ul style="list-style-type: none"> Specific sections in the National Forest Policy and Forest Action Plan integrate SLM lessons learned and best practices. <i>Baseline:</i> NFP not yet started 	1.1.1. Integrate SLM concerns into the new National Forestry Policy	FS-M	Specific sections on SLM in NFP in Yr 1
		1.1.2. Integrate SLM concerns into the new Forest Action Plan	FS-M	Specific sections on SLM in NFAP in Yr 1
1.2. Development of policy, regulatory and economic incentive frameworks regarding sustainable	<ul style="list-style-type: none"> New policies, legislation and regulations adopted including incentives for SLM and penalties for destructive practices <i>Baseline:</i> SLM Task 	1.2.1. Prepare draft policies and legislation for integrated SLM as appropriate	State Law Office/Ag M/ AgR/ FS-M/UoM	Draft policies and legislation prepared
		1.2.2. Conduct workshops for stakeholder inputs and validation	Forestry Service/ UoM	Stakeholder workshops in Yr 2

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
practices on non-forest land	Force set under the Sugar Sector Strategic Plan 2001 to deal with SLM issues Guidelines prepared by AREU for SLM for Vegetable Growers	1.2.3. Guide the new policies and legislation through the approval process	State Law Office/AgM /AgR/FS	One workshop of 25 participants for 1 day held in Yr 2
1.3. An SLM Investment	<ul style="list-style-type: none"> The UNCCD National 	1.3.1. Identify priority SLM investment needs and opportunities	PMU/Local contract	2-man team local consultants

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
Plan is developed	<p>Coordinating Body (NCB), UNCCD Focal Point and the Ministry of Finance use the SLM Investment Plan to mobilize, coordinate and direct investments needed for sustainable land management in Mauritius.</p> <p><i>Baseline:</i> There is little recognition of the need for investments in SLM, no NCB and no SLM Investment Plan.</p>	1.3.2. Develop a costed SLM Investment Plan including brief concept papers for priority investments	PMU/Local contract	2-man team local consultants

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
Outcome 2 : Training and Human Resource Capacity Building for SLM				
<p>Outputs</p> <p>2.1. Enhanced capacities for use of integrated land information systems/GIS/remote sensing for SLM</p>	<ul style="list-style-type: none"> 25 technicians are trained and know how to integrate GIS and satellite image data into an LIS for SLM applications <p><i>Baseline:</i> Some people have training on LIS/GIS at the UoM, NRSC, MoHL, MSIRI and FSR/Regional Assembly Rodrigues. Very little use of remote sensing imagery.</p>	<p>2.1.1. Conduct training on the use of LIS/GIS to SLM</p> <p>2.1.2. Conduct training on remote sensing applications to SLM</p>	<p>FoA of UoM /NRSC</p> <p>FoA of UoM /NRSC</p>	<p>1 x 2 wk. training course for 25 participants at the UoM (certificates awarded) in Yr 1</p>
<p>2.2. Enhanced capacities for sustainable pasture management</p>	<ul style="list-style-type: none"> 15 individuals understand the fundamentals of how to manage pastures to minimize soil 	<p>2.2.1. Conduct training on participatory management of open pasture systems (rangelands) – Rodrigues</p>	<p>International consultant</p>	<p>One training course for 25 participants for 1 wk held in Yr 1 – Rodrigues</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
and sustainable agriculture	<p>erosion, to favor the growth of preferred forage spp., and the fundamentals of participatory approaches to NRM.</p> <ul style="list-style-type: none"> 15 ag extension agents and 5 other individuals understand best practices for minimizing erosion on cultivated fields and for maintaining soil fertility and productivity. 20 farmers, herders, NGO/CBO staff trained in the basics of project proposal preparation 	<p>2.2.2. Conduct training on sustainable agricultural practices</p> <p>2.2.2.1. Develop and apply training modules for Mauritius</p> <p>2.2.2.2. Develop and apply training modules for Rodrigues</p> <p>2.2.3.1. Provide training/assistance in Mauritius to resource users in the preparation of project proposals for integrated SLM</p> <p>2.2.3.2. Provide training/assistance in Rodrigues to resource users in the preparation of project proposals for integrated SLM (EU decentralized participation Project, GEF Small Grants...)</p>	<p>FoA of UoM</p> <p>FoA of UOM/ AgR</p> <p>Contracted</p> <p>Contracted</p>	<p>Two 1 wk training course for total 25 participants for held in Yr 1</p> <p>One 2-day training course held for Rodrigues and one for Mauritius (Yr 2) for 25 participants</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>2.3. Development of capacities for the use of LIS/LIMS and SLM guidelines for integrating SLM into planning/ zoning and permit approval at central and local authorities level</p>	<ul style="list-style-type: none"> All municipalities have at least one staff member trained to make use of SLM guidelines and LIS databases for planning, zoning and processing of permit applications. <p><i>Baseline:</i> No municipalities have staff trained in use of SLM guidelines</p>	<p>2.3.1. Develop training modules as needed</p> <p>2.3.2. Conduct training in Mauritius</p> <p>2.3.3. Conduct training in Rodrigues</p>	<p>Contracted</p> <p>Contracted</p> <p>Contracted</p>	<p>Separate modules developed for Mauritius and Rodrigues</p> <p>2 x 2 day training workshop by local consultant for 25 participants</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>2.4. Development of expertise in environmental/natural resource economics</p>	<ul style="list-style-type: none"> Five Env/NR economists have the capacity to conduct/oversee economic and financial cost-benefit and profitability analyses of land use systems. 10 staff of key institutions have capacity to conduct basic cost-benefit analyses under supervision of the first five <p><i>Baseline:</i> Mauritius has eight professionals (FoA, UoM, MEPD and AREU) with training in environmental/ NR economics but none are trained to analyze land use systems</p>	<p>2.4.1. Conduct hands-on training of trainers and module development</p> <p>2.4.2. Conduct basic NR economics training of staff in FSM, FSR, AgM, AgR, RRA, MoHL</p>	<p>International academic expert</p> <p>Contracts with people trained in activity 2.4.1.</p>	<p>One international expert x 2 wks hand-on training for 10 participants and module development using case studies from KM</p> <p>1 wk training course for 15 participants</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>2.5. Enhanced capacities for restoration and management of fire-degraded subhumid mountain ecosystems</p>	<ul style="list-style-type: none"> Forestry Service in Mauritius uses their training and equipment to conduct early, light controlled burns as part of a set of monitored restoration trials on degraded mountain slopes. <p><i>Baseline:</i> Forest agents have no training and no equipment and do not use controlled burns as land management tools.</p>	<p>2.5.1. Develop cost-effective strategies for restoration/ reforestation of grass-dominated, fire-degraded mountain slopes</p> <p>2.5.2. Provide training in restoration tools including a) early controlled burning and grazing for fire risk reduction, and b) wildfire prevention and wildfire suppression.</p> <p>2.5.3. Procure basic equipment for controlled burning and fire suppression</p>	<p>International fire ecology expert</p> <p>International fire management and control expert (preferably the same as 2.5.1)</p> <p>Equipment recommended by IC</p>	<p>1.5 week mission Yr 1</p> <p>1.5 week mission Yr 1</p> <p>Procurement Yr 2</p>
<p>Outcome 3 : Knowledge management for SLM</p>				

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>3.1. Outputs</p> <p>Participant assessments of the sustainability of land use systems</p>	<ul style="list-style-type: none"> The causes and the severity of soil loss and fertility loss have been identified for each of the major types of agriculture on the two islands and best practices/lessons learned for each ag system have been summarized The causes and the severity of soil loss and of productivity loss (especially loss of preferred forage spp) have been identified on grazing lands and the lessons learned/best practices have been identified. The ability of all forest plantation 	<p>3.1.1. Conduct assessments of ecological sustainability of land use systems for agriculture, pasture use/management and forest use/management (identifying land degradation problems and their causes and identifying best practices – whether traditional or modern) strengths and weaknesses identified for each.</p> <p>3.1.2. Conduct analyses of the economic costs and benefits and the financial profitability of the main agriculture, pasture and forest management systems.</p>	<p>FoA of UoM/ Forestry Services through student research</p>	<p>3 reports in Year II</p>
			<p>FoSSH of UoM through student research /FS-thesis /FS-M&R</p>	<p>Analysis of the Economic costs and benefits for the three systems completed in the form of students thesis</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
	species to retain soil/ prevent erosion has been analyzed and ranked and	3.1.3. Develop synthesis of lessons learned, best practices, knowledge gaps and research needs;	FoA of UoM/ Forestry Services	One report in Year 2

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
		<p>3.1.4. Prepare status report on land degradation in Mauritius and Rodrigues</p>	<p>FoA of UoM</p>	<p>Two reports in Yr 2 (One for Mauritius & one for Rodrigues)</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>3.2. Sharing of Knowledge on SLM</p>	<ul style="list-style-type: none"> 90% of all farmers and herders on two islands receive booklets on ecologically sound and financially profitable SLM practices. Agricultural extension materials are modified to enhance SLM techniques All agricultural extension officers receive training in sustainable agricultural techniques All members of national and regional assemblies receive SLM policy briefs 	<p>3.2.1. Develop and implement an awareness raising program for farmers and herders (Mauritius)</p>	<p>Forestry Services/ FoA of UoM</p>	<p>One booklet on SLM practices for agriculture and pasture management to be published and distributed. One training course for 25 Mauritians</p>
		<p>3.2.2. Develop and implement an awareness raising program for farmers and herders (Rodrigues)</p>	<p>Forestry Services/ FoA of UoM/RR A</p>	<p>One booklet on SLM practices for agriculture and pasture management to be published and distributed. One training course for 25 Rodrigues</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>3.3. Development of Land Information Systems</p>	<ul style="list-style-type: none"> An intensively ground-truthed forest cover type map based on a classification scheme that takes into account FSM information needs and the capabilities of the imagery available is completed and integrated into the FLIS All State forest lands survey boundaries are digitized and entered into the FLIS and all available ownership information of private forest land ownership are integrated. 	<p>3.2.3. Develop policy briefs on SLM for decision makers</p> <p>3.3.1. Develop Forestry Land Information System Mauritius (ownership, forest cover type, forest condition...)</p> <p>3.3.1.1. Define the parameters of the system and procure hardware/ software</p> <p>3.3.1.2. Develop forest cover map for Mauritius</p> <p>3.3.1.3. Digitize the boundaries of State Forest Lands (co-financing Govt)</p> <p>3.3.1.4. Perform data entry and analysis of deforestation/land degradation on Forest Lands (Govt co-financing)</p>	<p>} } Contracted } FS-M and/or MoHL } } Contracted }</p>	<p>2 briefs Yr 2 and 2 in Yr 3</p> <p>FIMS developed in Year 1 & 2 Procurement Of hardware and software in Year 1 Forest cover type map prepared Yr 1&2 Digitization completed in Year 2 Data entry analysis completed in Yr 1&2</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
	<ul style="list-style-type: none"> A protocol for integrated standards, access conditions and data sharing is established and applied for the network of LIS providing essential information required for SLM. <i>Baseline:</i> LISs exist at MoHL, NRSC, MSIRI, SIFB, AREU and FSR. No LIS for FSM. No protocol for standards, access and sharing exists for the network 	<p>3.3.2. Develop Land Information System for Mauritius (Govt co-financing)</p> <p>3.3.3. Harmonization of LISs</p> <p>3.3.3.1. Identify overlaps and gaps amongst existing LISs (Develop linkages & partnerships between MoHL LIS, MSIRI LIS, NRSC MAURIS, LIS Rodrigues and FMIS, UOM/FOA's GIS)</p> <p>3.3.3.2. Develop an interagency protocol on LIS information access and sharing and data standards</p> <p>3.4.1. Develop a system for monitoring the sustainability of pasture lands use and management</p>	<p>MoHL</p> <p>} } } Forestry } Services/ } NRSC/ } UoM } } }</p>	<p>All State forest lands digitized by Yr 2</p>
<p>3.4. Development of monitoring and evaluation systems</p>	<ul style="list-style-type: none"> A system for monitoring the use of best practices that minimize soil loss 		<p>Forestry Services/ AgM/AgR /FoA of UoM</p>	<p>Framework of M & E in Year 2 for Mauritius & Rodrigues</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
	<p>and that maintain soil fertility is operational on both islands</p> <ul style="list-style-type: none"> • A system for 	<p>3.4.2. Develop a system for monitoring of agricultural sustainability</p>	<p>Forestry Services/ AgM/AgR /FoA of UoM</p>	<p>Framework of M & E in Year 2 for Mauritius & Rodrigues</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
		<p>3.4.3. Develop a system for monitoring forest and forest pasture lands</p> <p>3.4.3.1. Forest encroachment studies using satellite imagery</p> <p>3.4.3.2. Monitoring of clearing for deer pastures from satellite imagery</p> <p>3.4.3.3. Monitoring of clearing of river and mountain reserves and conversion of wetlands from satellite imagery</p> <p>3.4.4. Develop a system for monitoring the expansion of settlements and their encroachment on other land uses</p>	<p>} } } AgM/AgR / }NRSC/M oHL/ }FoA of UoM/ }FS-M&R }Overseas }Expert } } } } } } }</p>	<p>Monitoring system in Yr 1&2 Encroachment study Yr 1 Monitoring of deer pastures Yr 1 Monitoring of river and mountain reserves and wetlands Yr 1 Monitoring system expansion settlements Yr 2</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
<p>3.5. Enhanced SLM through improvements to the State lands leasing systems</p>	<ul style="list-style-type: none"> All new leases as well as renewal of leases include incentives for SLM and/or penalties for land degradation. <p><i>Baseline:</i> Lease systems for forest and “pas géométrique” lands on Mauritius are functional but do not integrate SLM clauses. Lease system for Rodrigues has fallen into abeyance.</p>	<p>3.5.1. Conduct a participatory review of strengths and weaknesses of lease systems in regards to SLM</p>	<p>AgM&R /FS-M&R/RR A/ MoHL</p>	<p>One 2 day workshop for 25 stakeholders/ participants, and submit report thereon</p>
<p>3.6. Planning for SLM alternatives to sugar cane cultivation</p>	<ul style="list-style-type: none"> Alternative land uses to sugar cane have been identified. The ecological sustainability and the 	<p>3.5.2. Facilitate a participatory process to develop improved, strengthened lease systems that provide incentives, regulations and monitoring/enforcement for SLM</p>	<p>AgM&R /FS-M&R/RR A/ MoHL</p>	<p>One 2 day workshop for 25 stakeholders/ participants, and submit report thereon</p>
<p>3.6. Planning for SLM alternatives to sugar cane cultivation</p>	<ul style="list-style-type: none"> Alternative land uses to sugar cane have been identified. The ecological sustainability and the 	<p>3.6.1 Identify land use alternatives to sugar cane and analyze the ecological sustainability and economic/financial viability of each</p>	<p>FoA of UOM /AgM/Ag R/ MSIRI</p>	<p>One report in Year 2</p>

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
	<p>profitability of each has been analyzed and ranked.</p> <p><i>Baseline:</i> A task force comprising various stakeholders already working on SLM aspect of Sugar Sector Strategic Plan.</p> <ul style="list-style-type: none"> Decision makers are informed of tradeoffs between land use alternative 	<p>3.6.2 Develop policy briefs and strategies for the promotion of sustainable land use alternatives to sugar cane.</p>	<p>AgM/AgR / FoA of UOM/ MSIRI</p>	<p>1 policy brief each Yr 1 & 2 Strategy completed Yr 3</p>
Outcome 4: Completion of National Action Program for UNCCD				

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
Outputs 4.1. Preparation of the NAP	<ul style="list-style-type: none"> Final draft of NAP completed Baseline national report of land degradation submitted 	4.1.1. Develop a draft NAP including problem and root cause analysis and prioritization of actions 4.1.2. Complete the modification and validation of the NAP through stakeholder workshops	Forestry Services/national consultant Forestry Services/national consultant	Draft NAP prepared Yr 1 One stakeholders workshop of 25 participants for 1 day in Mauritius and 1 in Rodrigues Yr 1
4.2. Adoption of the NAP	<ul style="list-style-type: none"> NAP adopted by Government and stakeholders 	4.2.1. Formal adoption of NAP by Government and negotiation of allocation of national budget for NAP implementation	Forestry Services/national consultant	Final NAP submitted to Government for funding and implementation in Year 3
<ul style="list-style-type: none"> NAP published 		4.2.2. Formal publication and dissemination of the	Forestry Services/	NAP made public at press

Outputs and Activities	Output Indicator	Activities and Sub-Activities	Responsibility	Annual Targets
		NAP through awareness and media programs	AgM/Ag R/ National Consultant	conference. Press release Yr 3

Annex D: Institutions and Groups Represented at UNDP/GEF Stakeholder Validation Workshop

Workshop on Capacity Building and Sustainable Land Management Pearle Beach Hotel – Wednesday 08 September 2004

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Annex E: Major Field Interventions aimed at Combating Land Degradation and Mitigation of Drought Effects

. *Projects completed during the past 5 years*

S.N 0.	Description of Projects, e.g. Project objectives, project area, activities, etc.	Cost Estimate(USD)
1	Midlands dam project	57M
2	Rehabilitation of La Nicoliere Feeder Canal	9.6M
3	Rehabilitation of Trianon-Grosses Roches Feeder Canal (to La Ferme reservoir)	2.1M
4	Rehabilitation of Mare-aux-Vacoas Dam	2.5M
5	Rehabilitation of Municipal Dyke (for Port-Louis water supply)	2.1M
6	Study of coastal erosion in Mauritius	0.5M
7	Review of National Physical Development Plan	0.9M
8	Control and mitigation of erosion in 3 watersheds (Pistache, Mourouk & Riviere Banane) (Rodrigues)	1.1M
9	Rehabilitation of drain at Pistache, Mourouk and Riviere Banane (3.9 km) (Rodrigues)	0.4M
10	Other minor projects	0.7M

On-going projects

S.No.	Description of Projects, e.g. Project objectives, project area, activities, etc.	Cost Estimate (USD)
1	Re-afforestation of 65 Ha of degraded forests at Port Louis Hills	0.9 M
2.	Feasibility study of Bagatelle Dam	0.4M
3	Feasibility study of Chamarel Dam (under planing stage)	2.5M
4	SSR memorial Park at Kewal Nagar	0.75M
5	Construction of dam at Anse Raffin – 65,00m ³ & Pave la Bonte-75,000m ³ (Rodrigues)	2.9M
6	Water harvesting through construction of liners, resevoirs and dams (Rodrigues)	1.3M
7	Other minor projects	0.3M

Projects in the pipeline

S.No.	Description of Projects, e.g. Project objectives, project area, activities, etc.	Cost Estimate (USD)
1	Re-habilitation of La Ferme Dam (Dam raising)	3.6 M
2	Soil and water conservation project throughout the Island (Rodrigues)	2 M
3	Other minor projects	0.2M

