

**MAINSTREAMING CLIMATE CHANGE ADAPTATION IN THE DEVELOPMENT PROCESS IN THE AGRICULTURE, TOURISM, AND FISHERIES SECTORS OF THE REPUBLIC OF MAURITIUS AS WELL AS THE WATER SECTOR IN PARTICULAR FOR RODRIGUES IN THE CONTEXT OF THE AFRICA ADAPTATION PROGRAMME (AAP)**



**DRAFT INCEPTION REPORT  
PRESENTATION  
TO  
STAKEHOLDER'S WORKSHOP  
AT  
MARITIM HOTEL  
BACLALAVA  
IN PORT LOUIS, MAURITIUS  
BY  
CAPITAL GUARDIANS**

# INTRODUCTION



The **Republic of Mauritius** consists of:

- Main island, Mauritius, Rodrigues and a group of small islands scattered in the South West Indian Ocean namely, the Cargados Carajos (St. Brandon), Agalega, Tromelin and the Chagos Archipelago (Diego Garcia). The total land area of the Republic of Mauritius is 2040 km<sup>2</sup>. It is surrounded by coral reefs and is situated at about 2000 km off the East Coast of Africa.

# INTRODUCTION cont



- **The ROM is a member of Small Island Developing States (SIDS) and is conscious of the potential dangers related to climate change. The potential threats and risks from climate changes, especially when combined with already existing environmental problems are a grave concern to ROM**

# OBSERVED EFFECT CLIMATE CHANGE



# **STUDY OVERALL OBJECTIVES**



- To provide support to the ROM to mainstream climate change concerns in the development process of the agricultural, fisheries, and tourism sectors. These will also apply to Rodrigues, especially to the water sector.

# **SPECIFIC OBJECTIVES**



- 1. To review and assess the impacts of climate change in the above-mentioned sectors and sub sectors and to identify possible gaps, needs and risks relative to the sectors (Mild, Medium and Worst Scenarios), in the short, medium and long terms;**
- 2. To formulate climate change-related policies that would address adaptation and mitigation of risks in the above referred sectors. Special attention will be given to gender mainstreaming;**
- 3. To advise on capacity building to enable the activities proposed for climate change adaptation; and**

## **SPECIFIC OBJECTIVES cont**



4. To devise strategies and elaborate action plans for enabling the activities for climate change adaptation of the sectors, including research and development and the need for continuous monitoring and evaluation process for climate change impacts to allow for continuous adaptation to anticipated new situations and conditions.
5. To mainstream climate change adaptation in the above referred sectors and also in the development process in Rodrigues.

# **SCOPE OF WORK**



6. The assignment is to be completed in four months time and covers both the mainland of Mauritius and Rodrigues as well.



# WORK PLAN



No	MAIN ACTIVITY/STEP	DATE
1.	Inception /sensitization workshop	22/6/012
2.	Comprehensive documents review	25/6-6/7/012
3.	<b>Data collection</b>	<b>9/7-13/7/012</b>
4.	Data capture, management and analysis	16/7-20/7/012
5.	Draft sectorial baseline reports production	23/7-3/8/012
6.	<b>Sectorial workshops</b>	<b>10/8/012</b>
	Develop action plans:	
7.	Short term action plan preparation	13/8-17/8/012
8.	Medium term action preparation	20/8-24/8/012

# WORK PLAN *cont*



NO	ACTIVITIES	DATE
9.	Long term action plan preparation	27/8-31/8/012
10.	Develop training materials	1/9-7/9/012
11.	Carry out training of staff	8/9-14/9/012
12.	Draft sector adaptation report	17/9-21/9/012
13	Validation over all workshop	26/9/012
14.	Production of final report	27/9-1/10/012
15.	Production of synthesis report for all sectors	2/10-8/10/012

# DELIVERABLES/OUTPUTS



## **AGRICULTURAL SECTOR**

1. Climate change assessment report
2. Institutional mapping report
3. Economic and social risk assessment and modelling report ;
4. Capacity building for long term planning and modelling to assess impacts of climate change in the agricultural sector and develop adaptation strategies in different subsectors
5. Training program for trainers for transfer of knowledge on climate change impacts and adaptation in the subsectors
6. Action plan to address climate change impact adaptation in the development.

# DELIVERABLES/OUTPUTS cont



## **FISHERIES SECTOR**

- 1. Climate change impact assessment report;**
- 2. Institutional mapping report**
- 3. A framework to facilitate an integrated Multi-Sectoral approach to manage climate change within the fisheries sector;**
- 4. Capacity building for long term planning and modelling to assess impacts of climate change in the fisheries sector and develop adaptation strategies in different subsectors;**
- 5. Training programs for trainers for transfer of knowledge on climate change impacts and adaptation in the subsectors**
- 6. Action plans with projects write-up to address climate change impact adaptation in the development process in the fisheries sector.**

## DELIVERABLES/OUTPUTS cont



### FISHERIES

7. Demonstration projects for educating the public on the ways to address climate change impacts in the different subsectors;
8. 8Project progress reports and project completion report;
9. Inland development control guideline for developments adjacent to the SEMPA;
10. Feasibility study report on the possible introduction of the *avicenna spp*
11. Assessment report with adaptation measures (both short-term and long-term) on the impacts of sand extraction on lagoonal ecosystems and beach stability in rodrigues.

# DELIVERABLES/OUTPUTS cont



## TOURISM SECTOR

1. A climate change assessment report
2. Economic and social risk assessment and modelling report;
3. Institutional mapping report
4. Networking system including different stakeholders for data and experience exchange, advice, etc.;
5. Capacity building for long term planning and modelling to assess impacts of climate change in the tourism sector and develop adaptation strategies;
6. Program for trainers for transfer of knowledge on climate change impacts and adaptation in the subsectors
7. Action plans to address climate change impact adaptation in the development process in the tourism sector;
8. Demonstration projects for educating the public on the ways to address climate change impacts in the sector.

# **DELIVERABLES/OUTPUTS cont**



## **WATER SECTOR**

- **An assessment report of water resources especially groundwater resources availability in Rodrigues,**
- **change impact assessment report on water resources particularly ground water in Rodrigues for the 2030 and 2050 horizons.**
- **Institutional mapping report**
- **Propose an integrated water resource management strategy for Rodrigues**

# APPROACH AND METHODOLOGY



## APPROACH

- 1. Comprehensive literature review of policy documents, consultation and focus group discussion**
- 2. Informal meeting and interviews with stakeholders' information.**
- 3. The review will cover, but not limited to, the following documents best practices locally, regionally and internationally**



# APPROACH AND METHODOLOGY cont.



- 1. Preparation of study instruments and checklist:**
- 2. Sampling of Respondents**
- 3. Field data collection :** The data required for climate change study will include:
  - Biophysical information
  - Geology and soil type
  - Climate data or information
  - Water quality and availability
  - Biodiversity
  - Vegetation
- 4. Data Cleaning, Editing, Coding, Entry and Analysis**

# APPROACH AND METHODOLOGY



- 5. Production of Draft Baseline Assessment Reports-** After data analysis, the consultants will prepare and submit draft reports as follows
- Agriculture for Mauritius and Rodrigues
  - Fisheries for Mauritius , Rodrigues and Agalega
  - Tourism for Mauritius and Rodrigues
  - Water for Rodrigues



# APPROACH AND METHODOLOGY cont



- **Stakeholders Workshop - One** -Day stakeholders' workshop 1/24/2013 for each Sector Technical Working Group in Port Luis where each Lead consultant shall present the Draft Report to key stakeholders for their Comments and suggestions from the stakeholders.
- **Development of Action Plan:** This task will involve costing and proposing distinct steps to pave the way for the implementation of the strategies laid down in final document with a view to mainstreaming climate change in four sectors
- 
- **Development of Training Materials:** this will involve developing Training Manual on climate Mainstreaming and will be guided with strategies laid down in the Sectoral Action Plan

## APPROACH AND METHODOLOGY cont



- **Training of Stakeholders:** A one week participatory training will be carried out to inbuilt ability of staff to implement suggested recommendations.
- **Production draft Sectoral Report:** Four draft sectorial reports on the recommended sectoral climate change adaptation framework:
- The draft action plans shall also include a log frame (activities, inputs, outputs, duration, cost, lead agencies, assumptions, etc) There shall be a validation workshop held immediately there after
- **Production and Submission of Final Reports and a Synthesis Report**

# **PRELIMINARY RESULTS (agricultural sector)**



## **Effect of climatic change in agricultural sector**

- Value added for agriculture dropped to 1.4% in 2009
- In real terms, it dropped by 1.3%.
- Share of Agriculture in the G.D.P decreased from 3.9% in 2009 to 3.6% in 2010. Although this decrease may seem insignificant, its effect is unprecedented. (Probably due to climate change).

## **Employment in Agriculture**

- This stagnated at around 42,250 in 2009 and 2010. Employment in large establishments decreased by 3.6% from 16,747 in 2009 to 16,143 in 2010. However employment in other large establishments increased by 2.1% to reach 29,100 in 2010. (probably due to climate change and its effects in the agricultural sector)

# PRELIMINARY RESULTS cont



## **Crop Subsector:**

### **Sugarcane**

- The cane yield per hectare for the whole island decreased by 3.8% from 77.3 tonnes in 2009 to 74.4 tonnes in 2010. This was caused by a decrease in cane yield in the North, south, East and an increase in the west which would be attributed to climate change factors.

### **Tea**

- The area under tea cultivation decreased by 2.1% to 698ha in 2010 against 713 ha probably due to climate change factors, in 2009.
- Production of green tea leaves fell by 3.8% from 7,663 tonnes in 2009 to 7,370 tonnes in 2010.
- The production of black tea decreased by 0.9% from 1,467 tonnes in 2009 to 1,453 tonnes in 2010.
- These yield decreases may be attributed to climate change factors.

## PRELIMINARY RESULTS cont



### ***Food crops***

Although food crop production ( i.e. rice, maize, cassava, and horticultural produce) increased by 6.9% between 2009 and 2010.

During that period there were decreases in the production of brinjal, carrot, chochon, calabash, groundnut, and pineapple probably due to climate change.

**Livestock:** Beef production from the live cattle increased by 5.0% from 2,090 tonnes in 2009 to 2194 tonnes in 2010.

Beef production from the slaughter of imported cattle increased by 2.5% from 2054 tonnes to 2100 tonnes and local beef production increased by 144.4% from 36 tonnes to 88 tonnes.

Production of goats meat and mutton was 68 tonnes, 11.7% lower than the 2009 figure of 77 tonnes.

# PRELIMINARY RESULTS cont

## ASSESSMENT OF INSTITUTIONS

Institutions	Role	Gap	Assessment method
National Agricultural Research and Extension services,	Dissemination of agricultural related information to farmers	<ul style="list-style-type: none"> <li>Lack of trained manpower on climate change adaptation</li> <li>Lack of infrastructure, technology and equipments such as advance computers that can do sophisticated numerical weather prediction models for climate change adaptation.</li> </ul>	<ul style="list-style-type: none"> <li>Focus group discussion with staff</li> </ul>
National Plant Protection Department	-Protect against pests, diseases from other countries	<ul style="list-style-type: none"> <li>Climate change adaptation skills and equipments such as weather satellite /radar and advance computers are not there to monitor the <b><i>incidence of new diseases and epidemic levels of existing diseases and pests</i></b></li> </ul>	<ul style="list-style-type: none"> <li>Focus group discussion with staff</li> </ul>



## PRELIMINARY RESULTS cont

Institution	Role	• GAP	• Assessment Method
Forestry Services department	Manages the islands forests	<ul style="list-style-type: none"> <li>• No manpower trained on climate change adaptation techniques .</li> <li>• No research on climate change</li> <li>• Slight recording of weather data</li> <li>• No ongoing projects on climate change</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion with staff</li> </ul>
Planning Department	Develops agricultural sector policy document	<ul style="list-style-type: none"> <li>• Lack of capacity to integrate climate change information in to Agri- management plans planning, strategies and decisions</li> <li>• Lack of equipment, skills and equipment for climate change adaptation such as software, GIS, Modeling knowledge.</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion with staff</li> </ul>

# PRELIMINARY RESULTS cont



## • ASSESSMENT OF DOCUMENT RELATING TO CLIMATE CHANGE

Policy Document	Priority Areas	Activities	Main Method	Key Finding
<p>The forests and Reserves Act No.41 of 1983, as amended by Act No.1986 and No.7 of 2003</p>	<ul style="list-style-type: none"> <li>• Conservation and protection of watersheds and other environmentally sensitive areas</li> <li>• Increasing tree cover to enhance the environment and carbon sink</li> <li>• Prevent forest destruction by recurrent cyclones, fire, insect pests and diseases</li> </ul>	<p>The document assessed for whether and how it considered climate risks</p>	<p>Document review</p>	<p>No explicit consideration of climate change in the document</p>

# PRELIMINARY RESULTS cont



Policy Document	Priority Areas	Activities	Key Finding
<b>Land (Duties And Taxes) Act 46 Of 1984 – 16 July 1984</b>	<ul style="list-style-type: none"> <li>• Levy of land transfer tax</li> <li>• Exemption</li> <li>• Declaration by transferor</li> <li>• Penalty for incorrect declaration</li> <li>• Levy of capital gains tax</li> <li>• Sale price and cost of infrastructure works</li> <li>• Contents of deed</li> </ul>	Document assessed for range of climate risk mitigation criteria,	no attention to climate change in the document
Plant Protection Act 2006	<ul style="list-style-type: none"> <li>• Issue of phyto-sanitary certificates</li> <li>• Protection of endangered areas and designate , maintenance and surveying pest free areas and area of low pest prevalence</li> <li>• Provide information to other countries concerning phytosanitary</li> </ul>	Document assessed for incidence of new diseases and epidemic levels of existing diseases and pests	No attention to incidence of new diseases and epidemic levels of existing diseases and pests' behavior with

# PRELIMINARY RESULTS cont



Policy Document	Priority Areas	Mainstreaming and adaptation of climate change	Main Method	Key Finding
<p>The Mauritius Agricultural Marketing Act 1963</p>	<p>(a) to provide or ensure the provision of efficient marketing facilities for all controlled products at fair and reasonable prices in so far as this may be practicable under the powers conferred upon it by this Act;</p> <p>(b) to maintain the register of all producers, buying agents millers and dealers as required by section 16;</p> <p>(c) to acquire and disseminate, to such extent as it thinks useful, market intelligence;</p> <p>(d) to operate or provide for the operation of such storage, handling, transport and processing facilities for controlled products as may in its opinion be necessary;</p> <p>(e) to buy; sell, import, export or otherwise deal in controlled products in such manner as it thinks fit and as may be authorized by this Act, and, in particular but without prejudice to</p>	<p>Document assessed for climate change risks in relation to marketing infrastructure</p>	<p>Document review</p>	<p>No attention to climate change, even where climate risks are obvious today such as storage , post harvesting , marketing infrastructure</p>

# PRELIMINARY RESULTS



Policy Document	Priority Areas	Mainstreaming and adaptation of climate change	Main Method	Key Finding
<p>Strategic Options in Crop Diversification and Livestock Sector 2007-2015</p>	<ul style="list-style-type: none"> <li>• Modernization and Competitiveness of Agriculture.</li> <li>• Sustainable land management and water control system</li> <li>• Agricultural research, technology dissemination and adoption.</li> <li>• Strengthening R &amp; D support</li> <li>• Reducing factors of risk in food supply and addressing the needs of</li> </ul>	<p>Document assessed for whether and how they discussed climate risks</p> <ul style="list-style-type: none"> <li>•</li> </ul>	<p>Document review</p>	<p>Little attention to climate change in the document only where cyclone risks</p>

# PRELIMINARY RESULTS

Policy Document	Priority Areas	Mainstreaming climate change and adaptation	Method	Key Findings
<p><b><i>Sustainable Diversified Agri-food Sector Strategy for Mauritius 2008 2015</i></b></p>	<p><b>Sustainable Diversified Agri-food Sector Strategy</b></p>	<ul style="list-style-type: none"> <li>• The document assessed</li> <li>• for whether and how it considered climate</li> <li>• risks in sustainable diversified food production</li> </ul>	<p>Document review</p>	<ul style="list-style-type: none"> <li>• No explicit consideration of climate change in the document</li> </ul>
<p>The Genetically Modified Organisms ACT 2004</p>	<ul style="list-style-type: none"> <li>• Importation,</li> <li>• Exportation,</li> <li>• Transit, development,</li> <li>• Research,</li> </ul>	<ul style="list-style-type: none"> <li>• Document assessed for whether and it considered climate</li> </ul>	<p>Document review</p>	<p>No references to climate change in the document</p>

# AGRICULTURAL SECTOR (Rodrigues Observations)

## EXTENSION OFFICER'S OBSERVATION

1. That there has been a good general awareness creation on the impact of climate changes and its impacts.
2. The direct impacts noted in the recent past include:
  - Number of seasons per year – where there used to be regular, predictable seasons, presently there are none.
  - The Island used to have a bimodal rainfall pattern i.e. March/April for Long rains and October/November short rains, but currently this is not the case.

## Observations cont..



- 3.** This has led to unpredictable rainfall patterns resulting into low agricultural productivity.
- 4.** In the past e.g. over 2 decades ago, there used to be several rivers traversing the Island, today most of the rivers are intermittent or have completely dried up.



# CROPS



- The estimated population of the Rodrigues is 40,000 people. The average farm size on the Island is ½ Acre. There are about 42 Farmer Associations on the Island. The trend is to transform these Associations into Farmer Cooperative.
- The gender differentiation among these farmer associations shows that women are the majority in terms of Leadership and management. Access to water by Households is quite high with about 90% of the populace having water source in their homesteads  
Small scale irrigation has increased in recent times but mostly employing bucket and drip irrigation.

## CROPS cont..



- **Maize production as staple crop has declined drastically presently among other key crops such as cassava, sweet potato, Irish potato and French beans due to drought and dependence on Rainfed agriculture.**

## CROPS cont..



- **Maize production as staple crop has declined drastically presently among other key crops such as cassava, sweet potato, Irish potato and French beans due to drought and dependence on Rain fed agriculture.**

# LIVESTOCK



- 1. Beef production in the Island has gone down in recent years with only about 8 – 10 heads being slaughtered in town. The goats, sheep, chicken production and consumption could be described as 50/50.**
- 2. These trends show a dramatic departure from the past when there were numerous slaughter houses and high consumption of meat in town.**
- 3. Additionally, receding and inadequate pasture for grazing livestock have also contributed to declining production in the sector. The severe drought of the 1972-79 had a devastating effect as it wiped out cattle and other small ruminants in their thousands.**

## LIVESTOCK cont..



- **4. The cyclone cycles which used to be predictable are no longer known and the last cyclone outbreak was sited in the year 2003. Since then there has been no cyclone outbreak on the Island.**
- **5. The cumulative effects have been declining production and consumption of livestock products particularly beef. The main causes of these negative occurrences have been traced to climate change and lack of adaptation.**

# DISASTER MANAGEMENT



1. There have been changes in consumption patterns in terms of dietary components associated with disaster occurrences.
2. Local initiatives during periods of disaster include: Donation of seeds, food, and piglets; Communal labor sharing; and share-cropping.
3. Formal compensation of destruction by natural calamities such as cyclone and drought can only be effected if the farm was insured just as applicable in Mauritius
4. Relief work schemes have also been instituted by the government as a coping mechanism during disaster in the agricultural sub-sector.

# FISHERY SECTOR



**The fisheries sector consists of the following sub-sectors**

- **Artisanal small scale fishery,**
- **The commercial fishery,**
- **Sport fishery,**
- **Fish processing and**
- **Aquaculture.**

# STATUS



- 1.** In 2009 the total supply of fish and fish products for direct consumption was about 18,000 tonnes and the total fish traffic in port stood at around 230,000 tonnes.
- 2.** Artisanal fisheries production accounted for 12% of total fisheries production in 2008.
- 3.** Fisheries GDP is approximately 1.5% of total GDP and the fisheries and seafood sectors contributed about 18.5 billion rupees to the national economy.
- 4.** The government strategy is to create a seafood hub for services and processing, which had a turnover of 8.5 billion rupees in 2009.
- 5.** The sector provides direct employment to around 12,000 people including processing and marketing activities, representing approximately 2% of the active population.



# FISHERY SECTOR Cont



## INSTITUTION ARRANGEMENT

- Fisheries are under the Fisheries Division (FD) of the new created Ministry of Fisheries.
- The Fisheries Department has the responsibility for management and policy advice, as well as development of fisheries and aquaculture.
- The Division has eight departments: Fisheries Planning, Fisheries Management, Research, Marine Conservation, Marine Science, Training and Extension Center, Fisheries Protection Services.

# FISHERY cont



## **Policy and Legal Framework**

1. The main legal instruments are:
2. The *fisheries and marine resources act* of 2007,
3. The *fishermen welfare fund act* of 2000,
4. The *fishermen investment trust act* of 2006,
5. *The marine protected area regulations* 2001/2007,
6. The *export of fish and fish products regulations* of 2006,
7. *Toxic fish regulations* of 2004
8. *Prohibition of removal of coral and sea-shell* of 2006,
9. *Fishing of sea cucumbers regulations* of 2009,
10. The *vessel monitoring system regulations* of 2005 and the *undersized fish regulations* of 2006.
11. National plan of action to prevent, deter and eliminate illegal, unregulated and unreported,

**Fishing (NPOA-IUU) for Mauritius was prepared and approved by the Government in 2009.**

# FISHERY SECTOR CONT( Policy document Assessment in relation to climate change )



Policy Document	Priority Areas	Assess in relation to climate change	Key findings
1. Fisheries and marine resources act of 2007	IUU Prevent, Deter and Eliminate Illegal, Unreported Unregulated fishing	<i>Assess whether the Doc has taken into account climate change risks</i>	Emphasis only on sustainable fishing operations. No serious emphasis on climate change
2. Aquaculture Master plan	Increase of production of 29,000 tons in medium term and 39,000 tons in long term. Go for high value species. Six sites chosen in Mauritius	Whether the document has taken climate change into account	Climate change not taken into account except the government creates the right environment for potential investment

# FISHERY SECTOR CONT( Policy document Assessment in relation to climate change



Policy Document	Priority Areas	Assess in relation to climate change	Key findings
3. Fisheries Master Plan	Management and Control of fisheries resources and managing the ecosystem therein	Elucidate whether climate change scenario is adequately enshrined in the document	Very little emphasis is directly related to climate change apart from sustainable fisheries
4. Fisheries and Marine Resources Act of 2007/ Maritime Zones Act 1977	Marine park and reserve protection and management (against exploitation, construction) control	Conservation zones created and protected	No direct mention of climate change even in the amendment Govt. notice No.196 Of 2007

# FISHERY SECTOR CONT( Policy document Assessment in relation to climate change

Policy Document	Priority Areas	Assess in relation to climate change	Key findings
5. Fishermen welfare Fund Act of 2000	Fish marketing, fish quality, bio-economic approach to management, communication and export of fish	Whether the fishers are conversant with the document and if any reference is made to the effects of climate change	No serious mention is made on climate change
6. Fishermen Investment Trust Act of 2006	Business models, costs, income, processing, credit facilities, processing and	Whether investors are aware of the climate change and if any reference is made in this	Very little is clearly mentioned

## **FISHERY SECTOR** cont

( **Policy document Assessment in relation to climate change** )

<b>Policy Document</b>	<b>Priority Areas</b>	<b>Asses in relation to climate change</b>	<b>Key findings</b>
7. Marine Protected Area Regulations of 2001/2007	Marine park and reserve protection and management	Conservation zones created and protected	No direct mention of climate change even in the amendment Govt. notice No.196 Of 2007
8. Environment Protection Act (EPA) 2002	Creation of ICZM, monitoring coastal erosion, management plans and pollution control	Mine the data if effects of climate change are discussed	Nit seriously recorded

**FISHERY SECTOR cont**  
**( Policy document Assessment in relation to climate change)**



<b>Policy Document</b>	<b>Priority Areas</b>	<b>Assess in relation to climate change</b>	<b>Key findings</b>
9. Wildlife and National Parks Act 1993, National Parks and Reserve regulations 1996 and wildlife regulations, 1998	Protection of flora and fauna, implementing CITES regulations, establishing parks, buffer zones	Whether climate change is given prominence in the document	Effects of climate change discussed in general but not in details
10 Forests and Reserve Acts 1983	Management of forests and nature Reserves in Mauritius and islets	Whether climate change is included in the document	Just high -lighted. Not seriously detailed

## **FISHERY SECTOR cont**

### **( Policy document Assessment in relation to climate change)**



Policy Document	Priority Areas	Assess in relation to climate change	Key findings
<ul style="list-style-type: none"> <li>•11 Town and planning Acts 1954</li> </ul>	<ul style="list-style-type: none"> <li>•Sustainable land management, control of infrastructure development</li> </ul>	<ul style="list-style-type: none"> <li>•Whether climate change is detailed in the document</li> </ul>	<ul style="list-style-type: none"> <li>•Enacted but not enforced</li> </ul>
<ul style="list-style-type: none"> <li>•12 Par Geometriques Act 1985</li> </ul>	<ul style="list-style-type: none"> <li>• Creation of a 81.21 meters as reserve land as public domain from area of highest water mark and the sea shore</li> </ul>	<ul style="list-style-type: none"> <li>•To scan and gather evidence of climate change</li> </ul>	<ul style="list-style-type: none"> <li>•Not detailed</li> </ul>



# FISHERY SECTOR CONT( Policy document Assessment in relation to climate change)

Policy Document	Priority Areas	Assess in relation to climate change	Key findings
13 Continental Shelf Act, 1970	Prescribed measures for creating safety zones for protection of living resources in the continental shelf	To toothcomb and find if climate change is discussed	Only measures for protection are mentioned but not clearly elucidated
14. National Coast Guard 1985	Enforcement measures on the surrounding waters	To ensure safety of fishermen particularly during bad weather	Should elaborate more

# **FISHERY SECTOR cont( Policy Document Assessment in relation to climate change)**

<b>Policy Document</b>	<b>Priority Areas</b>	<b>Assess in relation to climate change</b>	<b>Key findings</b>
15. The Plants Act 1976	Quarantine measures on plants to control movements of the same	To ensure quality of forestry products but does not include fisheries	Fisheries is elsewhere

## FISHERY SECTOR cont

(Observed threat to ecosystem)

- Land conversion and habitat fragmentation: Gradual degradation of forest land to give way for prime development and other infrastructure
- Habitat degradation include mangroves harvesting , wetlands extraction, lagoon fishing and sand mining
- Pollution from land based activities: include siltation in Rodrigues (sedimentation, rainfall, inadequate sewage and disposal systems
- Data collected on fish production indicated a gradual decline in overall landing for artisanal fisheries. In the year 2009 there was a sudden fish mortality and this was attributed to massive algal bloom

# THE FISHERY SECTOR (RODRIGUES)



Preliminary observation of the fishery in Rodrigues indicate:

1. Increasing number of fishing boats
2. Increasing number of fishers
3. Decreasing amount of fish per fisher both in finfish and octopus in the lagoon but an increase in off lagoon areas
4. The fishing efficiency and associated fishers income is highest in the west of Rodrigues
5. General income from fishery rather low, yet global fish prices are higher than other agricultural products
6. Almost all fish harvested are consumed locally (fresh, frozen, salted and sundried) and
7. The Government supports fishers financially in the form of compensation for “Bad weather”

# THE FISHERIES SECTOR(RODRIGUES ) cont



## Possible constraints to fisheries development:

- **Overcapacity-** The fishery is an open access and no alternative sources of ready income
- **Increasing number of legally restricted zones for fishing in the forms of marine/national parks, marine/nature reserves**
- **A part from SEMPA of 43km<sup>2</sup> there are 5 designated marine reserve of 16 km<sup>2</sup>, 4 proposed ones of 7.2 km<sup>2</sup> at Grand basin, Passe demi(7,2km<sup>2</sup>) Passe gabri(1.5km<sup>2</sup>) and Riviero Banana(1.5km<sup>2</sup>)**
- **The island has a short continental shelf**

# THE FISHERIES SECTOR(RODRIGUES ) cont



Just like other developing islands in the tropics, Rodrigues has been affected by recent global changes

- Coral bleaching, although not as serious as Mauritius, has been noticed
- The winter temperatures have been realized to be cooler and summer climates warmer than before
- Longer periods of rainfall has been realized especially the past two years resulting to erosion/siltation, land slides, greater turbidity in the lagoon and the short continental shelf
- Naturally all these affect the ecosystem in which the fish is the major economic inhabitant

# THE FISHERIES SECTOR(RODRIGUES ) cont



The following activities also add insult to injury to the fragile ecosystem

- Deforestation
- Sand mining on beaches and surrounding islands during low tides (Pointe L'Herbe has 15 mining /transporting boats)
- Poor agricultural practices including unsystematic grazing of animals
- Poor domestic waste and sewage disposal mechanism
- Infrastructure development on land
- Presence of cyclones which are very severe every ten years (one such is expected this year)

# THE FISHERIES SECTOR(RODRIGUES ) cont



Several documents are being assembled to obtain more information and elucidate on how the climate change if it is the cause of the previous factors can be contained, for the benefit of the fishing community.

Among interventions proposed include:

- ❖ Develop a long term awareness raising strategy to be promoted especially in the MPAs
- ❖ Continued data collection in all related parameters necessary for the monitoring, evaluation, mitigation and adaptation to impacts of climate change
- ❖ Identify stakeholders and formulate stakeholder participation in planning and strategizing policies to ensure all become owners of the intervention
- ❖ Identify regulatory mechanisms for ensuring enforcement and compliance in the management, adoption, mitigation against c.c.( Equipment/personnel)
- ❖ Identify financial instruments to generate income to sustain the climate change interventions
- ❖ These are just proposals are generate by my TEAM and further elucidation/clarification would come after the detailed literature review





# **TOURISM SECTOR**

# Impact of Climate Change on Tourism Sector



Impacts	Effects
Warmer temperatures	•Altered seasonality, heat stress for tourists, cooling costs, changes in plant-wildlife-insect populations and distribution, infectious disease ranges
•Increasing frequency and intensity of extreme storms	•Risk for tourism facilities, increased insurance costs / loss of insurability, business interruption costs
•Reduced precipitation and increased evaporation in some regions	•Water shortages, competition over water between tourism and other sectors, desertification, increased wildfires threatening infrastructure and affecting demand
•Increased frequency of heavy precipitation in some regions	•Flooding damage to historic architectural and cultural assets, damage to tourism infrastructure, altered seasonality

# Impact of Climate Change on Tourism Sector cont



•Sea level rise	•Coastal erosion, loss of beach area, higher costs to protect and maintain waterfronts
•Sea surface temperatures rise	•Increased coral bleaching and marine resource and aesthetics degradation in dive and snorkel destinations
•Changes in terrestrial and marine biodiversity	•Loss of natural attractions and species from destinations, higher risk of diseases in tropical-subtropical countries
•More frequent and larger forest fires.	•Loss of natural attractions; increase of flooding risk; damage to tourism infrastructure.
•Soil changes (e.g., moisture levels, erosion and acidity)	•Loss of archaeological assets and other natural resources, with impacts on destination attractions

# TOURISM SECTOR cont( Standards )



- National standards exist for the construction of new buildings (shorelines) but not effective
- System to measure and monitor carbon emissions in destination is weak
- Percentage of energy consumed in the destination from renewable sources is not clear
- Inadequacy of standards (apart from building setbacks) to reduce the vulnerability of hotels, marinas and associated tourism infrastructure to wave, storm surge and flood impacts

## **TOURISM SECTOR cont (Beach Management)**



- Beaches where erosion is monitored at least annually is clear
- Coastline with visible signs of erosion is clear
- Effective erosion protection measures are in place (vulnerable areas) but with side direct/indirect effects
- Coastal land use policies concentrate hotels rooms in vulnerable coastal areas
- Limited management of shelters from disasters and emergency plans
- Land ownership conflicts at the shoreline resulting from beach erosion and accretion exist
- Cost of financing shoreline management and protection and the relative responsibility of government and property owners is sharing such costs is not clear

## **TOURISM SECTOR cont**

### **(Awareness)**



- **Low public awareness among industry associations and their members of the predicted impacts from climate change and the adverse effects these are likely to have on the tourism sector**

# **TOURISM SECTOR** cont (Risk)



- **Absence of climate change risk and vulnerability analysis in tourism policy statements and tourism plans**
- **Climate change risk assessment for tourism industry does not exist**
- **Assessment of destination's adaptive capacity to climate change limited**

## TOURISM SECTOR cont (Gaps)



- **Gaps in meteorological, hydrological and socio-economic data critical to measuring environmental and socio-economic impacts associated with climate change**



# TOURISM SECTOR(institution assessment )



<b>Institutions</b>	<b>Role</b>	<b>Gap</b>	<b>Assessment method</b>
Mauritius Ports Authority	Ports management	<ul style="list-style-type: none"><li>• Skills on climate change identification, mitigation and adaptation</li><li>• Facilities and equipment</li></ul>	<ul style="list-style-type: none"><li>• Focus group discussion</li></ul>
Mauritius Tourism Promotion Authority	Tourism marketing	<ul style="list-style-type: none"><li>• Skills on climate change identification, mitigation and adaptation</li><li>• Data base</li></ul>	<ul style="list-style-type: none"><li>• Focus group discussion</li></ul>

# TOURISM SECTOR(institution assessment )



<b>Institutions</b>	<b>Role</b>	<b>Gap</b>	<b>Assessment method</b>
Tourism Authority	Tourism management	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Data base</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>
Airports of Mauritius	Airports management	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Facilities and equipment</li> <li>• Data base</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>
Beach Authority	Beach management	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Facilities and equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>

# TOURISM SECTOR (institution assessment)



Institutions	Role	Gap	Assessment method
Air Mauritius	Tourist travel (inbound and outbound)	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Facilities and equipment</li> <li>• Data base</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>
Board of investment	Tourism investment	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Data base</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>
Industrial and Vocational Training Board	Tourism training	<ul style="list-style-type: none"> <li>• Skills on climate change identification, mitigation and adaptation</li> <li>• Data base</li> <li>• Training facilities/equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Focus group discussion</li> </ul>

# TOURISM SECTOR(INSTITUTION ASSESSMENT)



<b>Institutions</b>	<b>Role</b>	<b>Gap</b>	<b>Assessment method</b>
Joint Economic Council (Empowerment Programme)	Capacity building	<ul style="list-style-type: none"><li>• Skills on climate change identification, mitigation and adaptation</li><li>• Data base</li></ul>	<ul style="list-style-type: none"><li>• Focus group discussion</li></ul>
AHRIM and other hotels: Small and Medium Hotel Association	Welfare of accommodation providers	<ul style="list-style-type: none"><li>• Skills on climate change identification, mitigation and adaptation</li><li>• Policy interpretation</li></ul>	<ul style="list-style-type: none"><li>• Focus group discussion</li></ul>

# TOURISM SECTOR(POLICY DOCUMENT REVIEW)



<b>Documents</b>	<b>Priority Areas</b>	<b>Activities</b>	<b>Key Finding</b>
The Tourism Authority Act 2006 (Act No 32 of 2006)	<ul style="list-style-type: none"> <li>• Tourism management</li> <li>• Tourism development</li> </ul>	<ul style="list-style-type: none"> <li>• Environment and sustainable development</li> </ul>	no attention to climate change in the document
The Tourism Authority (Amendment) bill (No11 of 2008)	<ul style="list-style-type: none"> <li>• Tourism management</li> <li>• Tourism development</li> </ul>	<ul style="list-style-type: none"> <li>• Environment and sustainable development</li> </ul>	
Mauritius Sector Strategy Plan on Tourism (2009-2015) and its related Programme Budget	<ul style="list-style-type: none"> <li>• Tourism planning</li> <li>• Tourism budgeting</li> </ul>	Environment and sustainable development Acknowledges climate change	

# TOURISM SECTOR(POLICY DOCUMENT REVIEW)cont



Documents	Priority Areas	Activities	Key Finding
Development of an Integrated Coastal Zone Management Framework (ICZM) for the Republic of Mauritius (2008)	<ul style="list-style-type: none"> <li>Environment management</li> <li>Environment planning</li> </ul>	Environment and sustainable development Acknowledges climate change	No explicitly in climate change
Sustainable Integrated Development Plan for Rodrigues (2009)	<ul style="list-style-type: none"> <li>Sustainable development management</li> <li>Sustainable development planning</li> </ul>	Environment and sustainable development Acknowledges climate change	
Planning Policy Guidance: Ministry of Housing and Lands (2004)	<ul style="list-style-type: none"> <li>Housing planning and management</li> <li>Lands planning and management</li> </ul>	Acknowledges effects of climate change	
Study on Coastal Erosion in Mauritius (2003)	<ul style="list-style-type: none"> <li>Coastal planning</li> <li>Coastal management</li> </ul>	Environment and sustainable	

# TOURISM SECTOR

## (MAIN BARRIERS TO IMPLEMENTATION)



- Limited knowledge/data by tourists and tourism operators
- Limited coordination between government agencies and private sector (policies and plans)
- Limited adequate legislation that requires compliance e.g. policy gaps on licensing processes, coral reef protection

# **RODRIGUES(TOURISM SECTOR)**

## **Objective**



The government aims at transforming the tourism sector into an engine that will drive the other productive sectors and services, so as to create a new economy: the community economy.

The government plans to redefine the tourism policy so as to focus on a type of eco-tourism that is rooted in the lifestyle, economy and environment of the island.



# Goal



- **the island has a fragile environment and limited resources**
- **a strategy that is focused on high-value added tourism will be adopted rather than mass tourism.**

# Tourism Priorities



- The development of a new master plan for tourism
- The revision of the tourism regulations to make them more practical
- The recuperation of land (that was distributed indiscriminately for tourism developments) that is inconsistent with the philosophy of “Rodrigues Green Island”
- The development of a label for tourist accommodation that will allow classification and categorization
- The promotion of the concept: “ Home-stay Tourism”

## Cont.



- **Defining Rodrigues in tourism promotion as a destination of rest and 'Ile autrement'**
- **Work for the re-establishment of direct flights between Rodrigues and Reunion Island**
- **Identify new tourist local attractions**
- **Develop a digitalized tourist card for Rodrigues**
- **Renegotiate the terms of the stimulus package for tourism in Rodrigues**
- **Consolidate the branch of the Hotel School in Rodrigues**

# Documents Specific



- **Sustainable Integrated Development Plan for Rodrigues (July 2009)**

## **PRACTICES**

- **Nature Conservation projects**
- **Marine Protected Parks**
- **Alternative Water Sources**
- **Alternative Energy Development**



# WATER SECTOR

# Rodrigues Water Assessment[1]



- **Water is scarce & rationed**
- **No Water Master Plans, no comprehensive Water Resources Assessment**
- **Borehole yields have decreased due to over exploitation and reduction in rainfall**
- **Rivers have dried or become seasonal since 1970s**
- **Pollution in the lagoons due to pesticides and other agro-chemicals.**

# Rodrigues Water Assessment[2]



- Review water administration
- No revenue policy, no water efficiency practices
- Funding very low; no donors at the moment
- Limited capacity

# Workplan [1]

Tasks	Activity	Status	Expected output
Water resources assessment in Rodrigues	Collecting and collating data and information	Data available in various forms	Water Resources Assessment Report for Rodrigues,  Integrated Water Resources Training Manual
Water for socioeconomic development	Review of Country Vision - MID, MDGs and long-range policy statements.  Integrated management approach	Ongoing Reviews	Present water supply/demand and future projections for 2030 and 2050



# Workplan [2]



<b>Task</b>	<b>Activity</b>	<b>status</b>	<b>Outcome</b>
Resources mobilisation and Water Financing	Climate change and climate variability scenarios . Consequences of Climate change and climate variability	Ongoing	Climate change impact assessment report for Rodrigues for the 2030 and 2050 horizons
Policy, legal and institutional review	Water institutions Water resources strategies Water supply and sewerage services strategies DRR strategies Institutional capacities	Ongoing	Policy, Legislative and Institutional analysis in the water sector
Review of water policy, legislation and regulations and resources	Water sector situation	Not started	Communication on Water Sector Reforms Outlook

# Water Investment Plan [1]



Short- term action plan for the period 2012-2015	Activity	Status	Outcome
Political leadership	Political consultation, Workshop, training	Srtarted	Proposed Integrated Water Resource Management Action Plan for Rodrigues
Policy reviews and legislative reforms by the Regional Assembly	Not started		
Incentivise rain water harvesting for domestic and supplemental agriculture	Not started		
Infrastructure rehabilitation			
Rehabilitate degraded lands, dams, carry out reforestation, groundwater recharge etc			

# Water Investment Plan [2][4]



Activity	Status	Outcome
New regulations and new tariffs		
Monitoring and data collection		
Rodrigues Multi-stakeholder Water Master Planning Team		

## Development programme for the medium term (2015-2020)



- Extension of rehabilitation works / improving the distribution system in the North and Centre of Rodrigues
- Reverse osmosis desalination plant about 2,500m<sup>3</sup> powered by 1 MW wind power;
- Economic and technical feasibility study of dams and reservoirs to meet the medium and long term demand.

# Long term plan for the sector beyond 2020



- Feasibility study for setting up a sewerage network in Port Mathurin and a wastewater treatment plant;
- Construct and equip a water laboratory;
- Capacity building and strengthening of governance mechanisms;
- Establish and build capacity of Irrigation Water Users Associations

# Roles and functions for the IWRM Process



Institution	Roles
Regional Assembly	Lead role, 'owner' of the process Mobilize funding for the workshop and future investments Set macro-economic policy environment
Steering Committee, Director of Water Resources	Guide the process (group with wide representation) Mobilize support across sectors and interest groups Guarantee quality output Monitor implementation progress
Management Team (8 members)	Manage day-to-day processes for strategy development, implementation and capacity building Reviews draft reports
Department of Water / Environment	Provide neutral platform for dialogue Support strategy development process by providing advice and sharing knowledge Foster capacity building and training



THE END