Ministry of Environment & Sustainable Development

Climate Change Facts for Mauritius

As a Small Island Developing State (SIDS), the Republic of Mauritius (ROM) is highly vulnerable to the adverse effects of climate change. The impacts of climate change are expected to worsen in the decades to come.

A. *Some of the Observed Impacts of Climate Change in Mauritius*

- Average temperature rose by 0.74^{0}C when compared to the 1961-90 mean (Mauritius Meteorological Services, MMS).
- Decreasing trend in annual rainfall of around 8% over Mauritius since the 1950s (MMS).
- Between 1998 & 2007, local mean sea level rose by 2.1mm per year. Over the last 5 years sea level has been rising by around 3.8 mm/year (Mauritius Adaptation Funds Board Project/Programme proposal).
- Significant beach erosion in the northwest, southwest and south of the island over last two decades (Ministry of Environment & SD, MoESD).
- Loss in beach area over the last two decades amounts to some 18,500 m^2 (Second National Communication 2010, SNC).
- Flash flood in 2008 and 2013 resulting in loss of lives.
- Mauritius experienced its worst drought in 1999 and 2011.
- In 2003, percentage of completely bleached corals at Ile aux Benitiers, Belle Mare, Poudre d'Or and Albion were 56, 11, 22, and 2% respectively. Coral bleaching also occurred in 1998, 2004 and 2009 (Ministry of Fisheries).
- Mauritius and Rodrigues are experiencing an increasing number of cases of landslide occurrences. While in the late nineties there was only one dangerous site in Mauritius requiring strict precautionary measures, this number rose to 22 in 2005.

B. *Projected Impacts of Climate Change*

- The average temperature is expected to increase up to 2^{o} C by 2061 -2070 compared to 1996 - 2005. (Disaster Risk Reduction [DRR] Report 2012).

- According to study conducted under DRR 2012 in Mauritius the following are exposed to flood hazard:
    a. Some 5 -70 Km^2 of built up land and 19-30Km^2 of agricultural land.
    b. 2.4-3 Km of motorway, 18-29 Km of main roads and 68-109 Km of secondary roads.
- According to the Intergovernmental Panel on Climate Change (IPCC), 4th Assessment Report, sea level is expected to rise by up to 0.6m by 2100. However, latest revised figures indicate around 1m rise in sea level by 2100. For Mauritius with a sea level rise of the order of 0.60 m, the beach loss at Flic en Flacq (central part & near police station), La Preneuse & Le Morne coastal areas will amount to some 25 000 m^2 representing a loss, in potential rental value, of about Rs 1.5 million/ year. Latest National Aeronautic & Space Administration (NASA) report indicates serious polar ice melting and rising of sea level up to 1 meter is very likely. For Mauritius Seal Level will rise up to 49 cm by 2100 (DRR, 2012).
- According to the DRR Report 2012 the following point elements are at risk of coastal inundation (due to surges and SLR), landslide and flooding:

Typology of exposed point elements	N° of punctual elements at Innundation_risk
Hotel	36
Industrial site	2
Medical Facilities	9
Police station	2
School	11
Shopping mall	1

(Source DRR, 2012)

- The damages to building and infrastructures has been estimated to around MUR 59, 000 million for flooding and MUR 43, 000 million for inundation in 50 years (2070 horizon) (DRR, 2012).

- The total amount of economic value for element exposed at landslide risk are as follows:

	Value of the exposed element (landslide risk) (millions MUR)		
	Built up area	**Expansion area**	**Road**
Mauritius	217,000	19.300	5,900
Rodrigues	10,600		1,200

- Utilizable water resources will decrease by up to 13% by 2050.

- Heat stress will impact on productivity in the poultry and livestock sector
- Date of flowering may be modified such that fruiting period may coincide with cyclonic season;
- Reduction in sugar yield is expected to range from 47% to 65% with an increase in temperature of 2^{o}C.
- Propagation of vector-borne and infectious diseases as a result of higher temperature and recurrent floods.
- Increasing frequency of heat spells, giving rise to cardiovascular and pulmonary complications.
- Lengthening of the transmission period of important vector-borne diseases due to rise in temperature.
- Live corals to be reduced by 80-100% in the event of 3.28^{o}C rise in temperature by the year 2100.
- Migratory shifts in tuna aggregations thereby disrupting the local seafood hub activities and other fish based industries and may result in conflict over the stock both at a national and international level.
- Changes in fish stock distribution and fluctuations in abundance of conventionally fished and "new" species may disrupt existing allocation arrangements.

C. Measure being undertaken to address climate change in Mauritius

a) Africa Adaptation Programme

The Africa Adaptation Programme (AAP) is one of the major climate change adaptation programme. Implementation started in January 2010 and was successfully completed in February 2013. The AAP was funded by the Government of Japan to the tune of Rs 90 M.

The main objective of the AAP was to integrate and mainstream climate change adaptation into the institutional framework and into core development policy, strategies and plans of ROM. The key sectors considered under the AAP are Disaster Risk reduction (DRR), Environment, Fisheries, Agriculture, Education, Health, Tourism and Infrastructure. Other islands including Rodrigues, Agalega were also involved in the programme. The projects comprise the development of climate-resilient policies, strategies, legislations, action plans as well as capacity building, research and awareness raising. 31 activities have been completed under the programme.

Some of the key achievements under the AAP are as follows:

A. Long-term dynamic modeling

(i) A Disaster Risk Reduction Strategy and Action Plan, including Risk Maps in relation to inland flooding, landslide and coastal inundation for the Republic of Mauritius by SGI Studio Galli Ingegneria S.p.A. (Italy) in association with Centro Euro-Mediterraneo per i Cambiamenti Climatici S.c.a.r.l and Desai & Associates Ltd.

B. Policy Reports/Documents Produced

(i) A National Climate Change Adaptation Policy Framework by Dr Andrea Bassi, KnowlEdge Srl (Italy).

(ii) Policy Recommendations to mainstream climate change adaptation in the Environmental Impact Assessment and Integrated Coastal Zone Management process and guidelines by a team of 4 experts led by Dr Johnson Nkem, Policy Advisor UNDP.

(iii) Climate Change Adaptation Strategies and Action Plans in the Agricultural, Fisheries, Tourism for both Mauritius and Rodrigues and Water Sector for Rodrigues by Capital Guardians (Kenya).

(iv) A draft Climate Change Bill has been prepared by Dr Winston McCalla from Hamilton, Brown Hamilton Associates (Jamaica).

C. Institutional Strengthening through training of some 2600 professionals and other stakeholders for building resilience against climate change (Agriculture, Construction, Climate Modeling and Analysis, Disaster Risk Reduction, Education, Environment, Fisheries, Finance, Gender, Health, Tourism and Water).

(i) African Mayoral Consultation Forum in Port Louis, July 2011. 75 participants from local authorities attended.

(ii) Training for the Review and Development of Climate Resilient Policies in Mauritius and Rodrigues, August and October 2011.

(iii) Training of Trainers and Capacity Development on Mainstreaming Gender in Climate Change and Community-Based Adaptation, April 2012.

(iv) Development of pedagogical materials and teachers' guide on Climate Change Education and Training for Primary/Secondary School Teachers, Inspectors and Head Masters/Rectors, April 2012.

(v) Training of Health Professionals on climate-related health impacts, May 2012.

(vi) Training workshops for Architects and Engineers on Climate Change Adaptation in the Building Sector and training of Engineers on Climate Change Adaptation for Road Infrastructure, August 2012.

(vii) Regional workshop on Climate Financing - leveraging public finance to catalyze private sector engagement for climate resilient development, August 2012.

(viii) Training of onion planters on use of salinity meter, salinity management and mangrove plantation, August 2012.

(ix) Workshop on Climate Change Knowledge Management, September 2012.

(x) Workshop for Media group and Communication Managers, October 2012.

(xi) Workshops on climate change for strategic level stakeholders including MID Steering Committee Members, Gender and Youth Associations, October 2011 and October 2012.

(xii) Workshop on presentation of research findings for studies on climate change, December 2012.

(xiii) Workshop for Village Council Leaders on enhancing climate change resilience at village council level including distribution of plants and bins to local authorities, January 2013.

D. Sensitisation of some 25000 people on Climate Change across the Republic of Mauritius

(i) Awareness Campaigns . Awareness Week on Climate Change, Symposium and Exhibition, University of Mauritius, July 2011. A Mobile Graphic Exhibition (bus) on climate change was put on display at primary schools, secondary schools, Municipal Councils, District Councils, Social Centers and Commercial Centers around Mauritius, April 2012.

(ii) Exhibition on climate change at Rajiv Gandhi Science Centre, June 2012.

(iii) Climate Change Knowledge Fair in Mauritius, October 2012.

(iv) Climate Change Knowledge Fair in Rodrigues, January 2013.

E. Demonstration Projects Undertaken

(i) Coral farming activities at Albion, Pointe aux Sables and Trou aux Biches in Mauritius and at Graviers and Hermitage in Rodrigues, 2011 and 2012.

(ii) Installation of seawater temperature sensors at 5 stations in Rodrigues (Riviere Banane, Anse aux Anglais, Grand Baie, Plaine Corail and Pointe L'herbe), April – June 2012.

(iii) Provision of salinity meters and training of onion planters on the South East Coast of Mauritius and the plantation of mangroves at Petit Sables, Grand Sables and Bamboux Virieux, October 2012.

(iv) Setting up of an Endemic Garden and an Information Centre at Panchavati, December 2012.

(v) Awareness raising to enhance resilience of vulnerable communities including donation of equipment, December 2012 and January 2013.

(vi) Setting up of 7 Agro-meteorological Stations as part of an Agricultural Decision Support System in different regions namely at; Wooton, Richelieu, Flacq, Plaisance, Plaine Sophie, Reduit, and Barkly to provide timely and vital information to planters for a sustainable agriculture, January 2013.

F. Promotion of Research on Climate Change Adaptation

1) Research Projects undertaken

(i) Evaluation of the vulnerability of coastal communities to climate change in the island economies - The case of the Republic of Mauritius by Prof S K Sobhee, University of Mauritius.

(ii) Energy futures of Mauritius in a carbon constrained world by Mr X. Koenig, Ecological Living In Action Ltd.

(iii) Use of compost by farmers as an adaptation strategy for climate change: Land application and simulation studies by Dr (Mrs) G Somaroo, University of Mauritius.

(iv) Climate Change and agriculture in Mauritius - impacts and vulnerability assessment by Mr R Sultan, University of Mauritius.

(v) Assessing the impacts of climate change on the Phenology of Native Mauritian Plants by Mrs P Tatayah, Mauritius Wildlife Foundation.

(vi) The use of system dynamics approach to identify integrated coastal zone planning and management indicators for Mauritius: A performance evaluation model by Dr C Bokhoree, University of Technology, Mauritius.

(vii) Modeling the Influence of Large Scale Circulation Patterns on Precipitation and a Multivariate Drought Analysis for Mauritius by Mr A K Sohun,Scinova Consulting Ltd.

(viii) Development of Offshore Wind Maps for Mauritius by Mr K Kathapermall, Mauritius Research Council.

(ix) Safe and Sustainable Utilisation of Coal/Bagasse Ash in Agro-ecosystems as Soil Amendment for Crop Protection by Prof V Lalljee, University of Mauritius.

(x) Assessing the Potential Use of Coal Ash and Bagasse Ash as Inorganic Amendment in the Composting Process of Municipal Solid Wastes: Improvements in Compost Quality for Agronomic Applications by Prof (Mrs) R Mohee, University of Mauritius.

(xi) Encapsulated Use of Bottom Ash in Concrete by Prof Ramjeawon & Mr A Cadersa, University of Mauritius.

2) Setting up of a Climate Change Information Centre at the Ministry of Environment and Sustainable Development to provide up to date information on climate change for informed decision making.

3) Installation of a High Performance Data Server at the University of Mauritius for climate modeling and research purposes.

b) Technology Needs Assessment (TNA)

The Technological Needs Assessment project has also been completed in March 2013 and a technology action plans to implement technologies that reduce greenhouse gas emissions in the energy industries sector and support adaptation in the agricultural, water and coastal zone sectors to climate change that are consistent with national development priorities has been developed.

Initiatives in other key sectors

c) Agriculture Sector

A Food Security Fund has been set up to increase the resilience of Mauritius towards food self-sufficiency by increasing production of foodstuff locally and at the regional level by partnering with neighboring countries.

d) Water Sector

- An integrated water resources plan for harnessing additional water resources has been prepared, along with maintenance of water networks, undertaking hydrological studies, boosting efficiency of water usage and amendment to water-related legislations.
- Mini-Hydro power plants have been set up at La Nicoliere Feeder Canal and Midlands Dam

- Construction of additional storage dams is being explored and a Rs 3 billion dam (Bagatelle Dam) is scheduled for completion by 2013.

e) Coastal Zone

- Setback policies: increased setback from 15m to 30m of the high-water mark;
- Appropriate frameworks for the sustainable management of sensitive coastal zones and environmentally sensitive areas have been elaborated and the recommendations are under implementation;
- An ICZM Framework has been developed.
- A capacity development on coastal protection and rehabilitation project in Mauritius in underway.

f) Fisheries

- Marine Ranching to enhance and sustain marine resources and ultimately sustain livelihoods.
- In 2012, a total of 100,000 fingerlings of 'cordonnier' released at the Blue Bay Marine Park – La Cambuse, the Fishing Reserves of Poste Lafayette, Trou d'Eau Douce and Riviere Noire.
- Coral Farming in ocean based nurseries in view to restore the degraded coral reefs around the island.
- Mangrove propagation to restore mangroves with a view to rehabilitate and reforest denuded areas and sensitise the younger generation and the general public on the concept of coastal environment protection.