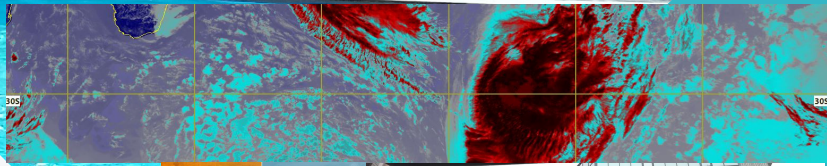




**A TOOLKIT FOR
PRIVATE
SECTOR AND
BUSINESSES
ON CLIMATE
CHANGE**



**MINISTRY OF SOCIAL SECURITY, NATIONAL
SOLIDARITY, AND ENVIRONMENT AND
SUSTAINABLE DEVELOPMENT
(ENVIRONMENT AND SUSTAINABLE
DEVELOPMENT DIVISION)**

REPUBLIC OF MAURITIUS

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Foreword

Climate change is one of the most daunting challenges which humanity is facing. It is considerably disrupting national economies, affecting livelihood, and the well-being of people in every corners of the planet. Weather patterns are changing, sea levels are rising, weather events are becoming more extreme and greenhouse gas emissions are now at their highest levels in history. Millions of people around the world have suffered and continue to suffer from extreme weather events. We have never met with a greater sense of urgency. Climate change threatens to affect all aspects of the development agenda, irrespective of countries: from poverty eradication to health care, and from economic growth to disaster risk reduction. It will represent a major impediment towards achieving sustainable development goals.

In the light of the growing concerns linked to climate change, Article 6 of the United Nations Framework Convention on Climate Change sought to promote education and awareness raising as a major pillar to trigger global climate action to ensure that everyone knows both the dangers of climate change and what is required to adapt and mitigate its impacts. Education and training are integral in enabling citizens' contributions to local and global efforts to meet the climate change challenge.

It is noteworthy that Mauritius is also being severely impacted by climate change. We are regularly being quoted among the most vulnerable countries on the planet. For instance, the 2018 World Risk Report ranked Mauritius as the 16th country with the highest disaster risk and 10th as the most exposed to natural hazards. As a matter of fact local climate indicators are all showing signs of serious concerns. Mauritius has experienced an increase in air temperature by up to 1.2 degree Celsius and the sea level is rising at an accelerated rate of 5.6 mm per year. A reduction of 8% over the last 50 years has also been observed in the annual precipitation. The width of our beaches, which is a major pillar of our economy, has been eroded by some 20 metres over the last 10 years.

It is recognized that climate change education and public awareness are vital tools to build resilience against climate change and extreme events. The Government of Mauritius has an on-going sensitization and public awareness programme in place with the aim to promote climate change literacy. It involves targeting various community groups including youth, women, senior citizens as well as sectors such as education, agriculture, fisheries, infrastructure, water, energy, waste and health, among others.

The approach being used involves developing tailor made sensitization materials such as audio visuals, sensitization toolkits, posters, pamphlets, roller banners, 3D models, interactive digital tools, card games, PowerPoint presentations and mounted exhibitions to hold relevant and effective sensitization activities with various target groups.

This toolkit has been specifically developed to provide the private sector and businesses with a detailed insight of climate change including the causes, the consequences, the impacts, the challenges and the opportunities to get involved as an individual solution oriented actions. Increased knowledge will enable companies to better play their role in climate adaptation and mitigation, and make our country climate change resilient and to progress towards a low carbon economy.

Abbreviations and Acronyms

AfRP	Africa Regional Platform
BUR	Biennial Update Report
CC	Climate Change
CCGT	Cycle Gas Turbine
CCIC	Climate Change Information Centre
CDRP	Community Disaster Response Programme
CEB	Central Electricity Board
CGE	CEB Green Energy
CSR	Corporate Social Responsibility
CWA	Central Water Authority
DOWA	Deep Ocean Water Application
EEMO	Energy Efficiency Management Office
EPZ	Export Processing Zone
EWEAS	Early Warning and Emergency Alert System
GHG	Greenhouse Gases
INDC	Intended Nationally Determined Contributions
IPCC	Intergovernmental Panel on Climate Change
JICA	Japan International Cooperation Agency
LNG	Liquefied Natural Gas
MARENA	Mauritius Renewable Energy Agency
NAMA	Nationally Appropriate Mitigation Actions
NGO	Non-Governmental Organisation
NPCS	National Parks and Conservation Services
ONEIG	Ontario Nurses for the Environment Interest Group
RGSC	Rajiv Gandhi Science Centre
RNAO	Registered Nurses' Association of Ontario
SADC	Southern African Development Community
SCAP	Smoke Control Action Plan
SME	Small and Medium Enterprises
SWH	Solar Water Heater
SWIO	South West Indian Ocean
TNC	Third National Communication
UNISDR	United Nations Office for Disaster Risk Reduction
URA	Utility Regulatory Authority

About This Manual

This manual is designed to provide an overall picture of climate change. It introduces aspects such as:

- What is climate change?
- Why is climate change happening?
- What are the projected impacts of climate change?
- What can be done to better address the challenges of climate change?

It lays emphasis on the science of climate change, which is deemed essential in providing a better understanding of its broader picture.

This manual aims to bring climate change closer to the business community by providing concrete examples and guidelines of how to better deal with climate change. Additionally, it explains the observed and projected impacts of climatic change.

The manual is specifically designed to direct business actions towards an eco-friendly future. It provides a variety of options for mitigating climate change and adapting to its impacts by business-led initiatives in Mauritius and around the world. Such actions are crucial as the challenge goes beyond raising awareness and inducing behavioural changes.



Introduction

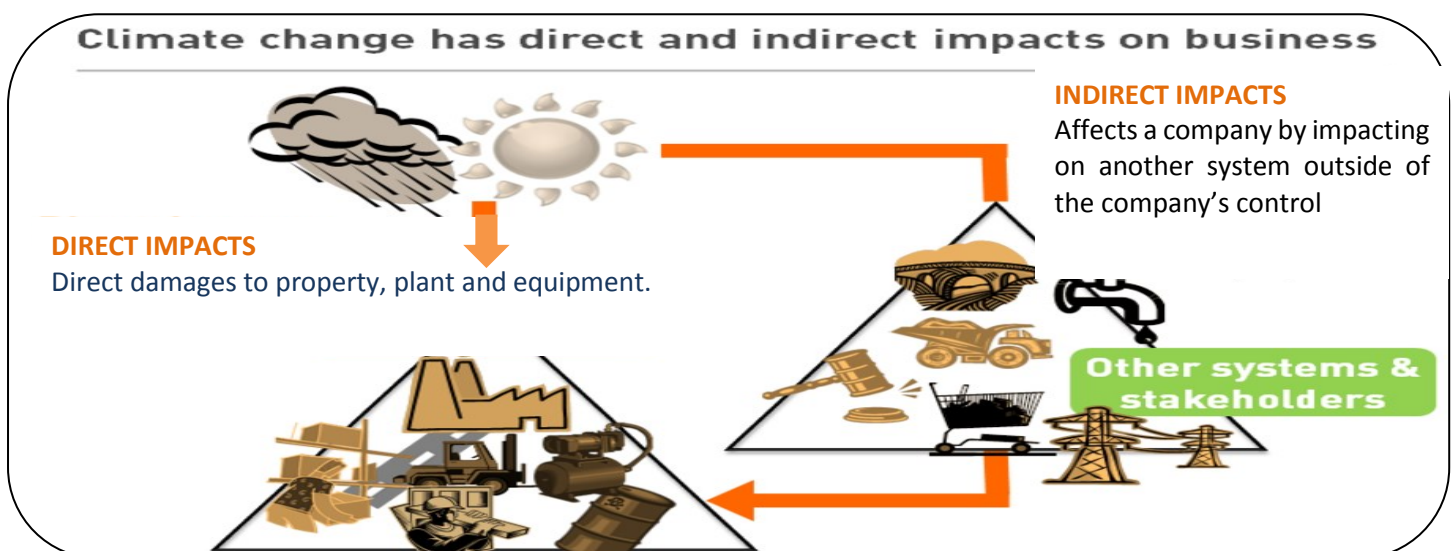
Climate Change and the Impacts on the Private Sector and Businesses

We need not be reminded that climate change is one of the most daunting challenges which humanity is facing. It is considerably disrupting national economies, affecting livelihood, and costing people, communities, business enterprises as well as countries today and even more tomorrow.

Weather patterns are changing, sea levels are rising, weather events are becoming more extreme and greenhouse gas emissions are now at their highest levels in history. Millions of people around the world have suffered and continue to suffer from extreme weather events. We have never met with a greater sense of urgency.

Scientific evidence clearly indicates the increasing likelihood and severity of climate-related threats, including: water shortages and droughts; flooding; extreme, unpredictable weather patterns and events; declining agricultural yields; spread of disease and decline in human health; and loss of biodiversity.

Just like all socio-economic sectors, the business community should also be concerned about climate change as it could impact negatively on their sector. Aspects such as site location, nature of the business activities, ability premises and infrastructure to withstand extreme weather events, the customer base and the length, location and diversity of supply chain, among others can be highly relevant factor which could increase vulnerability of the business community. Likewise, the business community can be a major actor to mitigate climate change by promoting renewable energy technologies and green environment initiatives in their activities. They can as well be key partners and allies in helping vulnerable communities cope with climate change risks and impacts.



Source: Climate Expert

The need for Private Sector and Businesses to have knowledge on Climate Change

Reasons:

- ✓ Climate change poses risks along the entire supply chain.
- ✓ Climate change is expensive; for instance, analysis by the South West Indian Ocean Risk Assessment and Financing Initiative (RAFI) project (2016) on the Flood risk for Mauritius stated that Mauritius would experience around USD 22 million each year in direct losses from flooding.
- ✓ A smart climate policy helps attract and engage employees.
- ✓ The low carbon economy is a growth market of the FUTURE.
- ✓ Cutting emissions usually goes hand-in-hand with efficiency and cost savings.
- ✓ It raises awareness and helps enterprises to get better prepared against the impacts of Climate Change.



International Initiatives on Climate Change

There are several international initiatives that work on climate change issues.

United Nations Framework Convention on Climate Change and the Kyoto Protocol

The United Nations Framework Convention on Climate Change (UNFCCC) and its Kyoto Protocol are the foundation of the international climate change governance. The Kyoto Protocol committed industrialized countries to achieving a specific level of greenhouse gas (GHG) emissions reductions.

Text of the UNFCCC, which entered into force on 21 March 1994, established an international framework for governments, working together, to develop a policy proposal to reduce the effects of climate change and adapt to its threats.

The Kyoto Protocol was negotiated in Kyoto, Japan, in December 1997 which was ratified by many countries, committed to reducing their emissions of carbon dioxide and five other greenhouse gases. The Kyoto Protocol of the UNFCCC is an amendment to the international treaty on climate change that obliges signatory nations to reduce emissions. It entered into force on 16 February 2005.

The objective of the protocol is the stabilization of greenhouse gas concentrations in the atmosphere at a level that would prevent disruption of the climate system.

Intergovernmental Panel on Climate Change (IPCC)

The Intergovernmental Panel on Climate Change (IPCC) organisation was formed by thousands of scientists from many countries. Members of the IPCC, coordinated through the United Nations, have been collaborating since 1988 to interpret data relating to climate change. In 2007 the IPCC, along with Al Gore, was awarded the Nobel Peace Prize for their efforts in studying climate change.

The Republic of Mauritius (RoM) is among the first countries to ratify the United Nations Framework Convention on Climate Change (UNFCCC) in 1992 and one among the first 15 countries to sign and ratify the Paris Agreement on 22 April 2016. This demonstrates its willingness as a responsible member of the global community to seek and achieve global solutions on climate change matters.

International Initiatives

IPCC oversees the technical and scientific aspects of Climate Change.

The UN Environment provides a list of international initiatives on climate change:

-  Absorb, Anticipate, Reshape (A2R)
-  Africa Renewable Energy Initiative
-  Climate and Clean Air Coalition
-  Climate Initiatives Platform
-  Climate Technology Centre and Network
-  Global Centre of Excellence on Climate Adaptation
-  Global Environment Facility
-  Green Climate Fund
-  GRID-Arendal
-  International Environmental Technology Centre
-  Partnership with the Technical University of Denmark (DTU)
-  Portfolio Decarbonization Coalition
-  Programme for Action on the Green Economy
-  The Adaptation Fund
-  UN Framework Convention on Climate Change
-  UN Environment Finance Initiative
-  UN Environment International Ecosystem Management Partnership
-  World Conservation Monitoring Centre

Source: UN Environment¹:

¹ <https://www.unenvironment.org/explore-topics/climate-change/about-climate-change/climate-change-initiatives-and-partnerships>

National (local) Initiatives

Climate Change and related Conventions signed by the Republic of Mauritius

- ❖ UNFCCC
- ❖ Kyoto Protocol under the UNFCCC
- ❖ Vienna Convention for the Protection of the Ozone Layer
- ❖ Montreal Protocol under the Vienna Convention
- ❖ More conventions can be found at the website of the Ministry².

² <http://environment.govmu.org/English/Pages/Conventions/Conventions.aspx>, and
<http://environment.govmu.org/English/Pages/Conventions/International-Conventions.aspx>



What is Climate Change?

Weather vs Climate



Weather describes the day-to-day conditions in a particular place. Weather is what it's like outside today, tomorrow, next week, next month, etc. For example, the weather can be cloudy, sunny, rainy, windy, hot or cold.

Climate describes the average weather conditions in a place over relatively long periods of time (e.g. 30 years). For example,

Curepipe: Cool and Humid,

Rivière-Noire: Hot and Dry

Climate change is the change in the usual weather found in a country or region. This could be a change in rainfall patterns, or a change in temperature. Climate takes longer time to change.

Examples in Mauritius: Long ago, there was a specific period for flowering of mango trees, nowadays flowering can occur more frequently in some years and less flowering occurs in some other years.

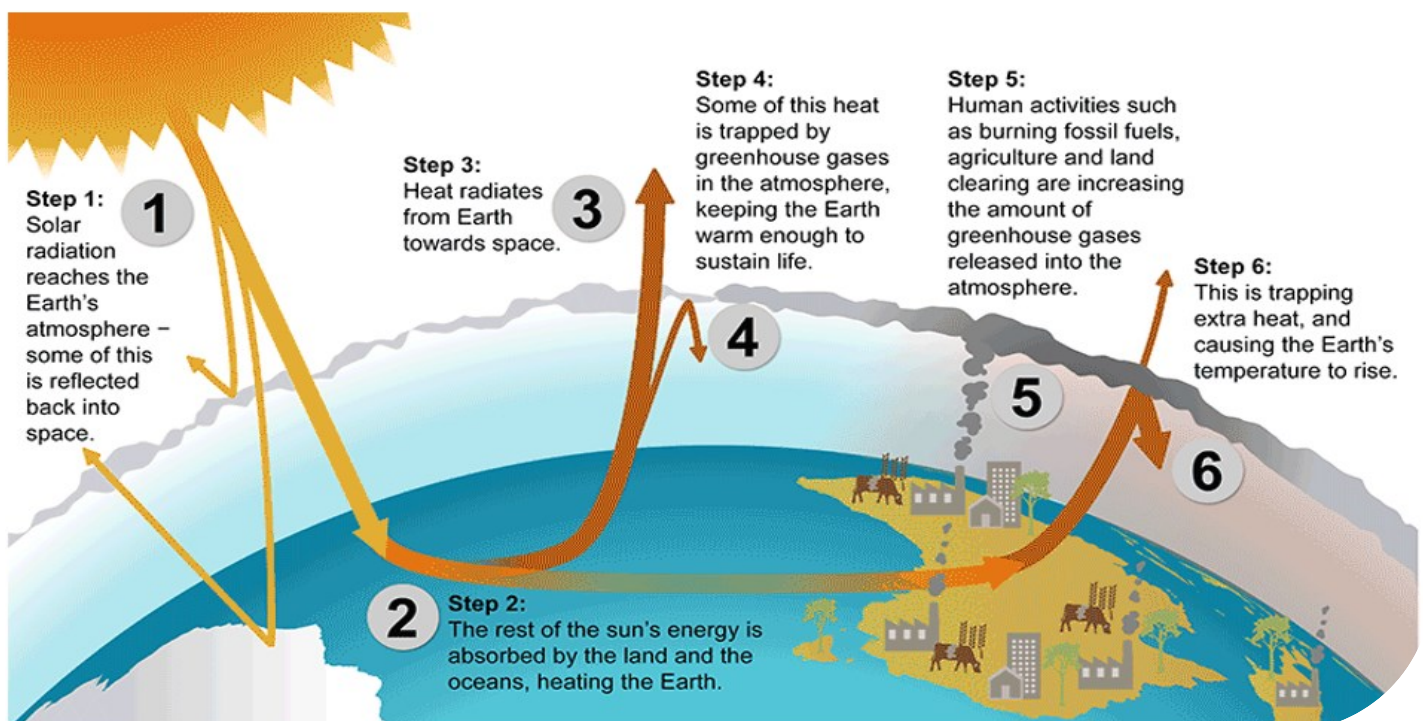
Examples in other countries: Decreasing amount of snow falls affect the water supplies that are used for farming and the timing of the winter snow season is shifting.

The Greenhouse Effect

When solar radiation hits the Earth's surface, some of this energy is absorbed and warms both the ground and the oceans, while rest escapes back into space. However, some of it is trapped in the atmosphere, which further warms the Earth. This is called the **greenhouse effect** because Earth's atmosphere acts like the glass panes around a greenhouse and thus warming the inside.

The Earth's atmosphere contains gases such as water vapour, carbon dioxide (CO₂), methane (CH₄) and nitrous oxide (N₂O) known as **greenhouse gases**, and are the primary gases that retain the thermal energy reflected from the Earth's surface. The greenhouse effect is what normally keeps our planet at a comfortable temperature. Unfortunately, human activities are increasing the amount of greenhouse gases in the atmosphere, which traps extra heat and further raises the surface temperature of the Earth.

Climate change mechanism – The greenhouse effect



Global Warming

Global warming refers to the rise in the temperatures of Earth's oceans and atmosphere. This is mainly due to the increasing concentration of greenhouse gases in the atmosphere as a result of human activities.

Activity 1

THINK ABOUT IT

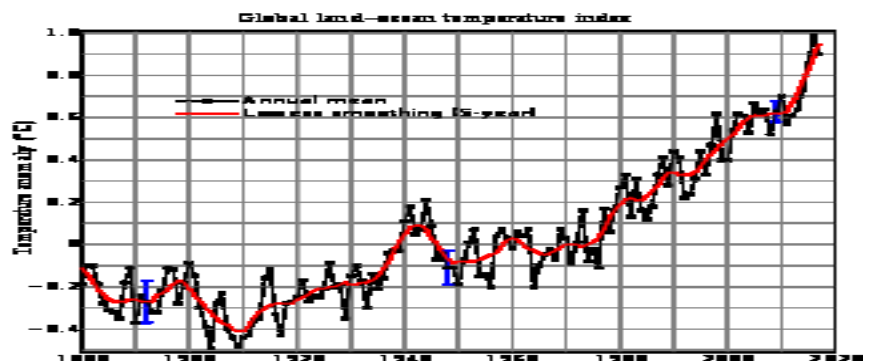
How does your enterprise view climate change? Is it a problem for the future and not now? Will climate change not affect private sectors and businesses? Can enterprises help to make a change?

Global historical trends

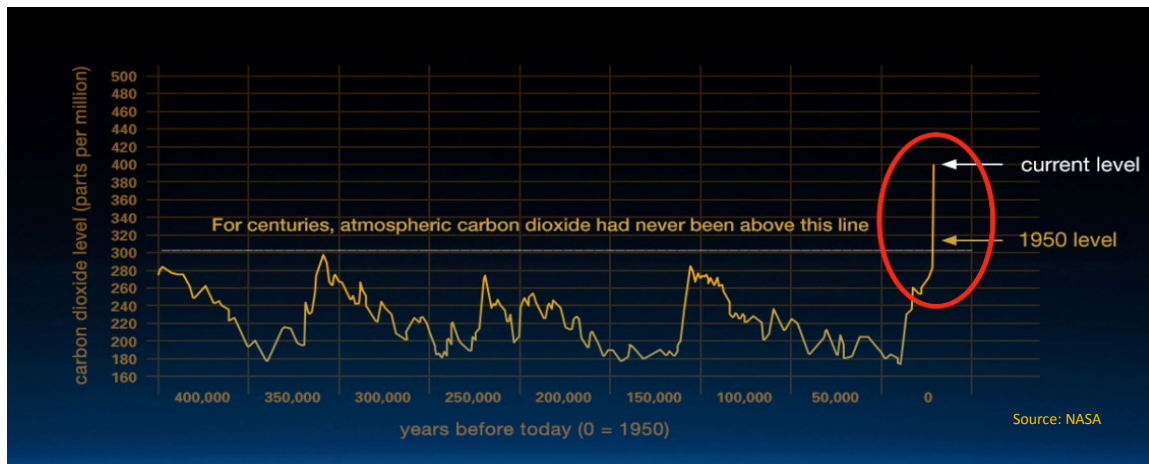
The Earth's climate has changed throughout history. Just in the last 650,000 years there have been seven cycles of glacial advance and retreat, with the abrupt end of the last ice age about 11,500 years ago marking the beginning of the modern climate era — and of human civilization. Most of these climate changes are due to very small variations in Earth's orbit that change the amount of solar energy our planet receives.

1. Temperature

The global temperature has been constantly increasing. The resulting negative impacts will keep on increasing in intensity if nothing is done.



2. CO₂ (Carbon dioxide) Concentration



CO₂ is the main greenhouse gas released by various human and natural activities. The concentration of CO₂ in the atmosphere, caused by human activities, has increased considerably in recent years. Many scientists agree on the fact that the increased concentration of CO₂ in the atmosphere is the main driving force behind climate change.

Ozone Layer

Is the hole in the Ozone layer responsible for Climate Change?

No! Ozone is a very useful gas high up in the Earth's lower portion of the stratosphere, located at around 20 – 30 kilometres above the Earth's surface that absorbs harmful ultraviolet radiation from the sun. When scientists realized that man-made gases used in fridges and aerosols were making a hole in the ozone layer, the international community set about phasing them out. An agreement called the Montreal Protocol was drawn up to gradually to phase out Chlorofluorocarbons (CFCs) in 2010 and hydrochlorofluorocarbons (HCFCs) in 2030.

Efforts have been so successful that the ozone layer is on track to recover by the middle of the 21st century. Unfortunately, **fluorinated gases**, known as F-gases, eventually replaced the CFCs. These have no effect on the ozone layer but are powerful greenhouse gases. Once again, the world took action: in October 2016, under the Kigali Amendment, the 195 countries that signed the Montreal Protocol agreed to gradually reduce the imports of these gases – the Hydrofluorocarbons (HFCs) as from 2024 for developing countries like Mauritius.



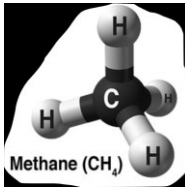
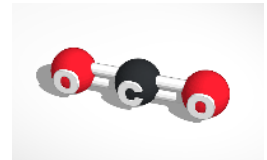
Causes and Impacts of Climate Change



Causes of Global Warming and Climate Change

Greenhouse Gases (GHGs)

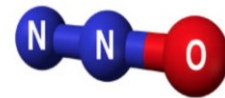
Carbon dioxide (CO₂) is the primary greenhouse gas emitted into the atmosphere through human activities. Humans are also influencing the ability of natural sinks, like forests, to **remove** (absorb) CO₂ from the atmosphere.



Methane (CH₄) is emitted during the production, use and transport of coal, natural gas, and oil. Methane emissions also result from **livestock** and other **agricultural practices** and by the **decay of organic waste** in municipal solid waste landfills.

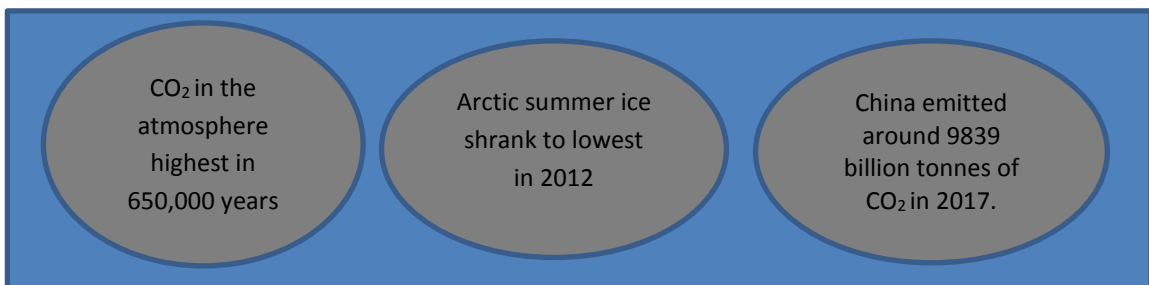
Nitrous oxide (N₂O) is emitted during **agricultural** and **industrial activities**, as well as during **combustion** of fossil fuels and solid waste.

Nitrous oxide (N₂O)



Fluorinated gases: Hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes (especially refrigeration and air conditioning).

These gases are typically emitted in smaller quantities, but because they are powerful greenhouse gases, they are sometimes referred to as High Global Warming Potential gases ("High GWP gases")



Factors leading to Climate Change

Natural Causes

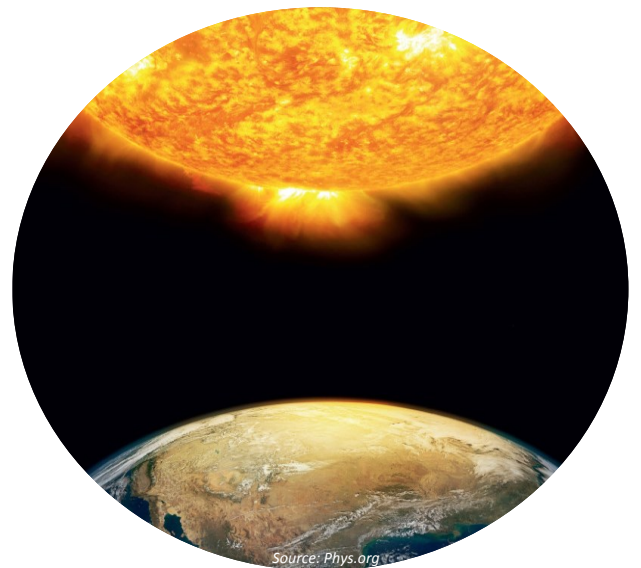
Volcanic Eruption



Volcanic eruptions emit carbon dioxide (CO₂), a gas which is responsible for global warming. On the other hand, volcanic ash or dust and sulfur dioxide can block a percentage of sunlight causing a temporary cooling effect.

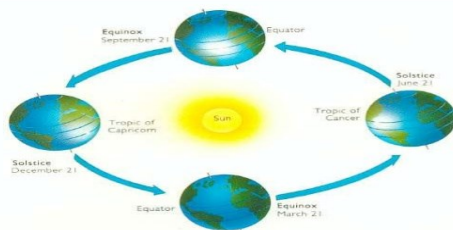
Variation in Solar Radiation

The Sun's radiation drives the world biological and physical processes. Changes in solar activities impact upon our climate as the rate of solar heating of the Earth and its atmosphere and cloud forming processes are altered.



Orbital Changes

- Earth orbital changes-
 - More tilt = warmer summers & colder winters
 - Less tilt = cooler summers & milder winters



Source: LinkedIn Learning

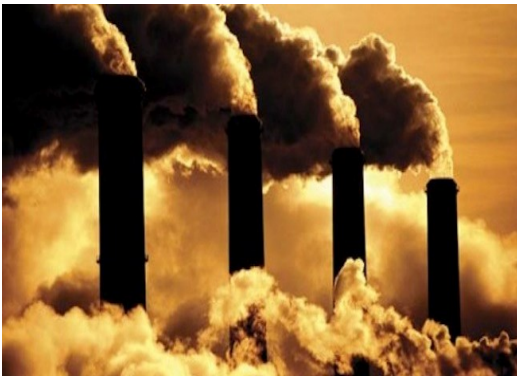
Climate change and Earth's orbit are definitely related. This is because the more Earth is exposed to solar radiation, the warmer the planet gets. Earth orbital changes are one of the natural causes of climate change.

Human Induced Factors

Activities that release Greenhouse Gases

The world's leading climate experts confirm that human activities are the main cause of the warming observed since the Industrial Revolution (IPCC). Greenhouse gases are the main drivers of a warmer planet as these gases trap heat. Some human activities that increase the global temperature resulting in climate change are illustrated as follows.

Burning of fossil fuel



Source: econews.com.au

Burning coal, oil and gas produce carbon dioxide and nitrous oxide.

Cutting down rainforest



Source: Smithsonian Magazine

Trees help to regulate the climate by absorbing CO₂ from the atmosphere. Cutting down them will increase CO₂ in the atmosphere.

Increased livestock farming



Source: Livestock farming blog

Cows and sheep produce large amounts of methane when they digest their food.

Use of fertilizers



Source: Free Press Journal

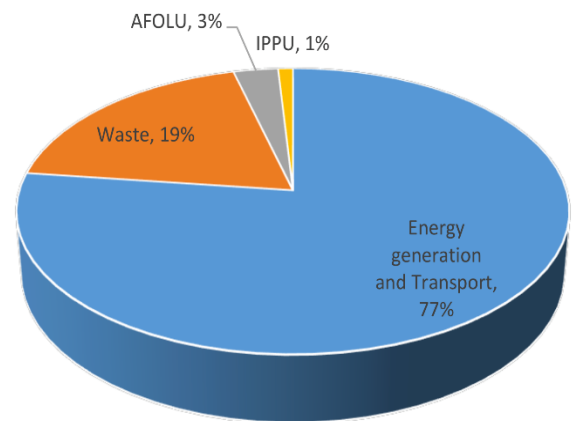
Fertilizers that contain nitrogen increase nitrous oxide emission, which is one of the greenhouse gases.

GHG Sources in Mauritius

The GHGs are increasing mainly because of uncontrolled human activities such as:

- Producing and using energy,
- Transportation,
- Deforestation and
- Waste generations.

In **Mauritius**, around 77% of the GHG emissions are from the energy sector, which includes electricity generation and transport. Waste releases some 19% of the emissions. Industrial processes and product use (*IPPU*) emit around 1% of GHGs, while Agriculture, Forestry and other land use (*AFOLU*) accounted for around 3% of emissions (*source: TNC 2016*).



DID YOU

KNOW...?

Global warming 'solved' a land dispute between India and Bangladesh because...



...the disputed island simply

disappeared.

Impacts of Climate Change Globally

Human activities are estimated to have caused approximately 1.0°C of global warming above pre-industrial levels, with a likely range of 0.8°C to 1.2°C. Global warming is likely to reach 1.5°C between 2030 and 2052 if it continues to increase at the current rate (IPCC Special Report on Global Warming of 1.5°C).

Stronger and more recurrent cyclones and extreme weather



Life and livelihood are threatened (scarcity of food, decrease in harvest/ fishing, etc.)



Increase in number and intensity of flash floods



More prolonged droughts



Intense heat and fire



Melting of glaciers

Activity 2

Identify the main activities in your organisation that are sources of GHG emissions.

.....

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**DID YOU
KNOW...?**

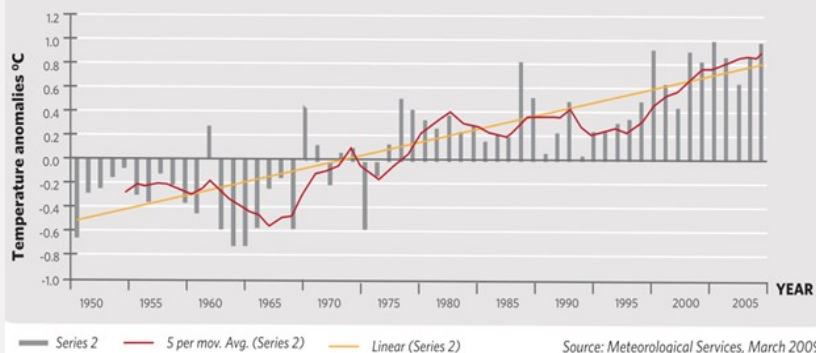
Fossil fuel burning currently adds nearly **6 BILLION TONS** of CO₂ to the atmosphere yearly, while...
....Oceans and forests only remove **HALF** of this CO₂.

Observed and Projected Impacts of Climate Change in Mauritius

- ❖ Even if Mauritius contributes only 0.01% of global greenhouse gas emissions, it is being disproportionately impacted by climate change.
- ❖ The 2018 World Risk Report has ranked Mauritius as the 16th country with the highest disaster risk and 10th as the most exposed to natural hazards.

TEMPERATURE TRENDS FOR MAURITIUS

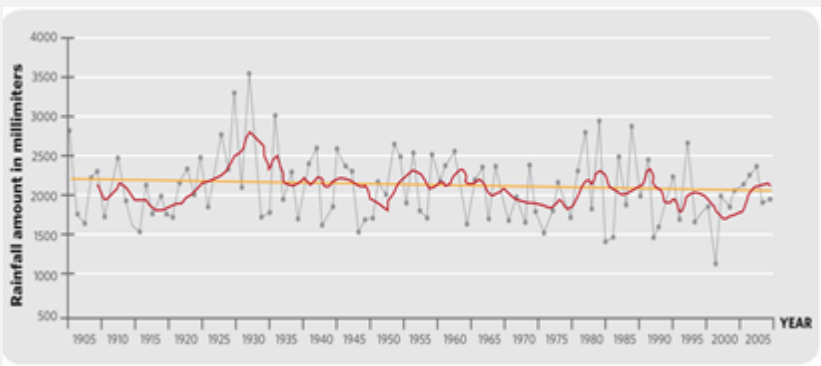
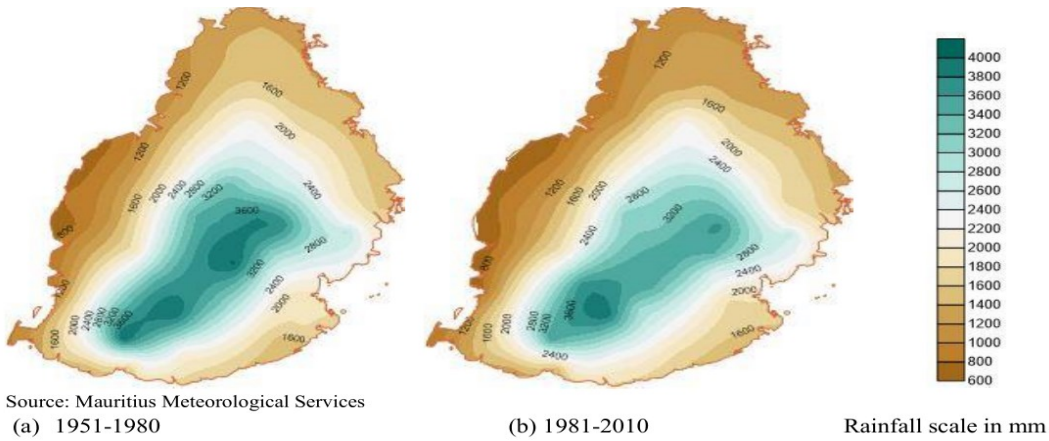
- ❖ There is a definite warming trend.
- ❖ Average temperature is increasing at the rate of 0.15 °C every decade.
- ❖ Climate records over the period 1951-2014 show a significant warming trend of about 1.2°C.



The average temperatures have increased by 0.74°C at Vacoas (high grounds) and by 1.1°C at Plaisance (coastal areas), when compared to the 1961 - 1990 long term mean.

RAINFALL PATTERNS IN MAURITIUS

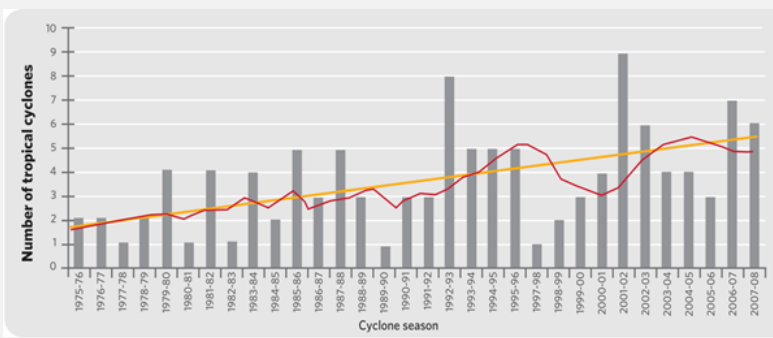
CHANGES IN RAINFALL PATTERN BETWEEN TIME PERIOD 1951 -1980 AND 1981-2010



There has been a decreasing trend in annual rainfall of 8% over Mauritius since the 1950s.

This decline has been accompanied by less rainy days and more consecutive dry days.

TRENDS IN EXTREME EVENTS



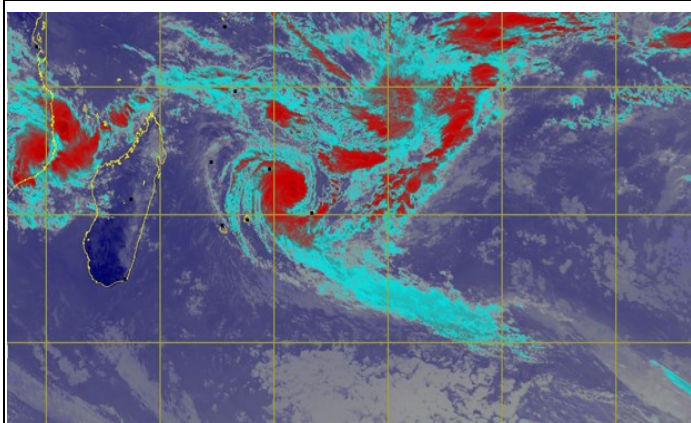
Since the last decade, there has been rapid intensification of tropical storms in the South West Indian Ocean (SWIO).

An example is cyclone Fantala in 2016 with gusts in the order of 345 km/hr. In 2019, 10 cyclones have formed, some have been devastating including for Rodrigues.

SEA LEVEL RISE

Sea level rise has been observed to be accelerating in the last decade at an average rate of 5.6 mm/yr compared to the global value of 3.2 mm/yr. (Third National Communication (TNC), 2016).

CYCLONIC WEATHER



Our exposure to cyclones is increasing. The impacts and intensity of the cyclones keep on increasing with time.

Due to the gusts and rainfall from cyclone Fakir on 24 Apr 2018, at Bois-des-Amourettes, many electrical poles and trees fell down.



The hoardings and signboards at Bagatelle and other places also fell down due to the violent winds of cyclone Fakir in 2018.

Picture Source: l'Express



Storm surge at Caudan due to cyclone Bejisa on 16 Jan 2014.

Many coastal regions, routes and beaches were inundated due to Berguitta cyclone on 16 Jan 2018 especially at Côteau-Raffin.



Picture Sources: *l'Express*

Activity 3

1. Tick all the factors below which are likely to cause climate change

- Planting trees
- Using more fertilisers
- Reducing wastes
- Driving a petrol driven car

2. State what could happen to our coral reefs if there is 1.5 °C rise in global average temperature

3. The intensity of cyclones is increasing with the advent of climate change

- True
- False

Observed Impacts

Water Shortages and Related Impacts



Due to the overall warming of the earth, Mauritius is having warmer summers. Water scarcity is becoming more frequent.

In November 2011, the Mare-aux-Vacoas reservoir was only 29.2% filled which led to a disruption in the water supplies to different parts of the country.

Beach Erosion



Accentuated beach erosion has shrunk the width of beaches around certain coastal areas in Mauritius by up to 10 meters over the past eight years.

Damage to Infrastructure



The Terre Rouge-Verdun road was damaged due to landslide after a heavy downpour.

Damage to Buildings

Regions such as Chitrakoot and Quatre Soeurs have recurrently been affected by landslide events such that residential buildings are prone to cracks and damages.



Picture Source: l'Express & Le Mauricien & hacklog

There has been an increase in the frequency of extreme weather events and more frequent torrential rains, the latter causing 11 deaths in March 2013. During the heavy rainfall in January 2015, around 250 sites were flooded in Mauritius. The flash flood of May 2017 affected around 74 household in the Flacq region namely, Central Flacq and Poste de Flacq (Cite Hibiscus, Camp Poorun and Cite Debarcadere).

The flooding at Cottage and surrounding regions on 17 December 2018, have resulted into severe damage to personal properties and public infrastructure. Government is implementing an Emergency Flood Rehabilitation Programme which would focus, inter alia, on the construction of new drains and detention basins.

Moreover, on 09 April 2019, flooding has caused major damage to material loss at Fond du Sac. To this effect, some 110 households were compensated.

Impacts on Agriculture



A rise in temperature is resulting in an increased incidence of pests and diseases. It has been observed that bugs (small insects) are increasing in numbers and are a direct threat to some vegetation.

The decreasing trend in annual rainfall of 8% over Mauritius since the 1950s, and an increase in evapotranspiration due to global warming may lead to a decline in agricultural yield by as much as 15-25% in the long run (TNC).



Coral Bleaching



Healthy Coral Reef



After an algal bloom (dead corals)



Totally bleached corals

Warmer seas and ocean acidification causing coral bleaching due to CO₂ absorption.

Activity 4

After natural disasters (e.g. flood, drought, cyclone), many properties and other assets are devastated, but some of them recovered quickly. Tick the reasons why some recovered?

- a. They make provision for food reserve
- b. They have protected and durable infrastructures
- c. They used most of their water reserves
- d. They have no insurance
- e. their land was vulnerable to natural disasters
- f. Their roads were built on the proper ground and well protected with proper drainage
- g. Their houses are not robust enough to withstand extreme weather
- h. They easily contacted emergency services where they live

DID YOU

KNOW...?

Corals are **ALIVE!** They are very fragile animals which have existed for over

400 million years.

However, many of the species of corals are listed as

Endangered or Critically Endangered.

Some Projected Impacts of Climate Change in Mauritius

- A temperature rise of up to 2°C is projected by 2061 – 2070.
- There is a decreasing trend of 8% in the annual rainfall and utilisable water resources will decline by up to 13% by 2050.
- Sea level rise is projected to be of the order of 49cm by 2100.
- Mauritius is likely to experience an increase in the frequency of extreme weather events such as torrential rains resulting in flash flood, and more intense tropical cyclones.
- According to the UN report 'SIDS in Numbers 2017' Mauritius is projected to become a water stressed country by 2025 and its agricultural production may decline by as much as 30%.
- Live coral are expected to decrease by 80-100% by 2100 if there is a rise of 3.8°C in temperature.

Emergency Numbers

SAMU: 114

Fire Services: 115

Coastguards: 212 2747

Police: 112/999

CEB (Electricity): 130

CWA (Water): 170

National Directory: 150

**Weather: 171 and 96 for
cyclone reports**



- ▶ World Environment Day - WED (June 5)
- ▶ World Wetlands Day (February 2)
- ▶ International Day of Forests (March 21)
- ▶ World Water Day (March 22)
- ▶ Earth Day (April 22)
- ▶ International Migratory Bird Day (May 3)
- ▶ International Day for Biological (May 22)
- ▶ World Oceans Day (June 8)
- ▶ World Day to Combat Desertification and Drought (June 17)
- ▶ International Day for the Preservation of the Ozone Layer (September 16)
- ▶ Clean Up the World (third week-end in September)
- ▶ Zero Emissions Day (September 21)
- ▶ International Day for Natural Disaster Reduction (second Wednesday in October)

Actions to Combat Climate Change



WAYS TO COMBAT CLIMATE

These are the two fundamental ways to combat climate change:

- Mitigation
- Adaptation



What is Mitigation & Adaptation?

Mitigation

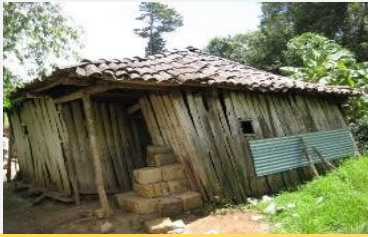
Mitigation refers to the actions that are taken to reduce and curb greenhouse gas emissions in an attempt to slow the process of climate change.

Adaptation

Adaptation refers to the measures that are based on reducing vulnerability to the effects of climate change.

What is Climate Change Vulnerability?

- ✚ Vulnerability is the susceptibility of exposed elements or assets to suffer damage and loss.
- ✚ Each type of exposed element can be affected by the hazard (i.e. climate change) in different ways.
- ✚ For example, a certain wind speed affects a wooden house and a concrete building differently.



Vulnerability depends on three things:

1. Exposure
2. Sensitivity
3. Adaptive Capacity

Is everyone vulnerable to the same extent?

Not everyone has same vulnerability. It depends on many factors such as health, wealth, location around the globe, etc. For example:

- ✚ Poor people are more vulnerable as they have fewer facilities in terms of infrastructure and shelter.
- ✚ Vulnerability also depends on age; for example, children and old people tend to be more vulnerable.



Adaptive Measures in Key Sectors

Health

Mosquito proliferation

Due to an increase in the frequency of extreme weather events – intermittent heat waves varying from 33 to 37°C, cyclones and flash floods – weather factors are conducive to the proliferation of vector-borne diseases by mosquitoes and bacteria leading towards health problems such as malaria and food poisoning.



Mosquito control especially in school premises



Sensitization campaigns



Use of mosquito coils, repellents, sprays, etc.

There is a need to prevent the proliferation of mosquitoes and to consume food that has been freshly prepared.

Disaster Risk Reduction and Management

With the unpredictable changes in weather patterns, the youths are at risk of being victims to flash floods amidst other calamities. Many related NGOs and forces have started to carry out simulation exercises and drills to help the youngsters be better prepared for such natural disasters.



Actions to Combat Climate Change

Sensitisation

Climate Change education and related environmental topics are taught as from pre-primary till tertiary levels.



Extra-curricular activities related to environment are organised on special events like the Earth day, Environment day, wetlands day, etc.

Activities like distribution of information materials, essay and drawing competitions, project presentations, debates and Slam are organised on these days.



World wetland day at Goodlands SSS



Slam presented by students of Satya Sai School of Mauritius



Children visiting the 'Bis Lamer' by REEF Conservation

Agriculture and Food Security

In the field of Agriculture and food security, the following adaptation actions are encouraged:

Cultivation of more drought and heat resistant varieties of food crops.



Practice of trash blanketing in sugarcane fields



Shifting towards soilless cultures and sheltered farming



Improved livestock housing and breeding



Reduction in the use of irrigation water and fertilizer, through improved techniques e.g pivot and drip irrigation systems and fertilization technology



Coastal Management and Tourism

In the coastal management and tourism sector, some of the following key measures have been undertaken to combat accentuated beach erosion around certain coastal areas as in the examples that follow.



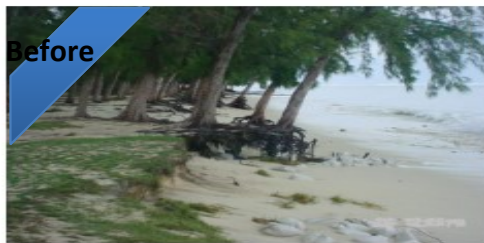
Rock revetment for shoreline protection at Baie-du-Cap



Beach nourishment at La Preneuse

In addition, various adaptation programmes are being implemented; for example, the minimum setback from high water mark has been increased from 15m to 30m for hotels and residential coastal development. An Integrated Coastal Zone Management Framework has been developed and many coastal activities are controlled through the EIA mechanism.

The increased erosion process at Flic en Flac and Rivière des Galets beach required beach protection works to reduce the effects of erosion.

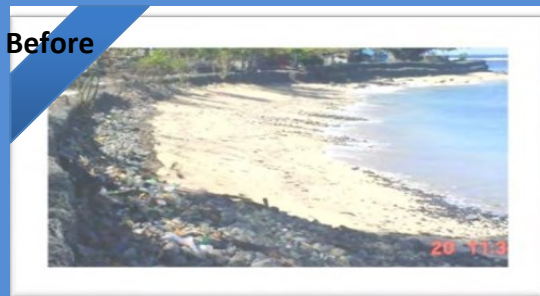


Beach erosion at Flic en Flac public beach



Beach protection works at Flic en Flac public beach

The authorities are also encouraging coral nursery and growth of coral reefs. They intend to incentivise **ecotourism** with the valourisation of natural capital.



Rehabilitation works at Rivière des Galets

Mangrove Plantation



Mangroves are almost five times more effective than land forest in sequestering carbon. They also protect coastal zones from heavy waves and beaches from erosion. In the Technical Needs Assessment Report (GoM, 2012), vegetation restoration was recommended as one of the priorities for the protection of coastal zones. Consequently, an intensive mangrove propagation programme is being promoted to increase mangrove forest following a drastic decline in mangrove cover, which stood at only 45 ha in 1980.

Several NGOs are now engaged in mangrove propagation with funding from the private sector and international agencies.

The benefits of mangrove implantation are far-reaching and have the potential to not only protect but to improve the local ecosystem by restoring equilibrium; mangroves play an important role in balancing the diversity of marine life in the area. An increase in mangroves could result in improvements in local fishing with positive consequences on individual livelihoods.

Actions to Combat Climate Change

Rainwater Harvesting

A rainwater harvesting system consists of stages like transporting rain water through pipes or drains, filtration and storage in tanks for reuse or recharge such as watering plants, landscape irrigation and washing of premises and cars.



Rose Belle market does rainwater harvesting since March 2017.

Infrastructure/Settlement

- ❖ Where practicable, adopt climate sensitive building design that allows cooling through natural ventilation and that consumes low energy through proper building orientation.
- ❖ Buildings should be designed taking into consideration future climate change impacts and incorporation of future adaptation.
- ❖ Development should be controlled in areas identified to be potentially at risks from flooding and even landslide.
- ❖ Provision of proper drainage system should be considered within inhabited vulnerable areas where drains are absent.
- ❖ Green walls and roofs: A number of cities are growing plants on walls and roofs to absorb heat and help control the temperature inside buildings when it is hot. They also absorb water and reduce run off during cyclone and heavy rainfall. In some countries, such as France and Denmark, the law requires all new buildings to have green roofs!

Climate Change Mitigation

Mitigation measures

Mitigation measures are the ways to reduce release of GHGs and enhance the absorption of carbon, e.g. by planting trees (Carbon sinks).

+ Use of renewable energies



Wind



Wave



Hydroelectric



Solar

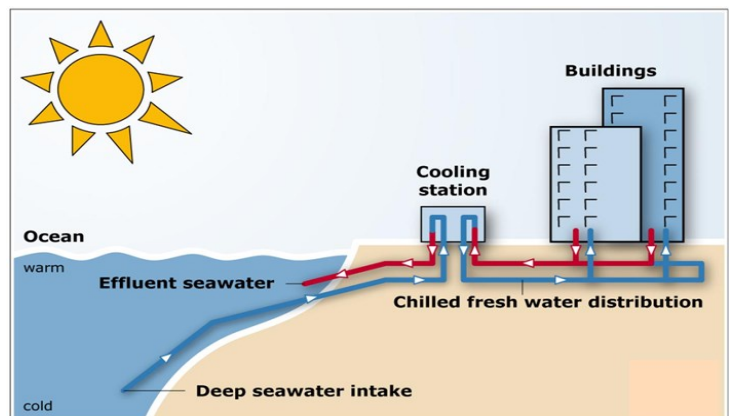


DID YOU KNOW...?

173,000 Terawatts of Solar energy strikes the Earth continuously. That's more than 10,000 times the world's energy use.

+ Deep Ocean Water Applications (DOWA)

The principal objective is to promote, design, construct and operate a ground-breaking system that will use thermal energy from the ocean by pumping cold seawater at 5°C from 1000 meters deep to be used for air conditioning.



Climate Change Mitigation

+ Bagasse and Biomass



Other energy alternatives:

- Biofuel
- Tidal
- Nuclear

+ Shift towards the use of cleaner energy technologies, such as Liquefied Natural Gas (LNG), among others.

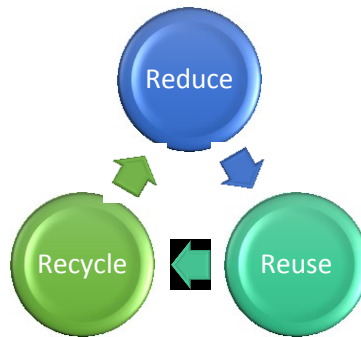


As compared to diesel and gasoline, LNG significantly reduces the GHG emissions.

+ Sustainable Consumption and Production



✚ Applying the 3 R's:



The three R's – *reduce*, *reuse* and *recycle* – all help to cut down on the amount of waste we dispose of. By applying the 3 R's, we contribute to conserving natural resources, landfill space and energy.

Reduce – means to reduce the waste a household/business is producing during the everyday activities, studies, work, and life in general.

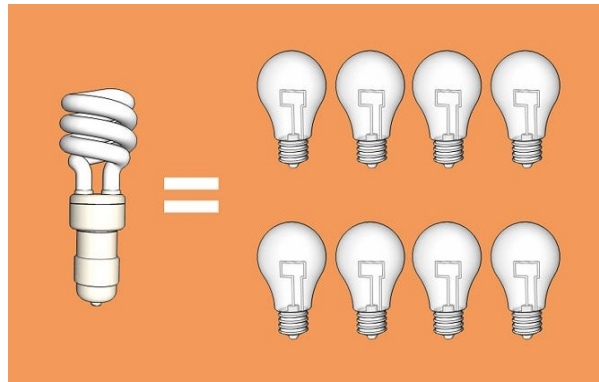
Reuse – means looking for ways to reuse some of the materials we use for our everyday life, including paper, toys, electronics and any other tools. If we reuse, then we do not have to buy a new item. Consequently, we save energy producing a new one and reduce the overall pollution.

Recycle – means turning the materials from waste into something new. Glass, paper, plastic, and metals such as aluminium and steel are all commonly recycled. Dead plants, fruit and vegetable scraps can be recycled through composting.



Climate Change Mitigation

- + Deployment of efficient energy technologies and awareness raising on energy conservation.



- + Sustainable transportation, including promotion of energy efficient mass transportation systems based on hybrid technologies and cleaner energy sources.

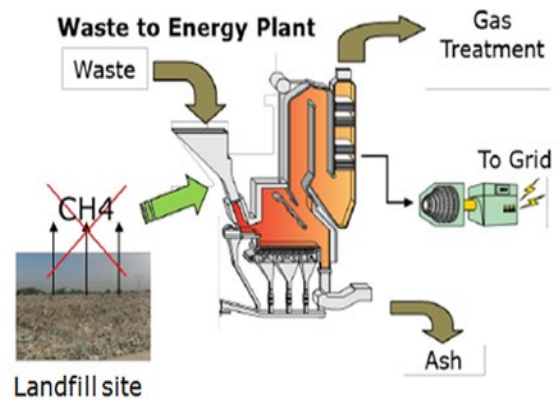


- + Climate smart agriculture including bio-farming.



Climate Change Mitigation

- ✚ Sustainable and integrated waste management, including waste to energy.



- ✚ Say no to plastic pollution

Plastic pollution, killing a large number of seabirds and marine mammals, is a widespread problem, which worsens the climate change issue. We must use eco-friendly products, which can act as substitutes to plastic and other harmful materials. Below are some examples of such products.



These baskets are made up of rattan ("rotin")



Products of aloe fibre



Bags which are products of pandanus fibre("Vacoas")

Enhancing Carbon Sinks

Tree Planting Programmes

Forests are the lungs of our country. With the on-going drastic decrease in the extent of trees, the future generations will have lesser clean air and balanced atmosphere. Many measures are being taken at the grassroots level to tackle this problem.



Carbon Footprint

The Carbon Footprint is the impact people cause by releasing GHGs out of daily activities, such as driving a car, producing wastes, using electricity, or consuming food, etc.

Welcome House Flights Car Motorbike Bus & Rail Secondary Results

Welcome to the web's leading carbon footprint calculator

First, please tell us where you live: [\[why?\]](#)

Country:

State:

Carbon footprint calculations are typically based on annual emissions from the previous 12 months
Enter the period this calculation covers (optional):

from to

Next, select the appropriate tab above to calculate the part of your lifestyle you are most interested in, e.g. your flights.
Or, visit each of the tabs above to calculate your full carbon footprint.

Following your calculation, you can offset / neutralise your emissions through one of our climate-friendly projects.

Activity 6

You may wish to calculate your carbon footprint by accessing the following link:
<https://www.carbonfootprint.com/calculator.aspx>

Case Studies/ Best
Practices for Private
Sector and Businesses

CASE STUDIES/BEST PRACTICES FOR PRIVATE SECTOR AND BUSINESSES

1) Business community engagement in sustainable development

Business Mauritius is an independent association, regrouping approximately 1200 members that focuses on the three pillars of sustainable development-economic, social and environmental. The association aims to be the unifying platform for integration and action on sustainable development for the country. Business Mauritius' main objective is to be the voice of Mauritian private companies, while delivering services that sustain the progress of both businesses and local communities and the Nation as a whole.

Business Mauritius remains focused on three strategic objectives:

- (i) Engage business in National Economic Development
- (ii) Champion the development of a strong Social Capital through business
- (iii) Promote Sustainability and Inclusive Growth for business

Two of the major global challenges facing the modern society, are the environmental degradation and growing inequality in almost all economic development models. These challenges are no more seen as the responsibility of only Governments and civil society; business can and must play an important role to mitigate those issues. The Sustainability and Inclusive Growth commission works towards advocating for the increased engagement of members in community development.

The commission is involved in the following initiatives:

- Inclusive Growth
- Waste management
- Energy Transition
- Coastal preservation
- Smart Agriculture
- Sustainable cities and communities
- Climate Finance

2) PNEE (Programme National d'Efficacité Energétique)

PNEE is a joint initiative of the private sector and the public sector, represented by the Ministry of Energy and Business Mauritius. It offers Mauritian companies technical and financial assistance to decrease energy consumption, have more competitiveness and be more eco-friendly.

The cornerstone of the PNEE is an audit carried out by energy experts in specific fields. The action plan will be implemented with the financial support of Switch Africa Green, a joint scheme of the United Nations and European Union.

In the hotel industry, 16 hotels took part in the PNEE programme. In the electricity consumption audit, air-conditioning has a highest share of 42% electricity consumption.

The audit accounted for 3 textile groups whereby the dyeing process represented the highest energy consumer.



3) BEST PRACTICES IN THE HOTEL SECTOR

i. Air conditioning

- Allow customers to set their own thermostats but not below a certain temperature, 22°C for instance.
- Develop more sophisticated management systems other than the card system such as installation of presence detectors or a centralized Building Management System.
- Install window contact sensors that shut down the air-conditioning when the client opens the windows or doors.

ii. Lighting

- Use automatic controls.
- Improve energy efficiency through better insulation and energy –efficient lighting.
- Raise awareness among staff and guests.

Sustainable building and management at Long Beach Golf and Spa Resort

The renovation of Long Beach Golf and Spa Resort at Belle Mare, a new 255 room complex, was viewed as an opportunity to build a hotel that could use sustainable design and construction principles as well as incorporate sustainability principles. With its 6 000 energy-efficient light bulbs, compact fluorescent light bulbs and spots or LED lighting, the saving in electricity usage is equivalent to the annual consumption of 500 households.

The roofs are covered with plants, pebbles and special materials to reduce the impact of sun exposure. The heat produced by the air conditioning system is captured and then used to heat water. The oil in the kitchen is recycled for reuse as fuel in vehicles. Ozone is used for laundry, which means that lower washing temperatures can be used.



A Building Management System (BMS) maintains the temperature of the rooms wisely. Photovoltaic panels produce electricity while rainwater is collected for irrigation and toilets. Waste water is also recycled to irrigate the gardens of the hotel. The Hotel is expected to produce 150m³ of green waste daily, some from the 59-acre site and some compostable waste from the kitchens, which is converted into fertiliser for the gardens.

4) BEST PRACTICES IN THE INDUSTRY SECTOR

- Insulate pipelines and pipe accessories to prevent heat loss
- Recuperate heat during processing
- Minimise heat loss at the boiler level
- Recover heat from compressors, thereby allowing savings in terms of heat and on fossil fuels
- Control losses by condensate

5) BEST PRACTICES IN THE AGRO INDUSTRY

I. Sheltered farming

Encourage farmers and agricultural farms to shift from traditional open field cultivation to sheltered farming systems. Such system will enable farmers to mitigate effects of adverse climatic conditions, improve production capacity and the quality of farm produce.



II. Smart Agriculture

Smart agriculture aims to tackle three main objectives:

- Sustainably increasing agricultural productivity and incomes;
- adapting and building resilience to climate change; and
- reducing greenhouse gas emissions, where possible.



The GoM is helping farmers and small farms to integrate smart agriculture into their routine.

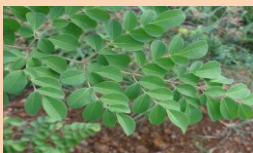
III. Micro irrigation

Micro irrigation helps to save water, increase or sustain farmers' income and enhance food security.



IV. Bio-farming

Bio-farming is thoroughly being encouraged and promoted through the different schemes and incentives like the subsidization of the cost of bio-pesticides. It is very beneficial from both the ecological and health perspectives.



Sustainable Agricultural Practices at V.Kanhya Health Foods Co. Ltd



- The Company produces Moringa products such as infusion and powder from fresh Moringa leaves grown locally through organic farming.
- Waste products from the process (e.g. Moringa branches) are sent back to the plantations where they :
 - decompose and replace the nutrients in the soil; and
 - act as a source of mulching to retain soil moisture and prevent the proliferation of weeds

Hence, there is efficient use of resources.

- Additionally, in the field, weeding is not carried out regularly; instead the grasses are trimmed to retain soil moisture.

5) ENERGY EFFICIENCY IN THE BUILDING SECTOR

The Government recognizes energy efficiency and energy conservation as proven means to deal with the energy and environmental challenges lying ahead, and to promote sustainable development. The Energy Efficiency Building Code (EEBC) is viewed as one initiative aimed at achieving energy efficiency in the building sector.



In 2012, EU funded a project to establish a comprehensive framework to promote the construction of sustainable buildings in Mauritius and Rodrigues. In 2015, under a UNDP funded project, the Government architectural specifications and construction methods were reviewed to include green building requirements.

The Mauritius Commercial Bank at the Ebène Business Hub of Mauritius is the first building in the Southern Hemisphere to achieve a Building Research Establishment Environmental Assessment Method (BREEAM) rating.

6) ENVIRONMENT-CONSCIOUS CORPORATE CULTURE

Rethink your waste

Trash and by-products have become a major problem in today's culture. It's virtually impossible to eliminate all waste, but think about ways you can apply the 3R's.

- Eliminate paper hand-outs
- It's easy to [skip the bottled water](#) at every meeting, and you might even consider a company-wide ban on single-use water bottles and consider water dispensers.
- Waste reduction also makes good business sense as it reduces the costs associated with both purchasing and waste disposal
- Also, keep in mind that recycling is a simple way to make a big impact - and it's amazing what companies can do to [give new life to old products](#).

Choose environmentally conscious vendors

- If your small business wants to fight climate change, find other businesses and organizations that do, too.
- Take a look at your supply chain. Who are your providers and do your values align?
- Using local vendors for catering and supplies not only supports your local economy and other small businesses, it also cuts back on shipping, gas, manufacturing, and logistics.

FAQs

What is Weather?

Weather describes the atmospheric conditions at a place over a short duration of time.

What is Climate?

Climate is the statistics of weather over long periods of time. It is measured by assessing the patterns of variation in temperature, humidity, atmospheric pressure, wind, precipitation, atmospheric particle count and other meteorological variables in a given region over long periods of time.

What is Climate Change?

Climate change is a change in the pattern of weather, and related changes in oceans, land surfaces and ice sheets, occurring over time scales of decades or longer.

What is the International Panel on Climate Change (IPCC)?

The IPCC is the International body for assessing the science related to climate change. It provides policymakers with regular assessments of the scientific basis of climate change, its impacts and future risks, and options for adaptation and mitigation.

What are Greenhouse Gases (GHGs)?

Greenhouse gases are any gaseous compounds in the atmosphere that are capable of absorbing infrared radiation. They trap and hold heat in the atmosphere.

What is the aim of the Paris Climate Agreement?

The aim is to strengthen the global response to the threat of climate change by keeping a global temperature rise this century well below 2 degrees Celsius above pre-industrial levels and to pursue efforts to limit the temperature increase even further to 1.5 degrees Celsius.

What is adaptation?

Adaptation means anticipating the adverse effects of climate change and taking appropriate action to prevent or minimise the damage they can cause. Early adaptation action saves money and lives later.

What is mitigation?

Climate change mitigation consists of actions to limit the magnitude or rate of long-term climate change. Climate change mitigation generally involves reductions in human (anthropogenic) emissions of greenhouse gases (GHGs).

Activity 8

THINK ABOUT IT

Undertaking a simple energy audit in your enterprise

- 1. Make a list of operations carried out in your enterprise that require the use of energy.**

- 2. Identify which of the operations mentioned above consume the highest amount of energy.**

- 3. Identify possible ways to minimize energy wastage for the operations mentioned in part (2).**

4. Implement the activities identified for minimizing energy wastage and observe the impact on your energy bill.

Month	Energy Bill

Activity 9

THINK ABOUT IT

Organisation of an Open Day to build a culture of awareness through your own Employee Green Team

- 1. Organise an Open Day whereby all employees can be sensitized on climate change.**
If you want to make sustainability part of your culture, it will become the norm, both in and out of the office. A great place to start is assembling a group of environmental advocates to form a sustainability team within your enterprise.
- 2. You may use the outcome of the previous activities in the exhibition**
 - (a) Energy audit observation chart**
 - (b) Survey carried out during the Enterprise based 'Save Transportation Energy' Program.**

Activity 10

THINK ABOUT IT

Enterprise based 'Save Transportation Energy' Program

1. Conduct a survey to determine how employees travel to and from workplace

----- Are driven to work

----- Take public transportation to work

----- Take company transport

----- Walk/ cycle to workplace

----- Carpool to workplace

2. The employees can be challenged to reduce their driving trips to workplace.

3. Evaluate success by carrying out another survey in 2 to 3 weeks to see how many employees who are driven to workplace each day tried another option.

4. Discuss how your enterprise can remain committed to reducing its transportation energy use beyond 3 weeks.

Answers to Selected Activities

Activity 2

Example answers

Driving a petrol driven car.

Garbage produces methane when they decompose and decay.

Using electricity that has been produced from fossil fuels.

Activity 3

1. Using more fertilisers, driving a petrol driven car.
2. Coral reef damage/bleaching, etc.
3. True

Activity 4

a, b, f, h

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