



# A TOOLKIT FOR NON-GOVERNMENTAL ORGANISATIONS ON CLIMATE CHANGE

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

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**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 16<sup>th</sup> country with the highest disaster risk and 10<sup>th</sup> 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 ongoing 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 Non-Governmental Organizations with a detailed insight of climate change including the causes, the consequences, the impacts, the challenges and the opportunities. Increased knowledge will enable NGOs 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 pathway.

# Abbreviations and Acronyms

<b>AfRP</b>	Africa Regional Platform
<b>BUR</b>	Biennial Update Report
<b>CC</b>	Climate Change
<b>CCIC</b>	Climate Change Information Centre
<b>CDRP</b>	Community Disaster Response Programme
<b>CEB</b>	Central Electricity Board
<b>CGE</b>	CEB Green Energy
<b>CGT</b>	Cycle Gas Turbine
<b>DOWA</b>	Deep Ocean Water Application
<b>EE</b>	Energy Efficiency
<b>EEMO</b>	Energy Efficiency Management Office
<b>EWEAS</b>	Early Warning and Emergency Alert System
<b>GHG</b>	Greenhouse Gases
<b>EIA</b>	Environment Impact Assessment
<b>INDC</b>	Intended Nationally Determined Contributions
<b>IPCC</b>	Intergovernmental Panel on Climate Change
<b>JICA</b>	Japan International Cooperation Agency
<b>LDRRMC</b>	Local Disaster Risk Reduction and Management Committees
<b>MARENA</b>	Mauritius Renewable Energy Agency
<b>NAMA</b>	Nationally Appropriate Mitigation Actions
<b>NDRRMC</b>	National Disaster Risk Reduction and Management Centre
<b>NEOC</b>	National Emergency Operations Command
<b>NGO</b>	Non-Governmental Organisation
<b>OECD</b>	Organisation for Economic Co-operation and Development
<b>RGSC</b>	Rajiv Gandhi Science Centre
<b>SADC</b>	Southern African Development Community
<b>SCAP</b>	Smoke Control Action Plan
<b>SME</b>	Small and Medium Enterprises
<b>SWH</b>	Solar Water Heater
<b>SWIO</b>	South West Indian Ocean
<b>TNC</b>	Third National Communication
<b>UNISDR</b>	United Nations Office for Disaster Risk Reduction
<b>URA</b>	Utility Regulatory Authority

## About This Manual

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

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

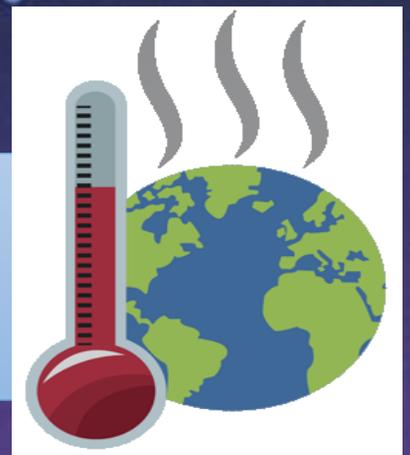
It lays emphasis on the science of climate change, which is essential for providing a better understanding of the broader picture.

This manual aims to support NGOs in their day to day battle against climate change towards an eco-friendly future.

It provides ways to combat this growing challenge through several initiatives taken locally and around the world. This is crucial because the challenges posed by climate change go beyond raising awareness and inducing behavioural changes.



## Introduction



## NGOs and Climate Change

Non-governmental organisations (NGOs) have often been termed as the eyes and ears of the globe. NGOs have especially become an integral element of global environmental governance. In particular, since the 1992 Rio Summit, multilateral negotiations on the environment have seen an unprecedented growth in NGO participation. The climate change negotiations are a prime example of this trend where hundreds of NGOs from environmental groups to business associations, from trade unions to women groups, faith-based organisations, or farmers' associations attend the annual Conference of the Parties (COP) of the United Nations Framework Convention on Climate Change (UNFCCC).

The Intergovernmental Panel on Climate Change (IPCC 2014) has recognized NGOs as key actors in knowledge production, risk and vulnerability mapping and community capacity building. Working across environmental and social sectors, NGOs are well placed to foster diverse approaches to climate change mitigation and adaptation.



For some NGOs, concerns about climate change have emerged from environmental advocacy. For others, climate change exacerbates ongoing struggles to address poverty and other forms of social inequity.

## Why engage NGOs to have knowledge on Climate Change?

### NGOs

- ✓ fill the gaps in the delivery of public services by governments, particularly in developing countries.
- ✓ have the ability to communicate at all levels, from the neighborhood to the top levels of government.
- ✓ have the ability to experiment freely with innovative approaches.
- ✓ are flexible in adapting to local situations and responding to local needs and are therefore able to develop integrated projects, as well as sectorial projects.
- ✓ enjoy good relationships with people and can render micro-assistance to very poor people as they can identify those who are most in need and tailor assistance to their needs.
- ✓ are able to collaborate with both the public and private sectors.
- ✓ provide expert advice and analysis. NGOs can facilitate negotiations by giving politicians access to competing ideas from outside the normal bureaucratic channels.
- ✓ have good analytical and technical skills and capacity to respond more quickly than government officials.
- ✓ can influence and mobilise public opinion through campaigns and broad outreach.
- ✓ can help to vocalise the interests of persons not well-represented in policymaking.
- ✓ can deliver technical expertise on particular topics as needed by government officials as well as participate directly in operational activities.
- ✓ can help to strengthen international agreements by monitoring negotiation efforts and governmental compliance.
- ✓ broaden the base of information for decision-making, improving the quality, authoritativeness, and legitimacy of the policy choices of international organizations.



# Introduction



## Activity 1

### THINK ABOUT IT

**How does your organization view climate change?** Is it a problem for the future and not now? Can NGOs help to make a change in our communities?

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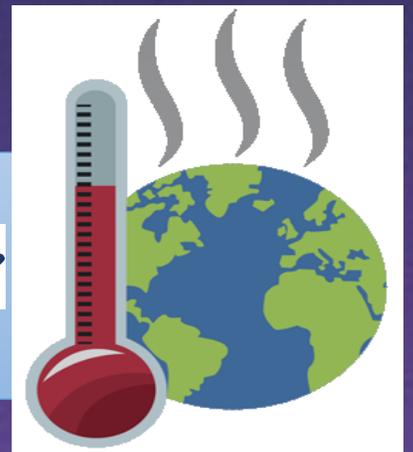
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What is Climate Change?



# 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.

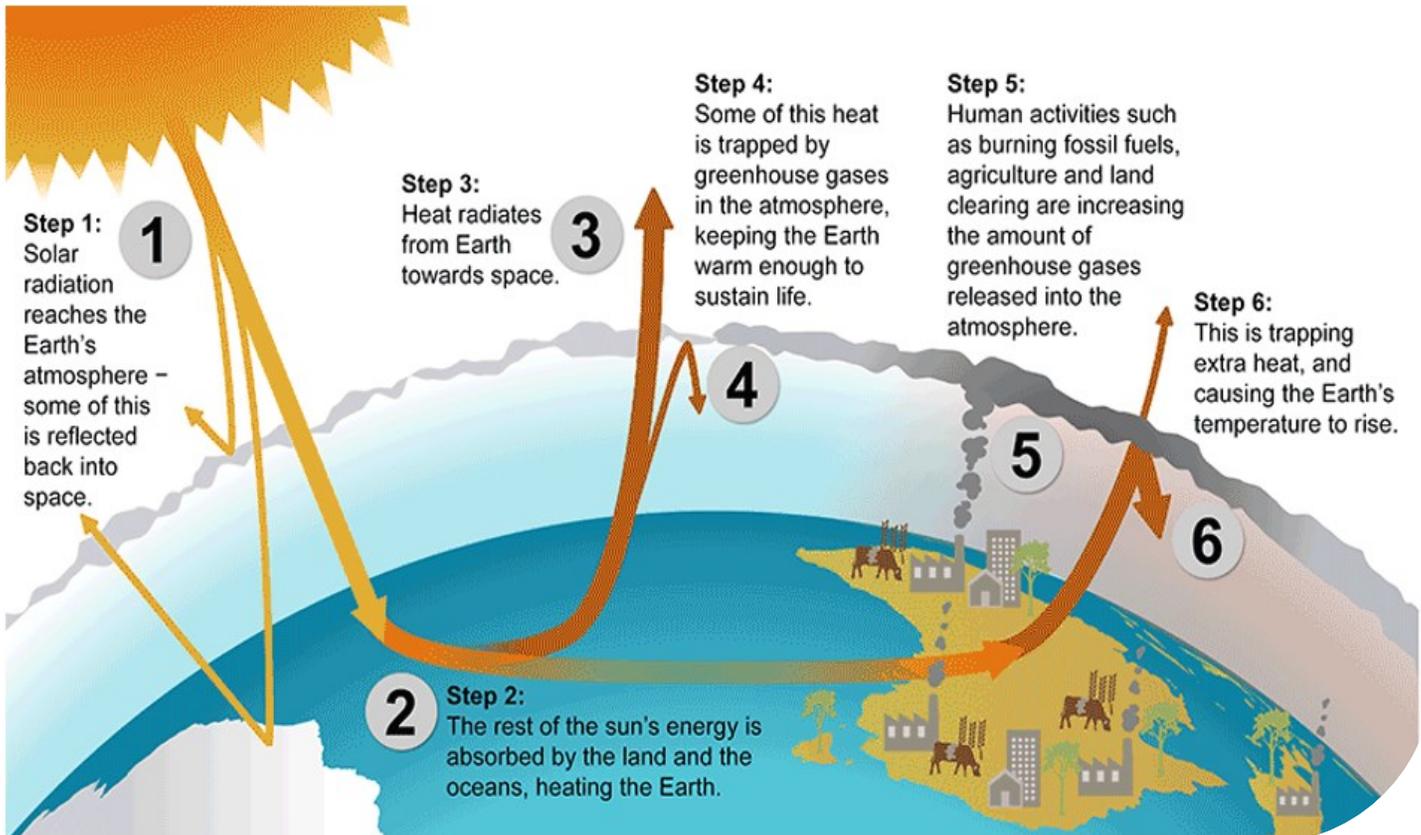
Examples in other countries: Decreasing amount of snow falls affect the water supplies that are used for farming and the timing of the winter snow season is shifting.

## The Greenhouse Effect

When solar radiation hits the Earth's surface, some of this energy is absorbed and warms up the ground and the oceans. The rest of the energy escapes back into space, but some of it is trapped in the atmosphere, which further warms the Earth. This is called the **greenhouse effect**. The greenhouse can be explained as the Earth's atmosphere acting like the glass panes around a greenhouse – warming the inside.

The Earth's atmosphere contains **greenhouse gases** such as water vapour, carbon dioxide (CO<sub>2</sub>), methane (CH<sub>4</sub>) and nitrous oxide (N<sub>2</sub>O) which 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. However, there is clear evidence that human activities are increasing the amount of greenhouse gases in the atmosphere, which traps more 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.

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

**No!** Ozone is a very useful gas high up in the Earth's atmosphere 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 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 21<sup>st</sup> century. Unfortunately, the CFCs and their successor substances were eventually replaced by fluorinated gases, known as F-gases. These have no effect on the ozone layer but are powerful greenhouse gases. Once again, the world is taking 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.

## 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

**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 Environment<sup>1</sup>:*

## Local Initiatives

### 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 and;
-  Montreal Protocol under the Vienna Convention
-  More conventions can be found at the website of the Ministry<sup>2</sup>

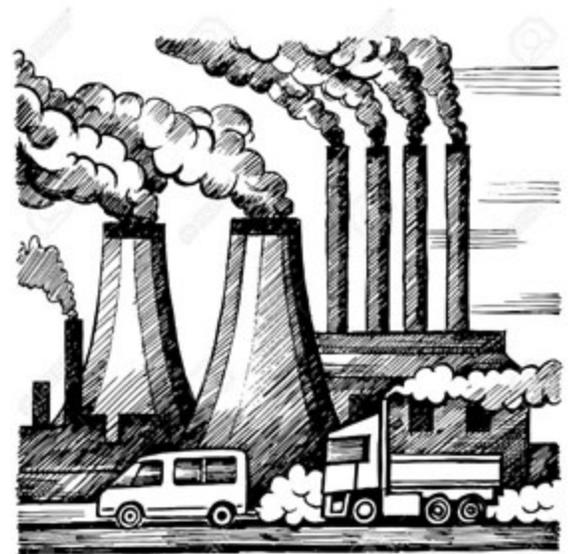
<sup>1</sup> <https://www.unenvironment.org/explore-topics/climate-change/about-climate-change/climate-change-initiatives-and-partnerships>

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





# CAUSES AND IMPACTS OF CLIMATE CHANGE

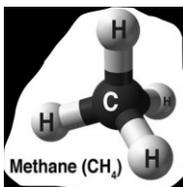


# Causes and Impacts of Climate Change

## Causes of Global Warming and Climate Change

### Greenhouse Gases (GHGs)

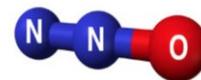
**Carbon dioxide (CO<sub>2</sub>)** is the primary greenhouse gas (GHG) emitted into the atmosphere through human activities. Humans are also influencing the ability of natural sinks, like forests, to **remove** (absorb) CO<sub>2</sub> from the atmosphere.



**Methane (CH<sub>4</sub>)** 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 (N<sub>2</sub>O)** is emitted during **agricultural** and **industrial activities**, as well as during **combustion** of fossil fuels and solid waste.

Nitrous oxide (N<sub>2</sub>O)



**Fluorinated gases:** Hydrofluorocarbons, perfluorocarbons, sulphur hexafluoride, and nitrogen trifluoride are synthetic, powerful greenhouse gases that are emitted from a variety of industrial processes.

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")

CO<sub>2</sub> in the atmosphere highest in 650,000 years

Arctic summer ice shrank to lowest in 2012 years

China emitted around 9839 billion tons of CO<sub>2</sub> in 2017.

# Causes and Impacts of Climate Change

## Factors Leading to Climate Change

### Natural Causes

#### Volcanic Eruptions

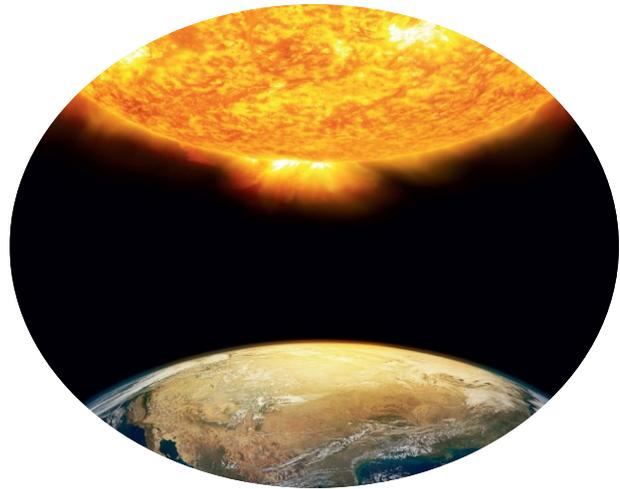


Source: Daily Express

Volcanic eruptions emit carbon dioxide (CO<sub>2</sub>) which causes global warming and volcanic ash or dust and sulfur dioxide that can block a percentage of sunlight causing a cooling effect.

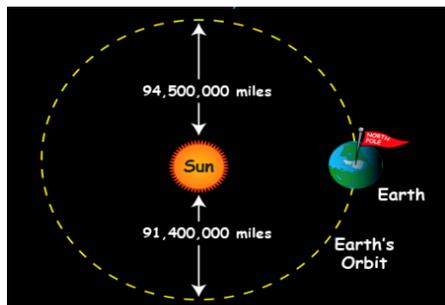
#### Variations in Solar Radiation

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



Source: Phys.org

#### Orbital Changes



Source: Pinterest

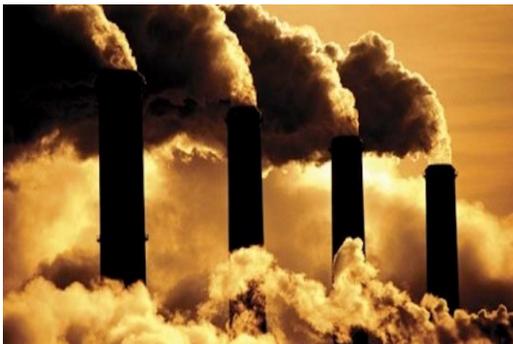
The amount of radiation that Earth receives varies with the distance from the Sun. Earth's orbital changes are one of the natural causes of climate change.

# Causes and Impacts of Climate Change

## Human Induced Factors

The world's leading climate experts confirm that human activities are the main cause of the warming observed since the Industrial Revolution from the 1760s (IPCC). Greenhouse gases are considered as the main driver of a warmer planet. 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 produces carbon dioxide and nitrous oxide.

**Cutting down rainforest**



Source: Smithsonian Magazine

Trees help to regulate the climate by absorbing CO<sub>2</sub> from the atmosphere. Cutting them down will increase CO<sub>2</sub> in the atmosphere.

**Increased livestock farming**



Source: Livestock farming blog

Ruminants 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.

Source: IPCC fourth assessment report

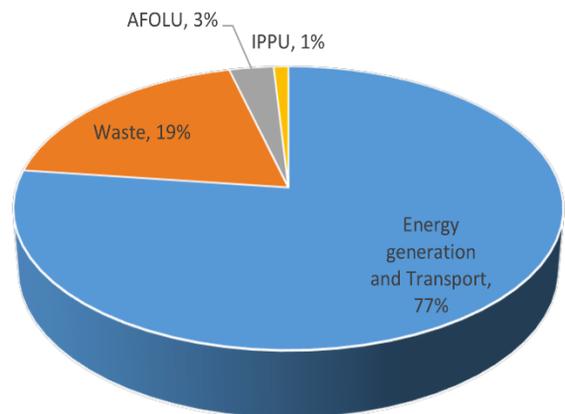
# Causes and Impacts of Climate change

## 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...



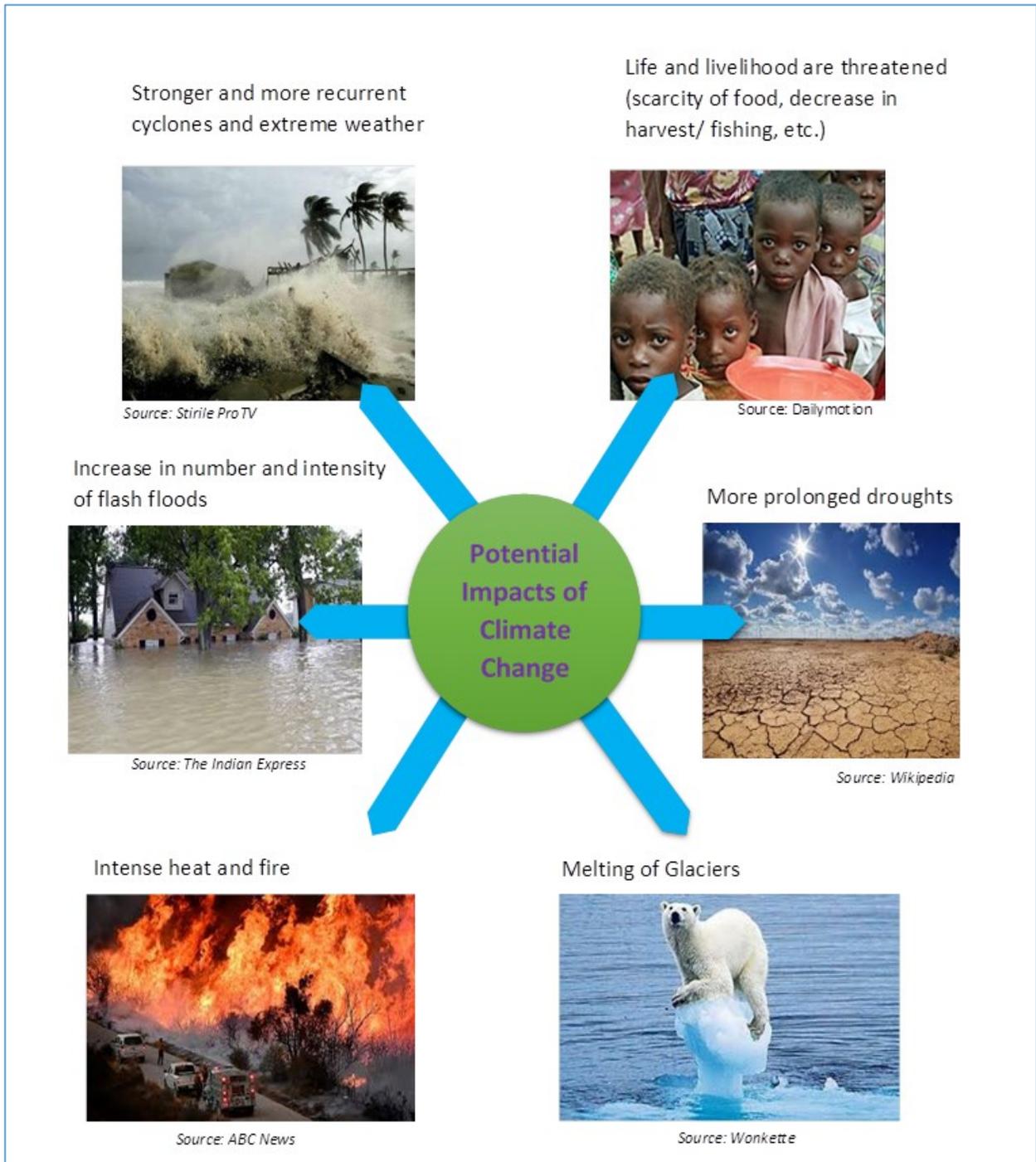
...the disputed island simply

**disappeared.**

# Causes and Impacts of Climate Change

## 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).



# Causes and Impacts of Climate change

## Activity 3

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 CO<sub>2</sub> to the atmosphere yearly, while...

.... Oceans and forests only remove

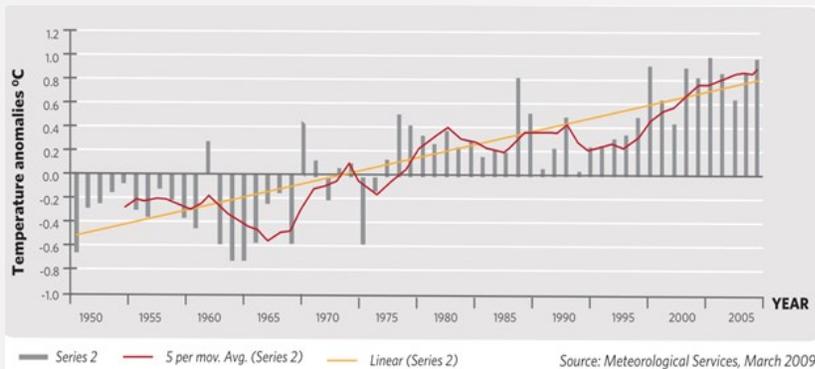
**HALF** of this CO<sub>2</sub>.

## 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 16<sup>th</sup> country with the highest disaster risk and 10<sup>th</sup> as the most exposed to natural hazards.

### TEMPERATURE TRENDS FOR MAURITIUS

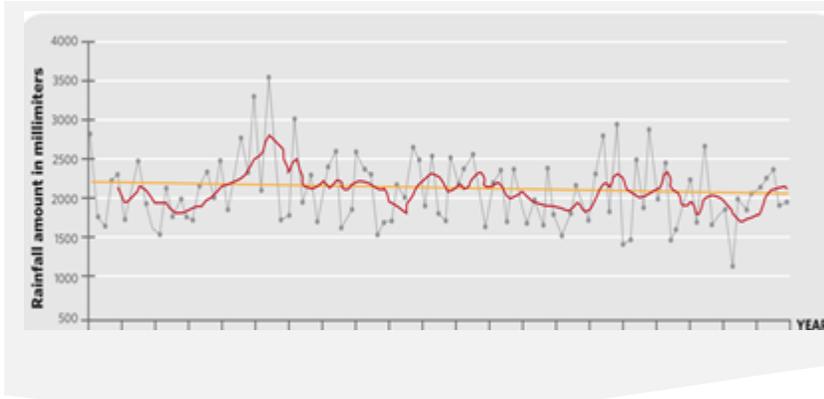
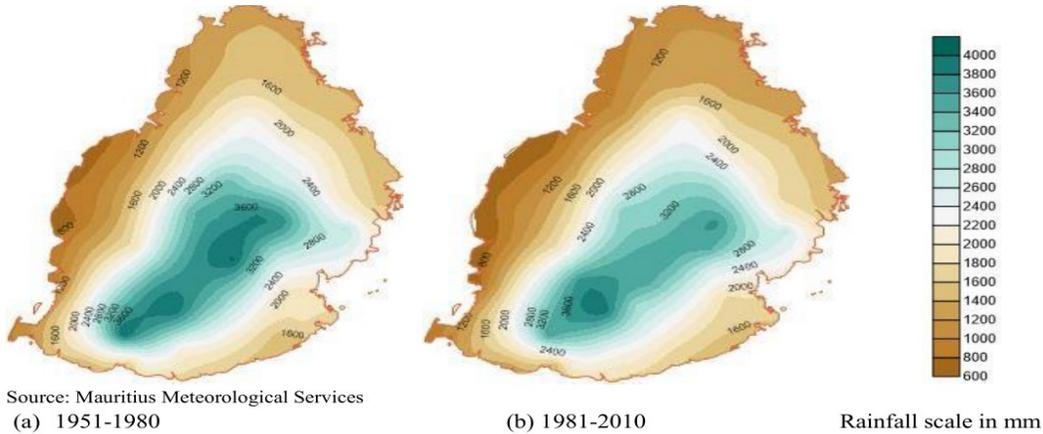
- ❖ There is a definite warming trend.
- ❖ Average temperature is increasing at the rate of 0.15 °C every decade.
- ❖ Climate records over the period 1951-2014 show a significant warming trend of about 1.2°C.



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

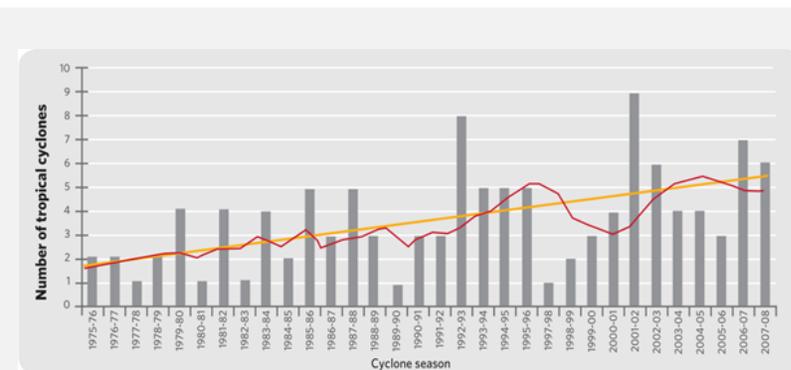
CHANGES IN RAINFALL PATTERN BETWEEN TIME PERIOD 1951-1980 AND 1981-2010



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



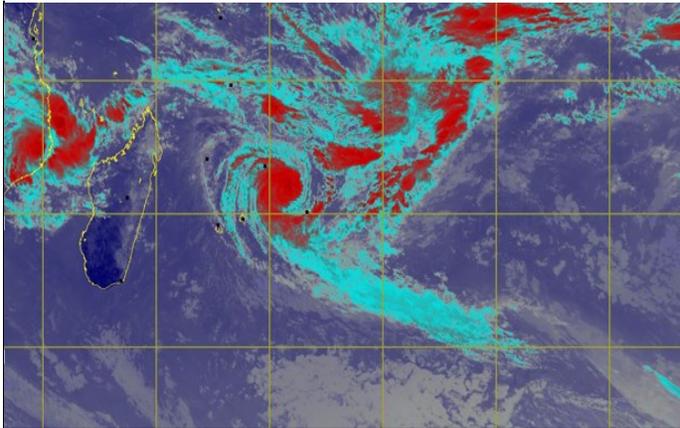
Since the last decade, there has been rapid intensification of tropical storms in the South West Indian Ocean (SWIO).

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 4

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

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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.



Flash floods



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 households 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 CO<sub>2</sub> absorption.

### Activity 5

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?

- They make provision for food reserve
- They have protected and durable infrastructures
- They used most of their water reserves
- They have no insurance
- their land was vulnerable to natural disasters
- Their roads were built on the proper ground and well protected with proper drainage
- Their houses are not robust enough to withstand extreme weather
- 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**

**Tourist Info: 152**



- ▶ 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)
- ▶ International Day of Climate Action (October 24)



# Actions to Combat Climate Change



# Ways to Combat Climate Change

These are the two fundamental ways to combat climate change:

- Mitigation
- Adaptation

## Adaptation

- Change in land use, relocation
- Emergency and business continuity planning
- Upgrades or hardening of building and infrastructure
- Awareness raising campaign
- Health programs

- Seal Buildings
- Green Infrastructure
- Water and Energy Conservation
- Smart Growth

## Mitigation

- Energy conservation and efficiency
- Renewable energy
- Sustainable transportation, improved fuel efficiency
- Capture and use of landfill and digester gas
- Increase carbon sinks



What is Mitigation & Adaptation?

## Adaptation

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

## 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.

## 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

Due to an increase in the frequency of extreme weather events – intermittent heat waves varying from 33°C 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.



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.



During these simulation exercises, they learn how to act upon the occurrence of calamities.

## Sensitisation

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

Initiatives like school compost project, rainwater harvesting, school endemic garden and waste segregation projects have been implemented in schools.



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



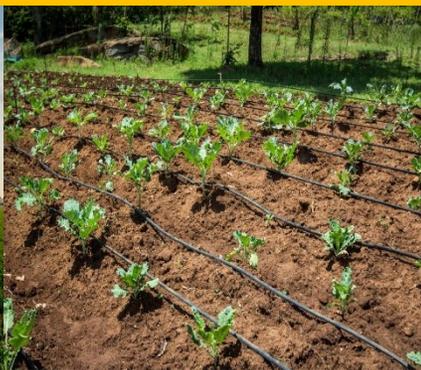
Shifting towards soilless cultures and sheltered farming



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 shown 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.

Before



Beach erosion at Flic en Flac public beach

After



Beach protection works at Flic en Flac public beach

Before



After



Rehabilitation works at Rivière des Galets

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

## 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. As a consequence, 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 available funding from the private sector and international agencies.

The benefits of mangrove plantation 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 effects on individual livelihoods.



## 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 possible, 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 closely monitored 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 to 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!



## Activity 7

What are examples of climate change adaptation?

- Riding bikes instead of driving cars
- Raising the level of the land to protect houses from floods
- Using public transport
- Planting crops that withstand bad weather
- Reducing consumption and reusing and recycling resources
- Making a portable clay oven that can be carried to higher ground in a flood
- Installing solar panels
- Use of drip irrigation

## Climate Change Mitigation Use of Renewable and Cleaner Energies

- Use of Renewable Energies



Wind



Wave



Hydroelectric



Solar

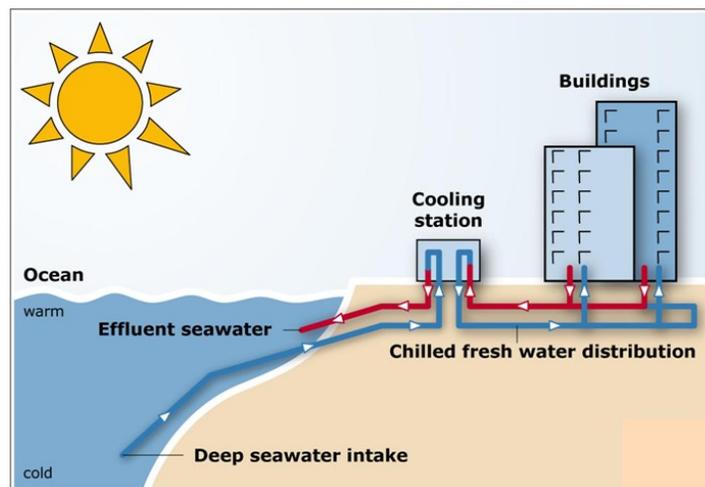
**DID YOU  
KNOW...?**

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

Energy.gov

- 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 sea water at 5°C from 1000 meters deep to be used for air conditioning .



- Use of 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.

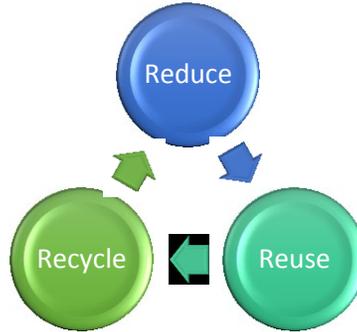


As compared to diesel and gasoline, LNG significantly reduces the GHG emissions.

- 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 throw away. They conserve natural resources, landfill space and energy.

**Reduce** – means to reduce the amount of waste produced in everyday activities by limiting the number of purchases. For example,

- a. Take your own bag when going shopping instead of buying biodegradable plastic or paper grocery bags.
- b. If possible, repair electronic devices instead of buying new one. This will reduce the amount of waste produced.
- c. Buy products with minimum packaging wherever possible.

**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 and reduce the overall pollution.

**Recycle** - Recycling is changing old products into new ones that can be resold. For example, recycled bottles and cans wind up becoming a wide variety of new products such as new aluminum cans, rain gutters, window frames, steel beams, recycled bicycles, new jars and bottles.

## BEST PRACTICES FOR WASTE MINIMISATION

- Buy good quality products that will last long
- Buy in bulk to save on packaging, energy-consuming shopping trips, and money
- Avoid over packaged goods
- Buy recycled/ recyclable products
- Buy environmentally-friendly goods that won't create havoc on our rivers and marine life
- Use durable shopping bags and avoid plastic bags completely
- Buy organic and locally grown produce thereby encouraging and supporting farming that is pesticide and chemical fertilizer free

## BEST PRACTICES FOR REUSING ITEMS CONSIDERED AS WASTE

- Use of PET bottles to make mini greenhouses for raising seeds and to make plastic funnels
- Collect and knit unwanted scraps of wool into blanket squares and sew them together to make a rug or blanket



- Make soil enricher from leaves collected by stacking them in a wire mesh frame or rubbish bag.



- Punch small holes along the length of an old discarded to make a water saving sprinkler



## Enhancing Carbon Sinks

### Tree Planting Programmes

Forests are the lungs of our country. With the ongoing drastic decrease in the number 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:

Carbon footprint calculations are typically based on annual emissions from the previous 12 months.  
If you would like to calculate your carbon footprint for a different period use the calendar boxes below (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 8

Which of the following contributes the least to your carbon footprint?

- a. Riding a bike to college
- b. Driving a car to the shops
- c. Taking a plane

## Activity 9

You may wish to calculate your carbon footprint by accessing the following link:

<https://www.carbonfootprint.com/calculator.aspx>

## Activity 10

### THINK ABOUT IT

Sensitize the community on how to undertake a simple energy audit at home

1. Make a list of items that use energy at home.

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2. Identify possible ways to save energy at home (e.g. switch off light when leaving a room, switch off TV when nobody is watching, iron large batches of clothing at one time, do not leave appliances on standby mode, replace your incandescent light bulbs by energy efficient bulbs, ...)

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**3. Implement the activities identified to save energy at home and observe the impact on your energy bill.**

Month	Energy Bill

## Activity 11

### THINK ABOUT IT

### NGO based 'Save Transportation Energy' Program

1. Conduct a survey to determine how members 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 members can be challenged to reduce their driving trips to workplace.

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

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

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## Activity 12

Classify the actions as adaptation or mitigation and choose those in which you have already participated/organised (tick). You may keep a checklist like this one and add your actions.

Actions	Mitigation	Adaptation	Participated/ organised
Tree planting			
Energy saving			
Waste recycling/composting			
Sensitising on climate change threats			
Biking			
Beach cleaning			

Success Stories /  
Case Studies in Fight  
against **Climate  
Change**



## NGOs in Mauritius

NGOs are playing a determined role in all aspects of the Mauritian society and have been one of the partners of Government in the upliftment of the conditions of the less fortunate members of our society and in many instances have led the way to social changes. With a view to enhancing a better partnership with the NGO Sector, an NGO Trust Fund was recently set up to financially assist NGOs, which are diverse and distinct in their functions.

Due to the increasing concern related to the impacts of Climate variability and extreme weather events, more and more NGOs are directly or indirectly carrying out activities related to climate in different sectors or fields as illustrated below.



## NGOs and Climate Change: Success Stories

### 1. MACOSS



#### Green Space by and for Persons with Disabilities

The Council in collaboration with various stakeholders launched “Green Spaces by and for Persons with Disabilities” across the Island. The project aimed at promoting the involvement of persons with disabilities in order to show that they also care for the environment and can participate in the protection of the environment. Persons with Disabilities had the opportunity to plant trees including indigenous plants

Two panels, one showcasing the 17 SDGs and another one entitled “Together We Save Planet Earth”, were also unveiled on that day. Various indigenous/decorative plants were then put in the ground.

#### Rainwater Harvesting System

MACOSS embarked in a Rainwater Harvesting Project whereby 75 Member Affiliates Centres were equipped with a Rain Water Harvesting System.

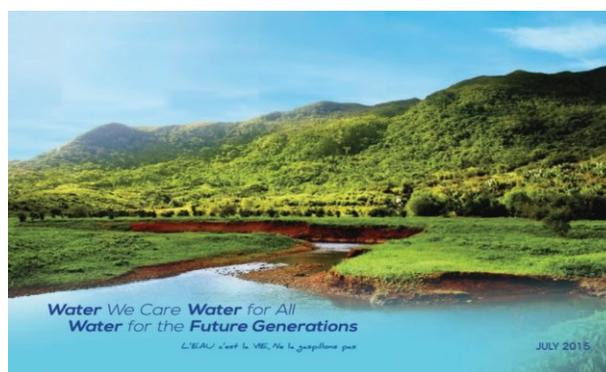
The main objectives were to provide a simple system for rainwater harvesting through which NGOs can collect rainwater and make use of the water for purposes other than drinking as well as to make the NGOs savings on its water bills; and to encourage them to maintain a kitchen garden.



### **L'eau C'est la Vie Ne la Gaspillons pas'**

A brochure entitled "Water We Care, Water for All, Water for Future Generations" was published by MACOSS in July 2015. The brochure was distributed to NGOs, Ministries and other relevant institutions. The brochure intends to sensitise the civil society to make judicious use of water.

Moreover, in the context of the celebrations of the Republic and Independence Day 2016 a clip entitled 'Viv l'Independans, Viv la Repiblik, Anou Sov Mama Later' was launched on 11th March 2016 at Bhujoharry College, La Tour Koenig. The video clip aims at sensitising the public on the importance of making judicious use of potable/treated water and on the need to harvest rain water that could be used for watering plants, washing vehicles and yards and other domestic cleaning activities.



### **Sensitisation Campaign on the 'Importance of Trees'**

MACOSS in collaboration with the District Council of Moka organised a sensitization campaign on the 'Importance of Trees' on 18 April 2018 – St Pierre. The programme consisted amongst others:

- (i) Affixing of 6 panels with key messages on the importance of trees (St Pierre Traffic Centre)
- (ii) Plantation of Trees (St Pierre Traffic Centre)



## 2. Conference of Youth by SYAH Mauritius



The aim is to push Youth not only to assist conferences, talks and seminar but also to equip them with tools and get them on the field for concrete action.

“The event may not have been publicised to a large extent, we might not have reached as many people as we would hope but our action prompt people to think of waste and its disposal, the blooming recycling industry and over consumption of plastic in day to day life.”

-Syah Mauritius

### SYAH Mauritius events and activities

#### Past projects

2015: Post COP21: Multi Stakeholder Dialogue

2015: Launch of Tap Water Revolution

2016: Conference of Youth 12 (COY12)

2017: Climate March

2017: Conference of Youth 13 (COY 13)

2018: Sustainability Tour with SYAH (Seychelles)

2018: Clean up with SYAH (Seychelles)

2018: Beach Clean-up Flic-en-Flac

#### Other projects:

- Waste Management System
- Environmental Education Newsletter
- Multi Stakeholder Dialogue (MSD)
- Conference of Youth 14 (COY 14)

*June 9, 2018: HONORING THE OCEANS*

*(Supporting the March for the Ocean community - M4O)*

*Site of Clean Up and waste auditing*

*Mainly grass and white sand, had some kiosks and trees Surface area:*

*approximately 100 metres square*

*Duration: 1 hour*

*No. of Persons: 12*

*Waste Audit – Data Collected: Weight of waste: 2.625 Kg Quantity of cigarette butts: ~ 1597*

**3. Volunteer Mauritius** aims to create opportunities for the Youth to engage in volunteering activities at regional and national levels.



### Overview of Green Module (GM)

Designed for beginners to gardening, the Green Module offers the basics of how to create a garden while emphasizing on organic gardening and sustainable farming. The knowledge and consolidated field experience gathered through the Green Module is expected to provide each participant with the required skills to operate in a sustainable context and support community's contribution to address food security challenges.

The green modules are 3 hours in length for a total of 27 hours.

A total of 33 hours of volunteering time need to be logged in to complete and validate the Green Module.



September 2017

More info on facebook: [https://www.facebook.com/pg/VolunteerMauritiusMYS/photos/?ref=page\\_internal](https://www.facebook.com/pg/VolunteerMauritiusMYS/photos/?ref=page_internal)

**4. Al-Waadjidah Ladies Welfare Association** took the initiative to clean up and give life back to the existing, but highly neglected pathway on the Priest Peak in Port Louis. Their mission was successful as it was not only a cleaning operation but also turned out to be a fun day out for the participants as well.



**Nettoyage du parcours de santé**  
Priest Peak, Cité Martial, Plaine Verte  
(pres du 'Canal Anglais' et de la Foire)  
samedi 16 novembre 2013 à partir de 10h



Pour plus d'infos,  
veuillez appeler  
**Mme Woorah Kootbally**  
présidente de  
Al-Waadjidah Ladies Welfare Association  
Plaine-Verte, Port-Louis

5748 9687  
242 1524

contact@cleanupmauritius.mu

**5. Brahma Kumaris Global Peace House** took several environment initiatives to raise awareness as follows:

### I. Solar Cooking Demonstration and Awareness



Several awareness and demonstration sessions were conducted in the country to show the use of solar energy in cooking. The proposed kit consists of a solar cooker box which uses the principle of greenhouse effect to slowly cook the food. It has the advantage of being low cost, low maintenance, user friendly and portable and has a healthy cooking technology. You can even build your own solar cooker box using simple materials.

### II. Sustainable Yogic Agriculture



It is the first initiative done in Mauritius to sensitise planters and the public in general about the importance of reverting to natural methods of farming with the support of environment friendly fertilisers and pest controls products. Special emphasis is laid upon the impact of positive thoughts on plants and biodiversity (use of positive frequencies using the mind).

### III. Écologie Intérieure



This is an exhibition set that explains the ethical, moral and spiritual aspect of creating a new mindset that is the foundation of green societies, Visitors can also better understand concepts such as climate change, sustainable development and the vegan diet concept. Furthermore visitors are also encouraged to pledge some green thoughts on a leaf form made up of paper which they put on a tree.

### IV. Aiming at an eco-friendly spiritual organisation

Brahma Kumaris Global Peace House is an environment friendly based organisation where the following practices are observed:

- Recycling of paper and collection of used paper to be recycled
- Collection of used cooking oil
- Composting
- Use of photovoltaic system
- Rain water harvesting

# Funding for Climate Change

## Climate Financing

A series of financial mechanism are in place to support climate change initiatives and the relevant ones for Mauritius are:

- (a) Adaptation Fund (AF).
- (b) Special Climate Change Fund (SCCF)
- (c) Green Climate Fund (GCF)
- (d) Global Environment Facility (GEF)
- (e) Africa Climate Change Fund (ACCF)
- (f) Climate Technology Centre and Network (CTCN)
- (g) Nationally Appropriate Mitigation Actions (NAMA) Facility
- (h) Sustainable Energy Fund for Africa (SEFA)

**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 compound 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).

**What is climate change vulnerability?**

Vulnerability refers to the degree to which people, or the things they value are susceptible to, or are unable to cope with the adverse impacts of climate change. Vulnerability determines how severe the impacts of climate change might be.

## Answers to Selected Activities

### **Activity 3**

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 4**

1. Using more fertilisers, driving a petrol driven car.

2. Coral reef damage/bleaching, etc.

3. True

### **Activity 5**

a, b, f, h

### **Activity 7**

b, d, g

### **Activity 8**

a

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