Are YOU ready for climate change?

A citizen's guide for reducing your carbon footprint and preparing for climate change in Seychelles

sustainability for seychelles

introduction

This is an illustrated booklet about sustainable living and Climate Change. It is intended as an information source for people in Seychelles and in other small islands in the tropics.

The booklet has two main aims:

1. To increase our understanding of Climate Change, what is causing it, and why Seychelles is vulnerable to its effects.
2. To motivate individuals and communities to protect themselves against the likely effects of Climate Change, and to act on reducing the causes of Climate Change. It gives practical suggestions on actions to take, and highlights the need to act now.

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Major causes of Climate Change : emissions from cars and power stations

Part 1 : about climate change

What is Climate Change?

The Intergovernmental Panel on Climate Change (IPCC), a leading group of climate scientists, says that the Earth's climate is changing: the atmosphere and oceans are getting warmer, sea levels are rising, and weather is becoming more extreme. This is what we know as 'Climate Change'. They predict that small islands such as Seychelles are likely to be directly affected by it.

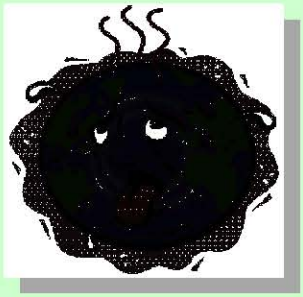
Fossil Fuel + Greenhouse Gases = Climate Change

Fossil fuel - diesel oil, petrol - is made from underground deposits of coal, oil or gas, that were formed over millions of years from fossilized remains of plants and animals. This fuel is meant for car engines and for generators which make electricity. Burning this fuel releases exhaust gases into the atmosphere (mostly Carbon Dioxide, CO_2), which we refer to as 'Greenhouse Gases' (GHG). Scientists say these GHGs heat up the atmosphere, and this is causing Climate Change.

Greenhouse Gases (GHG) also occur naturally [how?]. By absorbing the sun's heat they keep the atmosphere warm enough for us to live in. This is called the **Greenhouse Effect**. Without it, the Earth would be too cold for humans and animals to inhabit. (see diagram on next page)

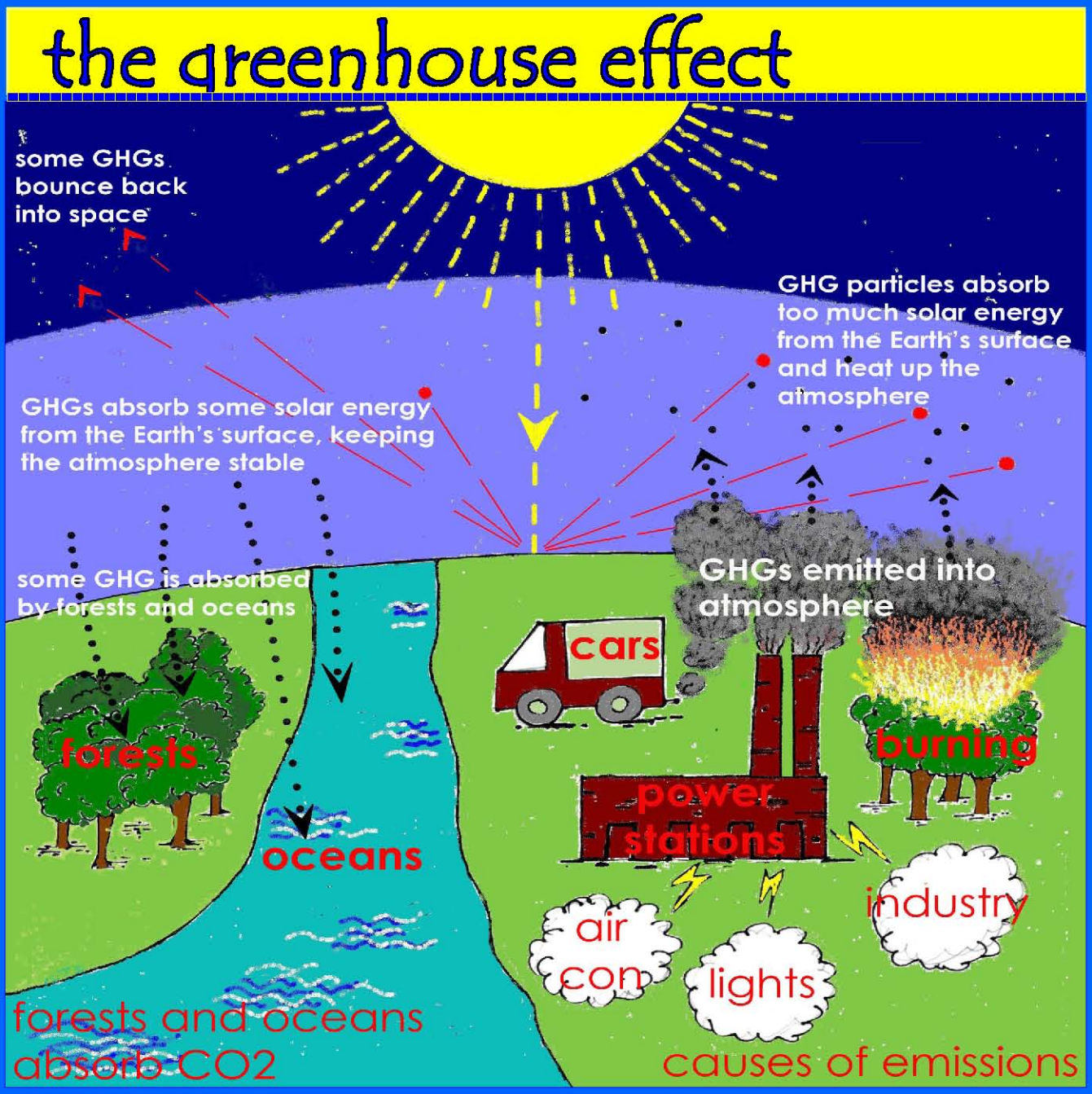
What have we done to our planet..?

Since the Industrial Revolution, we have consumed vast amounts of fossil fuel to meet our energy needs. This has added significant GHGs to the atmosphere, and gradually intensified the Greenhouse Effect. Normally, the level of GHGs is stabilized by forests which re-absorb CO_2 from the atmosphere, but we have cleared so much woodland on the planet for industry and agriculture, that they are not able to absorb enough CO_2. So now, too much of the sun's heat is absorbed in the atmosphere.



Question : After Fossil Fuels, what next?

Fossil fuels are non-renewable; what is left underground (or sea bed) is expected to run out in the next 50 years. Humans will have no choice but to reinvent a way of living that is not based on fossil fuels. Shouldn't we start doing it *now*, while there is still a chance to limit climate change?


the greenhouse effect
some GHGs bounce back into space
GHG particles absorb too much solar energy from the Earth's surface and heat up the atmosphere
GHGs absorb some solar energy from the Earth's surface, keeping the atmosphere stable
some GHG is absorbed by forests and oceans
GHGs emitted into atmosphere
cars
forests
oceans
power stations
burning
industry
air con
lights
forests and oceans absorb CO2
causes of emissions

addicted to fossil fuel

Is your lifestyle dependent on Fossil Fuel?

- Many of the foods we eat every day are imported on cargo ships which burn fossil fuels, ie. rice, garlic, oil, salt, flour, sugar…
- All of the manufactured products we buy burned up fossil fuels during production, i.e. shampoo, soap, plastic buckets, mops, plastic bags, toys, twisties, etc.
- All of our electricity in Seychelles is produced by burning fossil fuels (think about all the air conditioners and electrical appliances you use in your home, workplace, school…)
- The transport we use - airplanes, buses, cars, taxis - all run on fossil fuels
- Plastics, Styrofoam, many fabrics, cosmetics, chemical fertilizers, pesticides and many other products are made from fossil fuels


Cargo of imports

Electrical appliances


lighting


Petrol & diesel

How has the climate changed?

These extracts are from the IPCC 2007 Report on Climate Change:

- Atmospheric concentrations of **greenhouse gases** reached their highest recorded levels in the 1990s, mainly because of the combustion of fossil fuels, agriculture, and deforestation.
- 11 of the last 12 years (1995-2006) are among the 12 **warmest** years since 1850.
- It is very likely that the 20th century warming has contributed significantly to the observed **sea-level rise**, through thermal expansion of seawater and widespread loss of land ice.
- Recent regional changes in climate, particularly increases in temperature, have already affected land and marine **ecosystems** in many parts of the world.
- **El Nino** events became more frequent and intense during the last 20 to 30 years compared to previous 100 years.

part 2 : Impacts of climate change

What changes can we expect in future?

It is predicted that the features of local climate (rainfall in the NorthWest Monsoon, Dry season in Jul/ Aug) may become more intense and cause more damage, and may occur out of season. Climate experts predict the changes happening in two ways:

1) *slow onset changes* or
2) *sudden or extreme events.*

Slow Onset Changes

Warmer Oceans

Oceans absorb heat from the atmosphere; so, if we don't reduce our carbon emissions, the average sea surface temperature is predicted to rise by 1.4 to 5.8'C by 2100 relative to 1990. This would cause Coral bleaching, as corals are very sensitive to water temperature changes. Coral reefs support 25% of all marine life, so this will severely affect marine biodiversity.

Acidic Oceans

Oceans also absorb CO2 from the atmosphere; so higher levels of CO2 means the oceans will absorb more of it, and will become extremely acidic. This would slow the growth of coral reefs, compounding the effect of bleaching and threatening coral life such as reef fish.

Sea Level Rise

Thermal expansion and melting ice is expected to cause significant sea level rise by 2100. Seychelles would be at risk from coastal flooding and storm surges, which would threaten housing, tourism developments, ports and industrial sites.

Coastal erosion

Coral reefs and mangroves are a natural barrier against wind and waves. Higher sea levels will neutralize these natural defences, and the coastal environment - beaches, plants, buildings, roads - will be even more vulnerable to erosion than they are today.

Loss of Biodiversity

Plant and animal species will be at risk of extinction if global air temperature increases by more than 1.5 to 2.5°C. This would significantly reduce biodiversity in Seychelles, and would be a serious impact on our natural environment.

Impacts of climate change

Erosion at Anse Royale

Coral Bleaching

Rainstorm over Victoria

Seychelles' biodiversity is at risk

Impacts of climate change

Sudden or extreme events

Heavy rainfall

An example of a sudden event is exceptionally heavy and consistent rain, as happened in January 2005 on Mahe. This caused **landslides** and **flooding** at Mare Anglaise, and seriously damaged roads, buildings and infrastructure.

Tropical storms

Tropical storms, like the one in September 2002 on Praslin, can cause massive damage. These storms are predicted to become more intense, with greater peak windspeeds, storm surges and seawater flooding in low-lying coastal areas. There is also evidence of changes in their geographical tracks, suggesting that cyclones might eventually move northwards, and come much closer to Seychelles.

What is Coral Bleaching?

Coral is made of millions of tiny clear animals called coral polyps, which grow together in huge colonies. The polyps secrete limestone, which is the building block of coral reefs. Corals get their colour from tiny algae which live inside the polyps. Normally, when corals die, new coral grows on top of the limestone skeletons left behind.

One of the biggest threats to coral reefs is called 'bleaching', which is mainly caused by increases in water temperature, acidity and Ultraviolet exposure. These changes kill the algae that corals depend on for food and color, and the coral turns white. It takes many many years for coral to re-grow, and if the conditions which caused the bleaching persist, the corals may never recover, and die.

Corals are home to thousands of different species of animals, most of which would not survive if the reef died.

For more info see www.MCSS.net

Www.ausmea.org

Seychelles is vulnerable

How vulnerable is Seychelles to the impacts of Climate Change?

We are vulnerable because we depend on our natural environment for many things, such as food and tourism, and this environment is at risk from Climate Change. But there are also other important factors common to most Small Island Developing States (SIDS) which reveal our vulnerability.

Dependence on Tourism

Seychelles' economy depends primarily on Tourism to generate revenue. If global Climate Change were to impact Tourism, the decrease in revenue would affect the local economy and our ability to import the things we need, such as food and fuel.

Reliance on imports

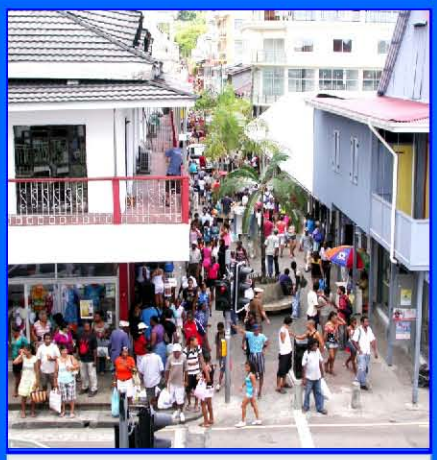
If an imported food staple such as rice, were to affected by adverse climatic events in a rice growing country, as has already happened[], we could face shortages and/or increases in price.

Society

Disruption to businesses and industry from Climate Change would affect the entire economy, and economic hardship and stress would be a threat to individuals and families. The people with the least financial resources would be most vulnerable.

In 2009, Seychelles imported 84,000 tons of rice

Tourism is the main pillar of the local economy



Saturday shopping: how would Market St be affected if people had less money?

Part 3: take action!

Big problems are consequences of small actions. Climate Change is a big problem but it is a result of the small activities we perform every day.

Conversely, the big solutions are rooted in small actions: if we shop, move, eat, drink, work and live our everyday life with disregard for the integrity of the Earth community, we are bound to destabilize the finely balanced harmony of our home planet. On the other hand, if we perform everyday actions carefully and mindfully, we contribute to the wellbeing of our entire ecosystem.

Changing the way we live :

1. Reducing our ***carbon footprint*** - reducing the amount of greenhouse gases emitted into the atmosphere as a result of our personal lifestyles.
2. ***Adapting*** to a changing climate, to ensure that we, our families and our communities have the food, water and shelter we need to live comfortably and safely despite the storms, heavy rains, water shortages and coastal erosion and flooding that are expected as a result of climate change.

Often, the actions we take to reduce our carbon footprint ***also*** help us adapt to a changing climate. Interestingly, many of those actions reflect traditional culture and ways of living in Seychelles. This section is organized under these themes:

Water * House design * Garden *Food * Energy * Transportation * Waste * Nature

The ideas listed here are just a beginning! Talk to your friends, family, neighbours, and especially elder members of society to get more ideas. ***Above all*** – be a role model to show it is possible to make small changes to your lifestyle that will benefit everyone.

Check out the movie *Age of Stupid* to get one filmmakers' view on what life will be like on earth if we adapt the "stupid" choice: www.ageofstupid.com.

Think of ways to be more self-sufficient by how you buy your food

water

Storing, treating, and supplying water uses has a financial and environmental cost due to the energy required. In a time of drought it's even more important to make sure that water is used efficiently and not wasted. There are simple steps that we can all take now to reduce the amount of water we use, to protect our precious water resources for the future.

- Rainwater is good for the garden, cleaning the car, washing clothes, flushing the toilet and other uses that do not require treated water. Connect a tank or other suitable container to your gutter to collect rainwater.
- Clean your roof and gutters regularly to ensure that no dirt gets into the tank.

Downpipe connects to..

..Rainwater tank

Water storage at home, school or work

- Install a water tank to store treated water from PUC. Make sure it is large enough to supply you in case of a long drought, especially if you are in an area with poor water pressure.
- Make sure all tanks are secure so they will not be toppled by strong wind or be damaged by falling trees. Keep them covered to reduce evaporation and to keep out rats and mosquitoes.

Use a watering can and a bucket and sponge to clean the car, not a hosepipe. Water saving : a *whopping* 124 litres with each wash!

DON'T WASH CARS IN RIVERS!
Many people take their car to a nearby river for a free wash. If you do this, make sure you park your car well away from the river so the dirty water doesn't flow back in—the oils and other chemicals can kill river life!

Watering your plants wisely

- Water the soil around the base of the plant so it seeps down to the roots; avoid spraying in the air.
- Avoid wastage through evaporation : water at dusk or early morning when it is cooler.
- Get advice on how often you need to water according to the plants you are growing.

Secured water tank

Water the roots

water

Using Grey water in the garden

- Wastewater from the kitchen, washing machine or baths, basins and showers is known as 'grey water' and can be used to water the garden.
- Household soaps and detergents are harmless to plants, but water containing bleaches, disinfectants, dishwasher salt and stronger products should not be used.
- It is prudent to alternate containers used for wastewater and mains or rainwater, to prevent build up of potentially harmful residues and bacteria.
- Avoid using grey water on salads and other produce to be eaten raw.
- Grey water should be used as it is produced and storage avoided. If left to stand, potentially harmful organisms might multiply and it will certainly smell bad.

Toilets

Did you know that nearly **1/3** of all the clean, drinkable water we use in our homes is flushed down the toilet? Put a water-saving brick or filled PET bottle in the toilet cistern. This will use less water to re-fill the cistern, but won't affect how your toilet works, will save 1 litre or more with each flush.

Showers

Most showers use 9 litres of water per minute; a 7-minute shower uses **63** litres! Try a shorter shower: turn on the water to get wet, turn off and lather up, and turn on again to rinse off. Showering this way can easily take under three minutes and only uses **18** litres.

Taps

- Fix dripping taps and save 15 L a day.
- Fit flow aerators to handbasin taps to reduce volume to save 4L a minute.
- Don't leave the tap running... fill a bowl or the sink to wash dishes, fruits and vegetables, and turn off the tap when brushing your teeth. Save 6L a minute!

Use a bowl instead of running the tap

Turn off when brushing, turn on to rinse