

# Bush Telegraph

Vol. 7 - No. 1

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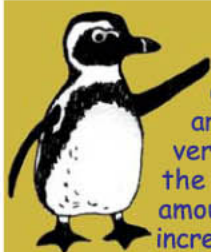
## CLIMATE CHANGE



## AND NOW?



## CLIMATE CHANGE ... NATURE'S WAY



Have you heard about climate change? Global warming? The greenhouse effect?

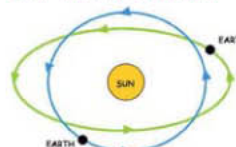
Climate change is the change of the "average weather" in an area over time. It is actually a natural process, when it happens very slowly over millions of years. In only the last 200 years, the Earth's climate has been changing faster and in greater amounts than expected. There has been a significant and rapid increase in the Earth's temperatures which is called global warming.

First, let us find out more about the natural process of climate change. Then, on page 3, read on to learn more about global warming and the greenhouse effect.

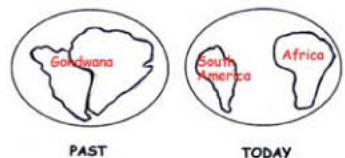
### HOW HAS OUR EARTH'S CLIMATE CHANGED NATURALLY?

We know that climate change over a long period of time is natural. Here are some possible reasons given by scientists:

**Earth's Position** - As the Earth revolves around the sun, it also turns on its own axis. Over thousands of years the path the Earth is traveling changes a little bit. This may cause colder and warmer periods as the Earth gets closer to or further from the Sun. In the diagram, the blue-coloured path shows a colder period and the green-coloured path a warmer period.



**Movement of Continents** - About 180-200 million years ago, Africa and South America were together as one continent called Gondwana. Over time, the large continent divided into two. This changed ocean currents, wind conditions and temperatures. Continents are still moving today. How do you think the land that is now Namibia has been affected?



These processes take place over millions of years and very slowly change the climate. This slow change gives time for nature to adapt.

### NATURAL CLIMATE CHANGE: ICE AGES



Over millions of years, the Earth's climate has included warm and cold periods. The cold periods are known as ice ages. The most recent ice age ended about 10,500 years ago. During that time most of North America and Northern Europe were covered in glaciers (ice).

The landscape of Namibia has also been affected by ice ages. About 2 million years ago, the beginning of the ice age in the Northern Hemisphere caused a worldwide **decrease** of the sea level by up to 120 meters. This created steeper slopes from inland Namibia to the ocean. Erosion was increased as large amounts of water moved faster towards the coast. The Kuiseb and Fish River Canyons were partially formed by this erosion.

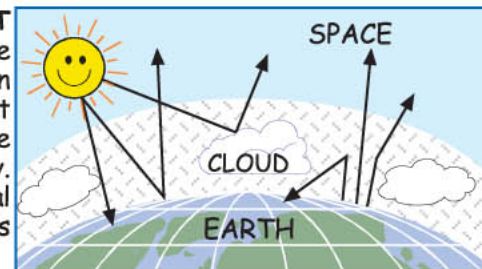
## CLIMATE CHANGE ... GOING TOO FAST



What is happening to make climate change go faster? In the last 200 years, we have dramatically changed the way we live. Worldwide, humans use machines driven by fossil fuels (oil, coal and natural gas). We cut down and burn more trees. We keep increased livestock numbers in smaller areas. Although in the short-term we often benefit from these activities, we are causing many environmental problems including global warming.

### THE NATURAL GREENHOUSE EFFECT

Life is possible on Earth because of the natural greenhouse effect. The sun provides the Earth with heat and light energy. The gases in the atmosphere trap small amounts of this heat energy. Through this process, the average global temperature of the Earth's surface is 15° C instead of only -18° C.



### THE GREENHOUSE EFFECT AND GLOBAL WARMING

When fossil fuels are burned, large amounts of carbon dioxide (CO<sub>2</sub>) and other gases are released into the Earth's atmosphere. With fewer plants, especially trees, less carbon dioxide is being absorbed. This imbalance has caused a rapid increase in the amount of greenhouse gases in our atmosphere. The average global temperature of the Earth's atmosphere is therefore increasing too fast. This human-caused process is called global warming.

**↑ GASES = ↑ TRAPPED HEAT = ↑ TEMPERATURES = GLOBAL WARMING**

### GREENHOUSE GASES

GAS	NATURAL SOURCE	HUMAN MADE SOURCE	NAMIBIAN SOURCES
Carbon dioxide	Breathing and natural fires	Burning of fossil fuels and trees	Vehicles, cement factories and electricity production
Nitrous oxide	Bacteria in soils and oceans	Vehicle exhausts, fertilizers and power stations	Burning fields and livestock farming
CFCs	None	Refrigerators, aerosols, solvents and foams	Old CFC-based equipment
Low-level ozone	Lightning	Reaction of vehicle exhaust with sunlight	Vehicles
Methane	Decaying plant material	Farming, sewage and landfill sites	Livestock farming
Water vapour	Evaporation	Large agricultural irrigation and dams	High evaporation rates



# IMPACT OF CLIMATE CHANGE IN NAMIBIA

The full impact of climate change on the Earth is unknown. Our planet has many interlinking, complex processes that humans have influenced through our high energy consumptive lifestyles. We do know that the whole Earth will be affected by climate change, and we are already starting to see these impacts. Below are many of the closely linked, potential impacts in Namibia. As a dry country, Namibia is extremely vulnerable to even the smallest climate changes.



## INCREASED TEMPERATURES

There may be an increase in the high, low and average temperatures. It is estimated that there will be an average increase of 2°-3°C. In northern Namibia it may even become another 1°C hotter on average.

## MORE ERRATIC RAINFALL

Overall, rain will most likely decrease. Rainfall will become more unpredictable and extreme. For example, there will be heavier rain storms for shorter periods of time. There may be increased flooding and damage due to these short, heavy rains.



## INCREASED EVAPORATION

It is estimated that for every 1°C increase in the temperature, there will be a 5% increase in evaporation rates.

## DECREASED WATER SUPPLY

Decreased rainfall and increased evaporation can lead to a decrease in surface water and the recharging of our groundwater. Continued high-levels of water consumption will make it worse.



## DECREASED HYDRO-ELECTRICITY

With a decrease in rainfall and surface water, the water supply needed to produce hydro-electricity will not be enough. This will most likely increase dependence on fossil fuel electricity.

## RISING SEA LEVELS

Due to increased temperatures, the Earth's ice is melting into the sea at an unnaturally rapid rate. Sea levels along the Namibian coast line may rise 30-100 cm in the next 100 years. This increase will flood significant parts of Walvis Bay and will affect other coastal towns.



## DECREASED AGRICULTURAL PRODUCTIVITY

Higher evaporation rates will decrease the soil moisture content. It is expected that the growing season will shorten, and that the crop nutrient quality will decrease. The decrease in water supply will also reduce land capacity for irrigation and livestock.



## DECREASED FISHERIES

With increased air temperatures the ocean temperature will also rise. Currently our cold Benguela current is very nutrient rich and therefore is the basis of the food chain. With rising temperatures this food chain will be broken resulting in fewer fish.

## INCREASED DISEASE

Drought and lack of clean, fresh water will lead to increased diseases. Young children are most likely to suffer from diarrhea, under-nutrition and respiratory problems.



## MORE MALARIA

With increased temperatures, the area at risk of malaria will spread further South. More people will have malaria and perhaps die from it.

## INCREASED POVERTY

Most Namibians depend on the land for their food, water and shelter. With decreased agricultural productivity, water supply and increased unpredictable weather, most people will become poorer as they struggle to survive.



## DECREASED BIODIVERSITY & ECOSYSTEM CAPACITY

All living things on Earth will be affected by climate change. The natural cycles and food webs will be disrupted causing an unbalanced ecosystem. Animals and plants living in these habitats have to adapt and/or move; or they will die.

## WHAT ABOUT PENGUINS?

Penguins are flightless marine birds. They eat mainly fish and live on islands or on the coast. Many penguins are already feeling the impact of climate change. Adélie penguins live along the Antarctica peninsula. They are dependent on sea ice for feeding and resting platforms. Adélie penguins are threatened because the sea ice is melting and fish stocks have become less. In Namibia we have the African Penguin. It breeds on islands and on the coastline near Lüderitz. The African Penguin is also endangered by rising sea levels and decreased food supply.





## GOVERNMENTS TAKING ACTION

Climate change is a crisis shared by everyone. Because the Earth only has one atmosphere, the impact will be felt worldwide. The main sources of climate change are countries that heavily pollute the air with greenhouse gases. However, many of the countries that produce less pollution, will be affected the worst. Governments throughout the world have agreed to solve this global crisis together, and have therefore created an international agreement.



### UNITED NATIONS FRAMEWORK CONVENTION ON CLIMATE CHANGE (UNFCCC)

The UNFCCC is an international treaty for governments to work together to combat and adapt to climate change. The UNFCCC came into effect in 1994 and requires governments to:

- ❖ Gather and share information on greenhouse gas emissions.
- ❖ Develop national strategies.
- ❖ Work together to adapt to the impacts of climate change.

Learn more on the internet at:

· <http://unfccc.int>

· [www.met.gov.na/dea/env\\_issues/climate](http://www.met.gov.na/dea/env_issues/climate)



### MAKING IT LAW: THE KYOTO PROTOCOL

Even though most countries set targets for the reduction of their greenhouse gases, the overall emissions are still increasing. The Kyoto Protocol was created to make the voluntary agreements in the UNFCCC into international law. The Kyoto Protocol came into effect in 2005.

It requires developed countries to significantly reduce their greenhouse gas emissions by 2012. Total greenhouse gas emissions are to be reduced by an average of 5% compared to the 1990 emission levels.

### WHAT ACTION IS THE NAMIBIAN GOVERNMENT TAKING?

Namibia is party to the UNFCCC and Kyoto Protocol. Although Namibia does not yet have a national policy on climate change, it set up the National Climate Change Committee (NCCC) in 2001. The NCCC's aim is to give advice to the Namibian government and people on how to reduce and adapt to climate change. NCCC members include:

- ❖ government ministries (e.g. Ministry of Mines and Energy),
- ❖ parastatals (companies linked to the government e.g. NamPower),
- ❖ non-governmental organizations (e.g. Namibia Agricultural Union) and
- ❖ educational institutions (e.g. Polytechnic of Namibia).

The Ministry of Environment and Tourism - Directorate of Environmental Affairs is the implementing agency of the National Climate Change Program. Work is currently underway on Namibia's country report, the Second National Communication, which is to be submitted to the UNFCCC.

Jonas Nghishidi, Climate Change Program Assistant, says "What we do not realize is that climate change is real. The Namibian environment is vulnerable and we need to change our attitude. Youth cannot make decisions about buying solar systems but they can make decisions about how much water is boiled in the kettle. This saves energy."



## PERSONALITIES IN CONSERVATION

**Name:** Marina Coetzee

**Organisation:** Ministry of Agriculture, Water and Forestry

**Job Title:** Chief Agricultural Researcher

**No. of years on the job:** 18

**What are your main job responsibilities?**

I supervise the following three sections: Agricultural lab, Crop supportive services and Natural resource mapping.

**What does the Agricultural lab do?**

The Agricultural lab provides several services to farmers at a discount cost. For example, we analyze soil and plant tissue samples for their nutrient content. We give farmers recommendations on fertilizer application for better crop growing, and licks to improve the nutrition of their livestock.

**What work is done by the Crop supportive services?**

Our main work at the moment is to experiment with alternative crops. For example, we are working together with farmers to grow test areas of plants such as wild sesame and jatropha. We want to find out in what soil and rainfall areas the crops will grow and if there is a commercial market for the crops.

**What does the Natural resource mapping unit do?**

Natural resource mapping gathers and compiles information using fieldwork and satellite images. For example, with these maps we can determine seasonal biomass production and soil types.

**How does your department contribute to the National Climate Change Committee?**

We provide agricultural data to the committee and to national assessment reports. Through the committee we are also linked to the environment and climate sectors. We share data between our sectors that help each other to better address climate change in Namibia. We also raise awareness about climate change to farmers, the general public and to politicians within our ministry. We aim to get the need to address climate change into our ministry's strategic plans and policy documents. Lastly, we supervise and evaluate consultancies done for the National Climate Change Committee based on its scientific information.

**What is the Climate Change Adaptation Project?**

This project is being piloted in the Omusati Region. It aims to find out what farmers are already doing to adapt to changes and variability in our climate. It aims to provide a network between farmers to share best practices and to implement the use of better adapted crops and livestock breeds. The project is also looking at how information can be shared between the local and national level.

**What is your message for Namibia's youth?**

We are the custodians of our natural environment for the coming generations. We each have the responsibility to leave it in as good of a shape as we received it.





## FOR THE BEGINNER READER: LIVING A LOW-CARBON LIFESTYLE

### What is a Low-Carbon Lifestyle?

A Low-Carbon Lifestyle is living in a way that produces as few greenhouse gases as possible, especially carbon dioxide (CO<sub>2</sub>). CO<sub>2</sub> is produced when any carbon containing material, like trees and fossil fuels (oil, coal and gas) are burned. Approximately 85% of the energy used by humans worldwide comes from burning fossil fuels. We now know that this high rate of fossil fuel energy use has resulted in global warming. **How can you change your lifestyle to use less CO<sub>2</sub> producing energy?**

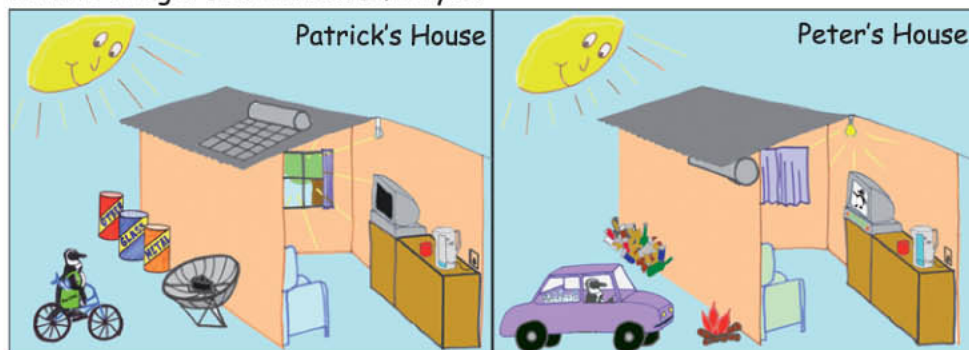
### What is carbon?

Carbon is a chemical element that is found in many different forms in all life. For example, when combined with oxygen, carbon is a gas. Carbon, in the form of diamonds, is a solid.

### What is carbon dioxide?

Carbon dioxide- or CO<sub>2</sub>- is a colourless, odourless gas that is naturally present in our atmosphere. All animals, including humans, breathe out carbon dioxide. Plants take in carbon dioxide and breathe out oxygen while they are photosynthesizing (converting sunlight into plant food).

Look at the two pictures below and compare how Patrick and Peter live differently. See if you can find at least eight differences and list them below. Who do you think is living a 'Low-Carbon Lifestyle'?



1. ....
2. ....
3. ....
4. ....
5. ....
6. ....
7. ....
8. ....

**What other things can Patrick and Peter do to live a low-carbon lifestyle?**

## FOR THE ADVANCED READER: A GLOBAL IMBALANCE

On the previous page we learned that Patrick and Peter's lifestyles produce varying amounts of greenhouse gases, especially CO<sub>2</sub> because they use different amounts of energy. This is also true on a much larger scale as countries produce varying amounts of CO<sub>2</sub> emissions based on their dependence on fossil fuel energy. Check out the chart below to compare the quantities of CO<sub>2</sub> emissions in various countries.



COUNTRY	TONNES OF CO <sub>2</sub> EMITTED PER PERSON ON AVERAGE	APPROXIMATE POPULATION SIZE	APPROXIMATE TONNES OF CO <sub>2</sub> EMITTED PER COUNTRY
Namibia	1,24	2 million	2,5 million
China	3,84	1300 million	5000 million
South Africa	9,2	47,8 million	440 million
Germany	9,8	82 million	805 million
USA	20,4	304 million	6200 million
Worldwide (current)	4	6670 million	26600 million
Worldwide (target)	2	6670 million	13300 million

### Can economic principles help reduce global greenhouse gas emissions?

The Kyoto Protocol recognizes the differences in greenhouse gas emissions and applies the principle of "common but differentiated responsibilities". A greater burden is placed on developed countries as they have a greater ability to pay for the cost of cutting emissions and they historically have emitted larger amounts per person. To help countries be able to meet their emission reduction targets, the Kyoto Protocol established the "Flexibility Mechanisms". One of these is the Clean Development Mechanism (CDM).

The CDM allows developed countries to earn and trade emission credits by funding and implementing low-carbon projects in developing countries. These projects are often more cost-effective than carbon-reduction measures in developed countries. Developed countries benefit as they spend the least amount of money to benefit the environment. Developing countries also gain as they receive increased investments in sustainable technology. Some people question if the CDM will actually reduce global greenhouse gases enough and therefore significantly benefit the climate.



### "No time to sit back and relax!"

Namibia currently emits fewer greenhouse gases than the acceptable average. This is no reason for us to become comfortable and only maintain or even increase our emissions. As Namibia tries to meet its development goals in Vision 2030, it has the opportunity to do so in a long-term, environmentally sustainable manner. Namibia can learn and benefit from the global problems created primarily by developed countries instead of contributing to it. Country-wide this can be done by implementing large-scale renewable energy projects instead of relying on fossil fuels and through environmentally-friendly decision making on an individual level.

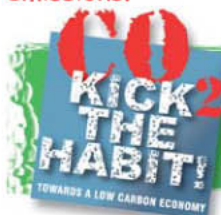




## ACTIVITY PAGE: YOU MAKE THE DIFFERENCE

"Climate change doesn't affect me. I can't do anything that will make it stop.  
What difference does it make how I live?"

Have you ever heard someone you know say this? Well, it is not true. Each person makes a difference every day. Either you can have a positive effect on the environment or a negative one. You are the one to choose. We are dependent on our environment and impact it with each of our actions. Become an environmental citizen today and every day. Get started by reducing your carbon dioxide (CO<sub>2</sub>) emissions.



**CELEBRATE WORLD ENVIRONMENT DAY  
5 JUNE 2008**

**KICK THE CO<sub>2</sub> HABIT! Towards a Low Carbon Economy**

Check out this Environmental Action Alphabet to learn ways that you can reduce greenhouse gas emissions, especially CO<sub>2</sub>, and improve our environment:  
**Act for the Environment**

- Bring your own bag to the supermarket
- Conduct clean-up campaigns
- Donate time or money to an environmental cause
- Educate yourself about living a low carbon lifestyle
- Farm with indigenous livestock breeds
- Grow drought-tolerant crops
- Heat only enough water for what you need
- Invest in a thermal blanket for your electricity hot water geyser
- Just use solar energy
- Keep fewer livestock in one area and prevent overgrazing
- Live life without burning fossil fuels or trees
- Mulch and use compost in your garden
- Never litter
- Oppose unsustainable development
- Plant more trees
- Quiz your environmental knowledge
- Reduce, Reuse, Recycle
- Save water
- Turn off appliances and stand-by lights
- Use energy-efficient light bulbs
- Visit an environmental education centre
- Walk or ride a bicycle instead of using a car
- Xchange ideas, values and culture
- Yell out 'Stop polluting!'
- Zero your carbon emissions



Adapted from [www.unep.org/wed](http://www.unep.org/wed)



## Chinga's & Nzovu's Corner



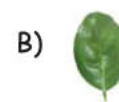
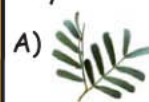
Dear friends,



Thank you for all of the letters, especially from Walvis Bay. We have answered two of them below. If you have any questions for Chinga and Nzovu, please write to: **Chinga & Nzovu, NaDEET, P.O. Box 31017, Pioniers Park, Windhoek**

Dear Chinga and Nzovu,  
Do all plants lose the same amount of water through transpiration? Why?  
From Venecia in Walvis Bay

Dear Venecia  
No, all plants do not lose the same amount of water through transpiration. Transpiration is the loss of water through the surface of a leaf. Look at the two leaves below. Which one do you think loses more water?



A) is a camel-thorn leaf. The camel-thorn tree is from Namibia and is adapted to our dry climate.  
B) is the leaf of an orange tree which originally comes from South-east Asia. South-east Asia is a hot and humid place all year round. In general the larger the leaf, the more water is lost through the leaf. The camel-thorn leaf must save as much water as it can as there is little rain and moisture and lots of sunshine in Namibia.  
Chinga and Nzovu

Dear Chinga and Nzovu,  
How do oil spills affect marine animals and plants? How long does the oil take to decompose without human interference?  
From Adrian in Walvis Bay

Dear Adrian,  
Oil spills are extremely dangerous for marine life. The most dangerous is a large oil spill. Although some of the dangerous materials evaporate quickly, the majority of the oil remains on the surface of the ocean water. Without human interference, it is estimated that it will take 1-3 years for the majority of the oil to be less harmful.

Marine plants and animals are affected by the oil in different ways. Many animals and plants are suffocated by the oil. Marine birds covered in oil may be unable to fly as the oil is too heavy. The oil may also strip the protective, water-resistant coating from marine life. This exposes them to the dangers of the cold temperatures.

Oil may also accumulate (build up) in the marine life food chain. Oil is toxic and may have long-term impacts such as problems with reproduction and growth.  
Chinga and Nzovu

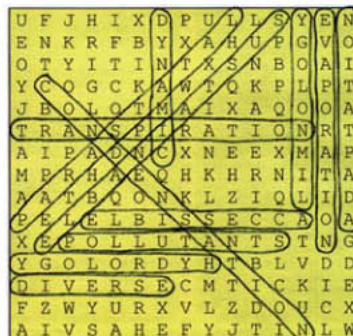


## UPDATES FROM LAST ISSUE

Below are the answers to the Water Word Search and Test Your Math Skills from Vol. 6, No. 1 - "Water is Life!"

**TEST YOUR MATHS SKILLS**  
Below is a list of some common daily activities for which we use tap water. First calculate how much you currently pay for the water. Then, calculate how much you would pay if it cost as much as beer. The first one has been done for you.

ACTIVITIES	AVERAGE WATER USE/DAY	COST @ N\$0.006/LITRE	COST @ N\$12/LITRE
Brushing Teeth	0,5 litres	N\$0.003	N\$6.-
Showering	50 litres	N\$0,3	N\$600.-
Washing dishes	30 litres	N\$0,18	N\$360.-
Drinking	2 litres	N\$0,012	N\$24.-
<b>TOTAL</b>	<b>82,5 litres</b>	<b>N\$0,495</b>	<b>N\$990.-</b>



Thank you to the 2nd National Communication to the UNFCCC project, MET-DEA and the UNDP-GEF for sponsoring this issue.



Global Environment Facility



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The Bush Telegraph is a mini-magazine for Namibian youth. It aims to increase knowledge of and improve attitudes towards our environment through reading.

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