

Trash and Climate Change

The Earth's atmosphere contains naturally occurring greenhouse gases that hold the sun's warmth and control global temperatures. Plants and animals are part of this natural cycle.



Cars, trucks, factories, and power plants release large amounts of greenhouse gases, upsetting the natural atmospheric balance. Too much extra greenhouse gas can raise global temperatures and cause environmental harm.

Adaptation to Climate Change in the

Pacific Islands Region



gtz



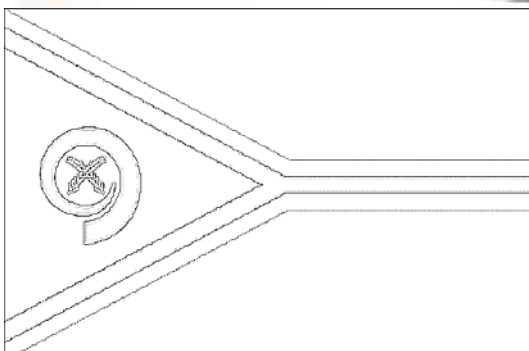
Kipim Kaontri blong Yumi Klin!!!

Sapos yu luk rabis
samples, pikimap mo
putum long bin!



**Adaptation to Climate
Change in the Pacific
Islands Region**

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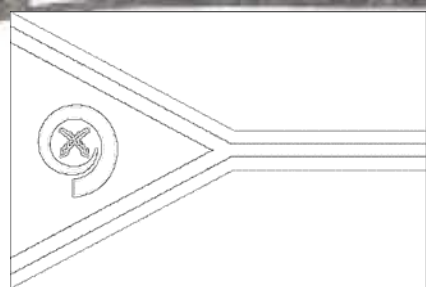


Kipim Air i Klin!

Traem raedem
baesikol o
wokabaot i ko
long skul. Trak
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**Adaptation to Climate
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TURN IT OFF!



**Adaptation to Climate Change
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CLIMATE CHANGE



A Habitable Planet

The Earth's atmosphere consists of nitrogen (N_2 ; 78%), oxygen (O_2 ; 21%) and small but important quantities of carbon dioxide (CO_2 ; less than 0.05%). These gases act like a blanket around the Earth, keeping it at just the right temperature. Short-wave radiation coming from the sun passes easily through carbon dioxide (CO_2) in the atmosphere and warms the Earth's surface. As the Earth's surface warms, it re-radiates long wave radiation back into the atmosphere. However, long-wave radiation cannot easily pass through CO_2 in the atmosphere, so this heat is trapped and warms the Earth; in exactly the same way as the glass of a greenhouse works. For this reason CO_2 , as well as some other gases, are called greenhouse gases.

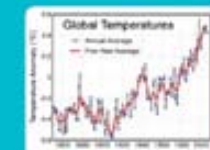
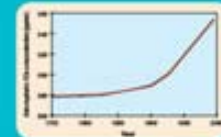


Earth's atmosphere



The Greenhouse Effect

Over the last 250 years, human's activities (agriculture, forest logging and fossil fuel [gas, oil, coal] consumption by sprawling cities, cars, and factories) have increased the concentration of CO_2 in our atmosphere. This is expected to double by 2050 (see diagram, top right). Thus the Earth is warming faster than ever before (see diagram, bottom right). Global temperature is predicted to rise by between 2-8°C, affecting both land and oceans. Because the oceans are so large and deep, the surface will warm only slowly relative to the land; perhaps by as little as 1-2°C only.



Pollution by the Afrim power near Cape Town

The Effect of Global Warming on the Oceans

SEA LEVELS WILL RISE

When ocean water warms up due to the "greenhouse effect", the entire ocean expands, and causes a rise in sea-level of several millimetres per year. If this happens over 100 years or longer, then sea level may rise by 1-2 metres and will start to flood low-lying areas close to the sea. In South Africa, areas such as the Cape Flats could eventually disappear beneath the sea.



Rising sea levels will cause land to disappear beneath the sea.

WARMER OCEANS WILL AFFECT MARINE LIFE

Mobile Animals

Mobile animals can move to different areas to remain within the temperature limits they can tolerate. This is already happening in the North Atlantic, where a northward shift of warm Equatorial water is forcing cold-water-loving zooplankton to move northwards. Fish and birds that feed on them follow them - therefore the whole structure of the food-chain is changing. This has contributed to the collapse of important fish stocks that we eat.

Sedentary Marine Life

Animals that are sedentary (can't move) and fixed to the bottom, such as corals, cannot migrate. When their ocean becomes too warm, and if they cannot tolerate a temperature increase of 3-4°C, many will die, becoming bleached and white in the sun. When corals die, all other life (e.g. fish) on the coral reef suffers.



Marine life on a healthy coral reef



Healthy coral



Zooplankton - the size of a grain of rice



Bleached (unhealthy) coral

OCEANS AND RAINFALL

Warmer oceans will affect the amount of rainfall and where it falls. Warmer oceans and a warmer atmosphere cause evaporation, leading to cloud formation and then rainfall. The devastating rainfall and floods that occurred in many parts of South Africa's eastern coastline (e.g. in KwaZulu Natal) can be traced to parts of the south west Indian Ocean that are warming. In contrast, the cold Benguela Current on the west coast may be less affected by warming, and might even cool as upwelling intensity increases because of stronger winds. Since upwelling of cold water does not bring rain, the west coast is likely to become even drier.



Flooding in KwaZulu Natal

MELTING SEA-ICE, ICE CAPS AND GLACIERS

Warmer seas and a warmer atmosphere are causing the melting and retreating of the ice-caps of the Arctic and Antarctic polar regions. As a result of a 2.5°C rise in air temperature in the last 50 years, the area of Antarctic sea-ice, which forms in winter when the sea freezes, is shrinking by about 1.5% every ten years. Arctic sea-ice is home to polar bears, and as their world shrinks, their existence is threatened. Even in Africa, the snowy ice-covered top of Mt. Kilimanjaro is disappearing.

In Antarctica, melting sea-ice creates similar problems for penguins and seals that live there. On the edges of the Antarctic continent where once there was only ice, bare rock is now becoming exposed.



Melting ice caps in the Arctic



Polar bears in the Arctic

PHYTOPLANKTON TO THE RESCUE?



Phytoplankton

Can nature reduce the amount of CO_2 in the atmosphere and then perhaps cool planet Earth? Plants on land and in the sea use inorganic CO_2 and turn this into organic carbon, which makes up their cells and tissues. To do this, plants capture and use the sun's energy as fuel to drive the biochemical process called photosynthesis. Many regions of the surface ocean contain tiny (microscopic) plants called phytoplankton that capture CO_2 from the atmosphere and turn this into organic carbon. When phytoplankton die and sink into the ocean, the organic carbon within them remains in the deep ocean for thousands of years. This is called the "biological carbon pump". At the moment, about half the CO_2 that enters the atmosphere because of human activity is taken up equally by both land and marine plants.

HOW CAN WE HELP? The real challenge facing us all is to reduce the amount of "greenhouse gases" we produce that escape into the atmosphere. To do this, people everywhere will need to reduce their use of fossil fuels to conserve Earth, our precious planet.





IT'S RUNNING OUT
SAVE WATER

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DO YOUR PART



CHANGE
WE NEED
gtz





Bae i kat aelan long fiuja?

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**STOPEM CLIMATE CHANGE BIFO
BAE YUMI NID BLONG SWIM**

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IT STARTS NOW

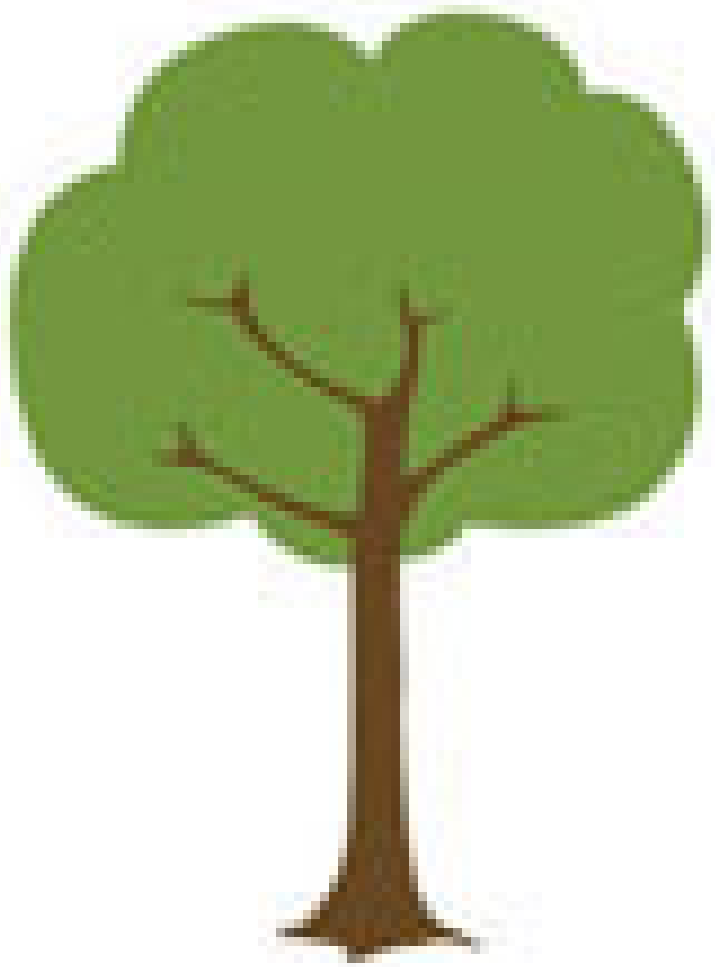


CLIMATE OF CHANGE

CLIMATE OF CHANGE: THE SCIENCE, THE IMPACTS, AND THE SOLUTIONS. A REPORT BY THE NATIONAL ACADEMIES OF SCIENCES, ENGINEERING, AND MEDICINE OF THE NATIONAL RESEARCH COUNCIL ON ENVIRONMENT AND NATURAL RESOURCES OF THE NATIONAL ACADEMIES PRESS, 2002.

CO₂





CO₂

PLANT A TREE: A SINGLE TREE WILL
ABSORB ONE TON OF CO₂ OVER ITS LIFETIME

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