

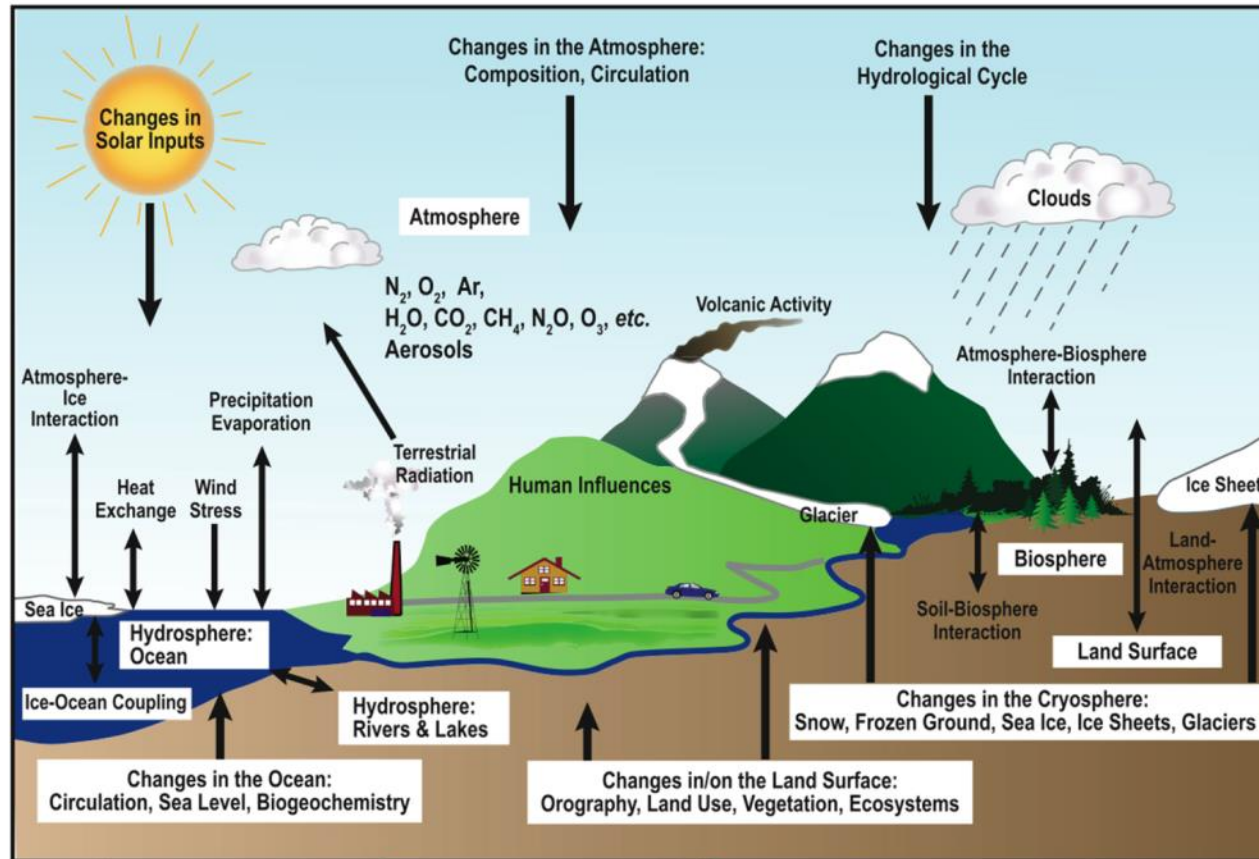


# Climate Change 101

Society for the Conservation of  
Philippine Wetlands, Inc.

# What is Climate Change?

## *Ano ang Pagbabago ng Klima?*



changes in our climate system  
over a period of time

# What is Climate Change?

*Ano ang Pagbabago ng Klima?*



Climate Change refers to a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods.

- **United Nations Framework Convention on Climate Change**

# What is Climate Change?

*Ano ang Pagbabago ng Klima?*



Change in climate brought about by the rise in global temperature;

the consequences are drought and extreme precipitation rate, storminess and sea level rise.

# How Earth keeps temperature relatively constant?



## The Heat Budget

The Earth's heat budget is in balance since millions of years ago.

*HOW: the interaction between the oceans and the atmosphere.*

# How Earth keeps temperature relatively constant?

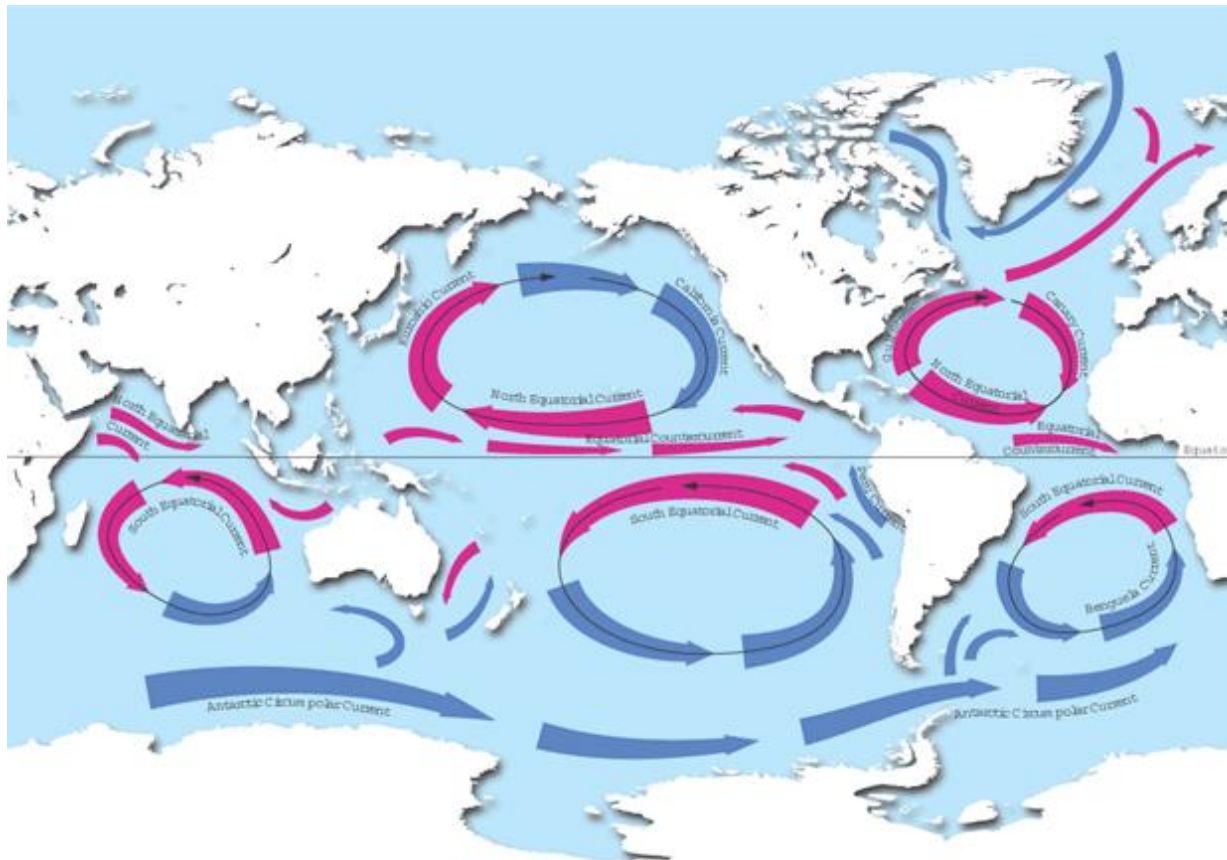


## The Heat Budget

The oceans play a major role in the heat transfer.

*HOW: Seawater absorbs heat and oceanic circulation helps dissipate heat absorbed by Earth just as water-cooled engines/radiators help motor engine from overheating.*

# Oceanic currents and heat transport



Surface Ocean Currents

# What is Climate Change?

*Ano ang Pagbabago ng Klima?*

- Over a decade ago, the idea of climate change may have seemed distant and obscured.
- The vast majority of scientists agree that global warming is real, it's already happening.
- We're already seeing changes.
- Glaciers are melting, plants and animals are being forced from their habitat, and the number of severe storms and droughts is increasing.



# Consequences of heating of the oceans



**Heating of seawater will disrupt weather patterns.**

**Oceanic circulation will not follow usual paths or will weaken.**

**Distribution of heat that drives local weather will be affected; droughts in places that are normally characterized by high precipitation and flooding in other parts.**

**Did you know that oceanic circulation prevents some parts in Europe from freezing?**



If normal circulation patterns, such as the Gulf Stream, are disrupted by an increase in temperature due to global warming, much of Europe will experience extremely cold weather.

# WHAT CAUSES CLIMATE CHANGE?

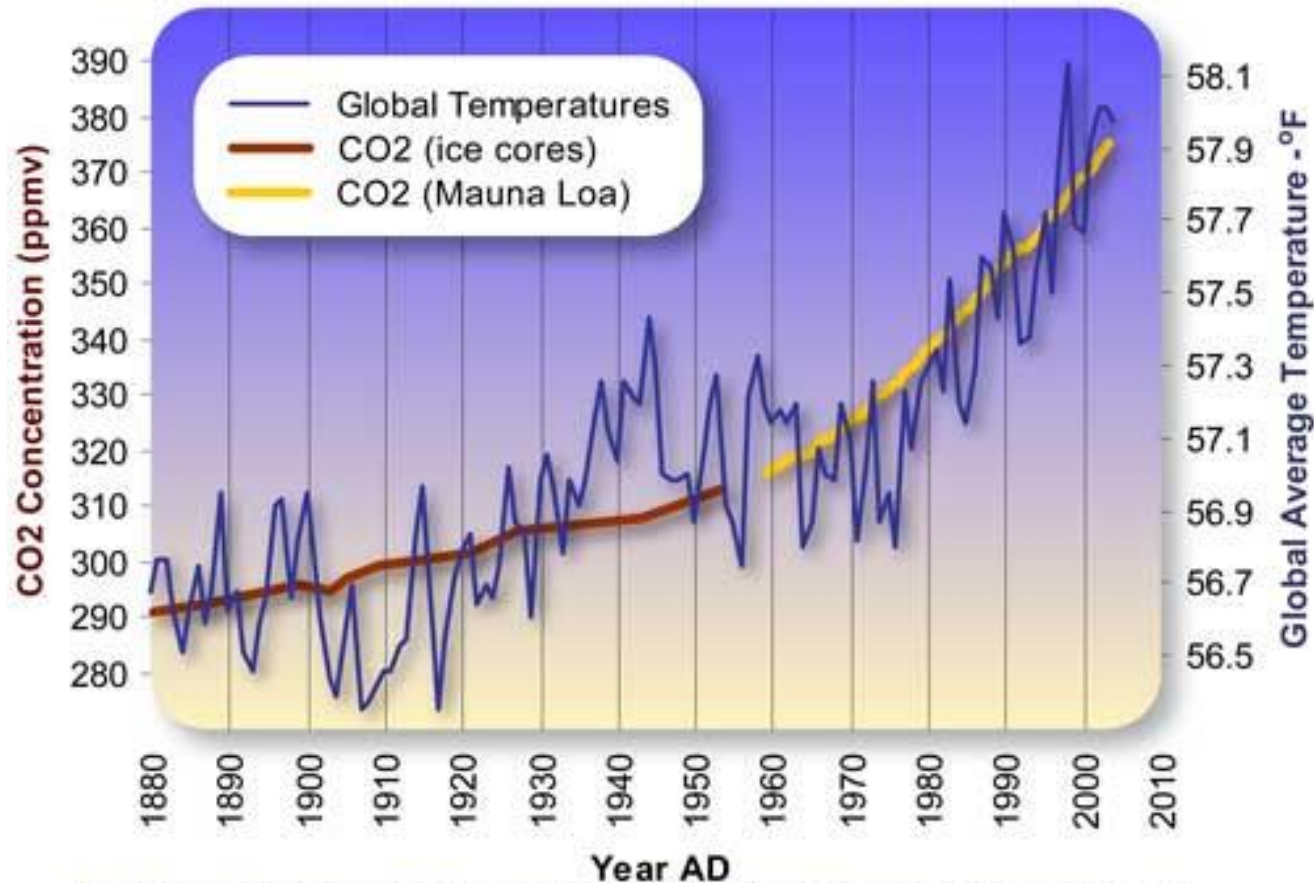


**Common gases that trap radiation:**

1. Methane
2. Carbon dioxide
3. CFC's

# Trend in CO2 concentration and global temperature

## Global Average Temperature and Carbon Dioxide Concentrations, 1880 - 2004



Data Source Temperature: [ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual\\_land\\_and\\_ocean.ts](ftp://ftp.ncdc.noaa.gov/pub/data/anomalies/annual_land_and_ocean.ts)

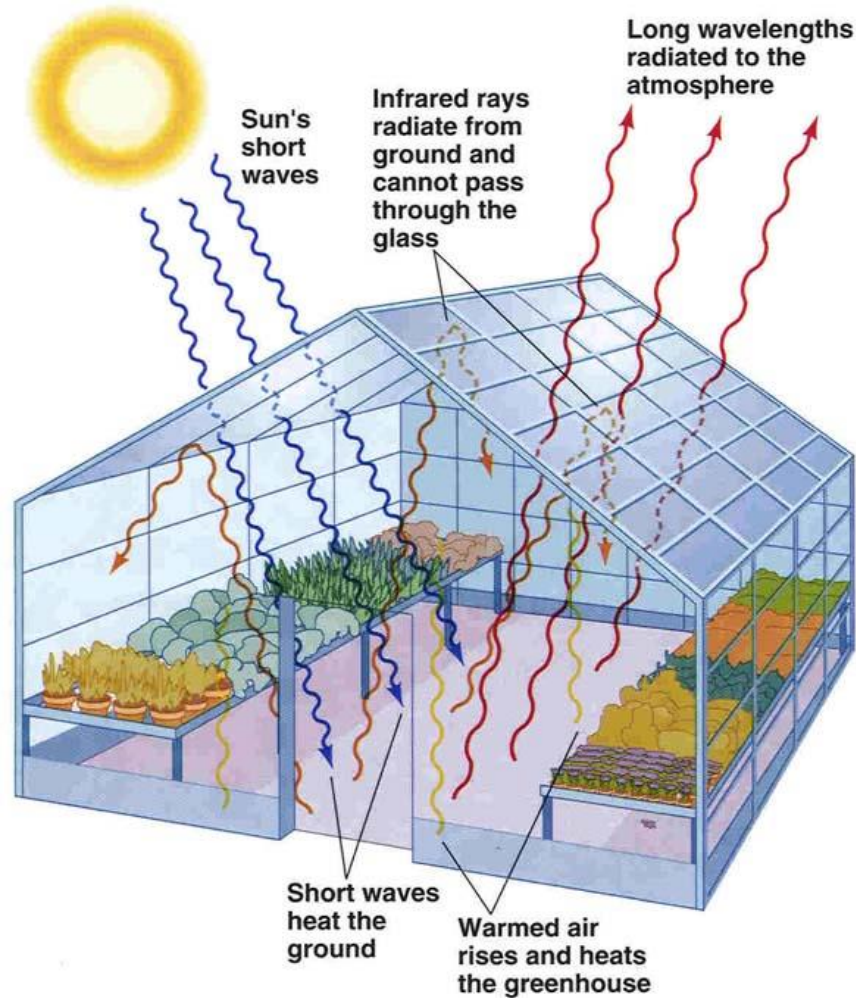
Data Source CO2 (Siple Ice Cores): <http://cdiac.esd.ornl.gov/ftp/trends/co2/siple2.013>

Data Source CO2 (Mauna Loa): <http://cdiac.esd.ornl.gov/ftp/trends/co2/maunaloa.co2>

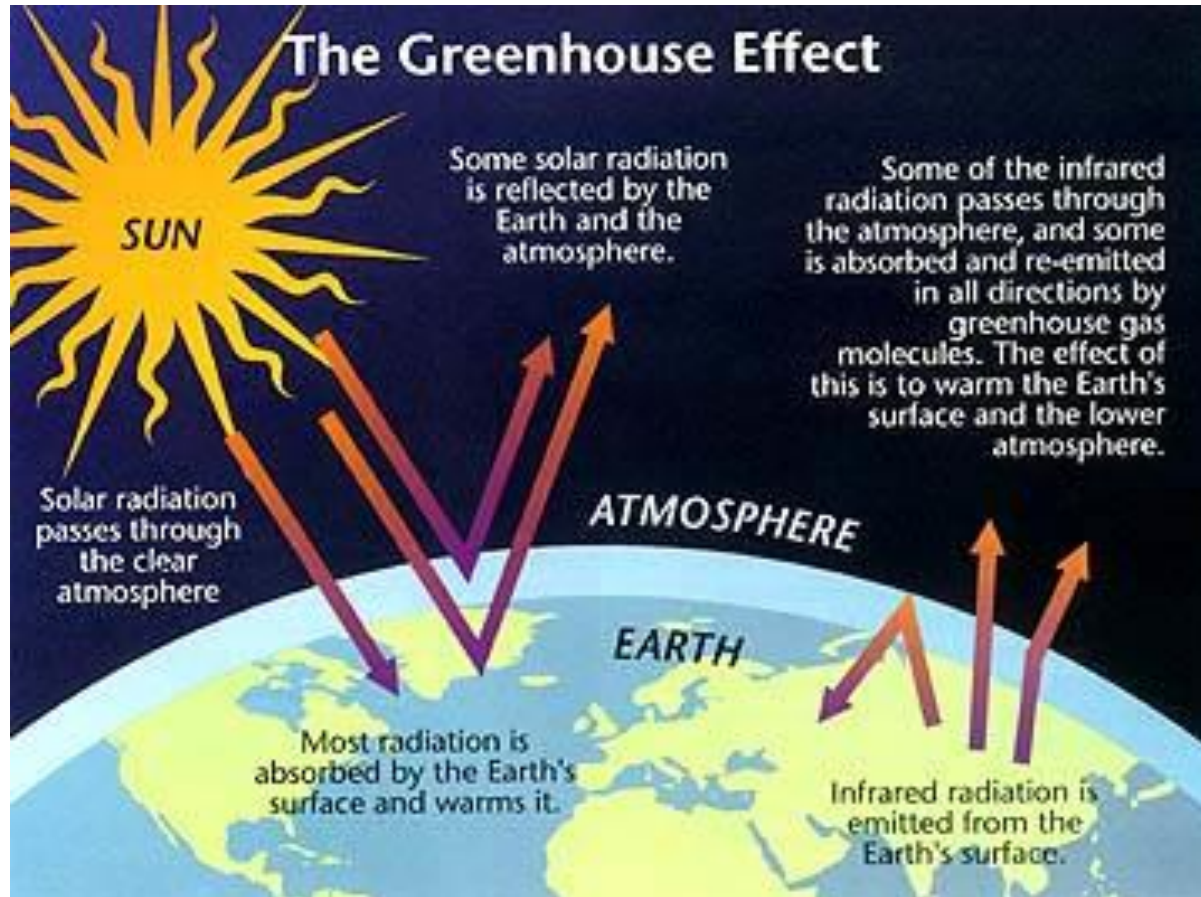
Graphic Design: Michael Ernst, The Woods Hole Research Center



# The greenhouse effect



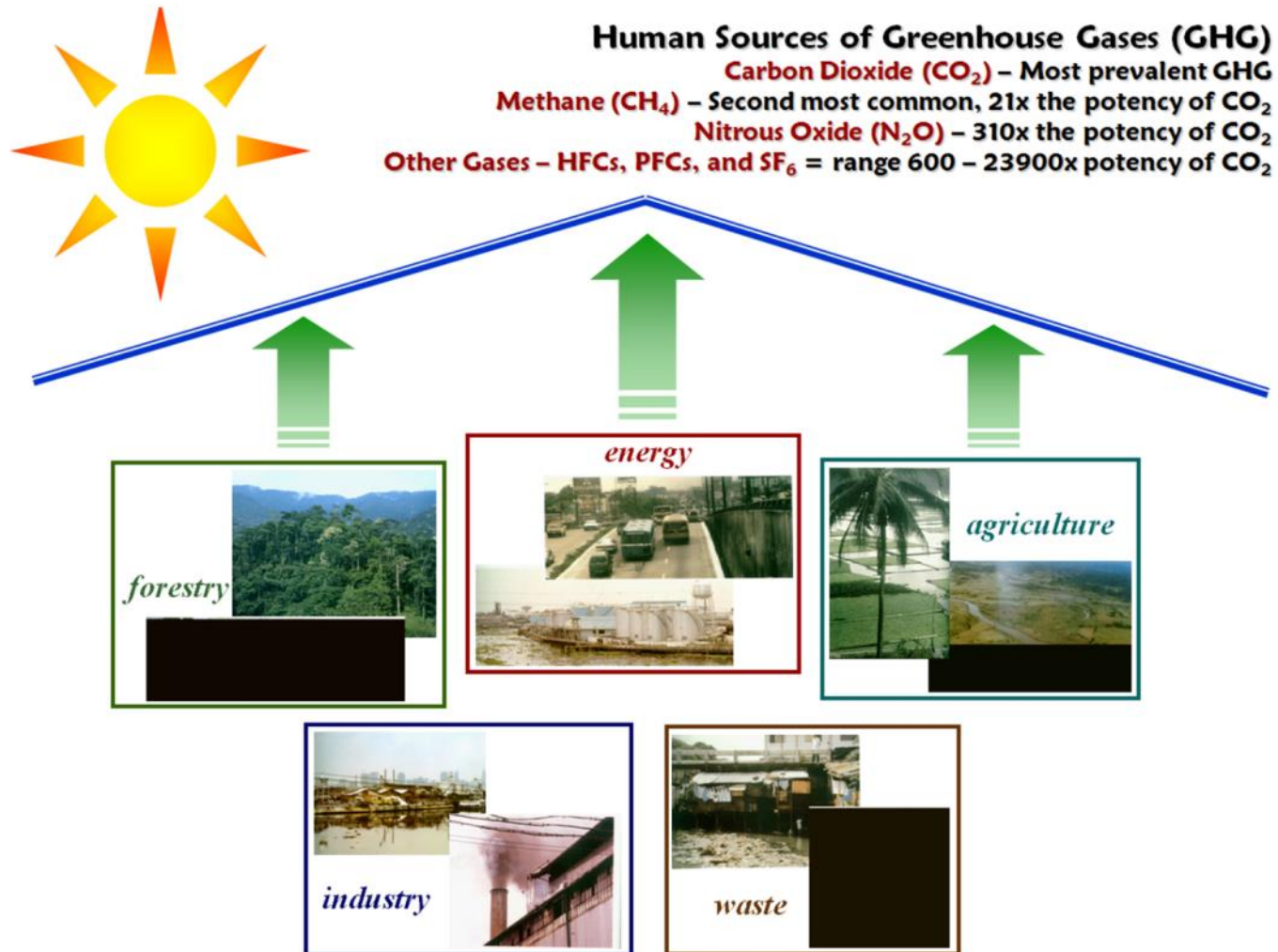
# The greenhouse effect





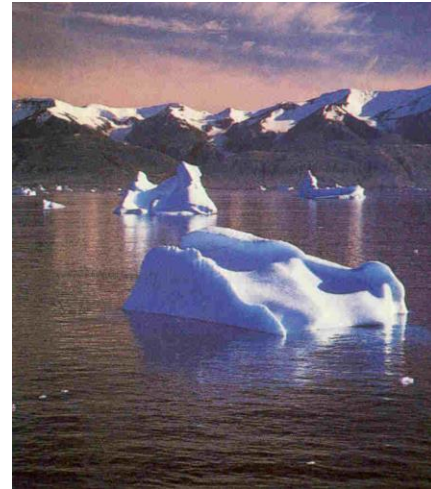
# What causes Global Warming?

*Ano and dahilan ng pag-iinit ng mundo?*

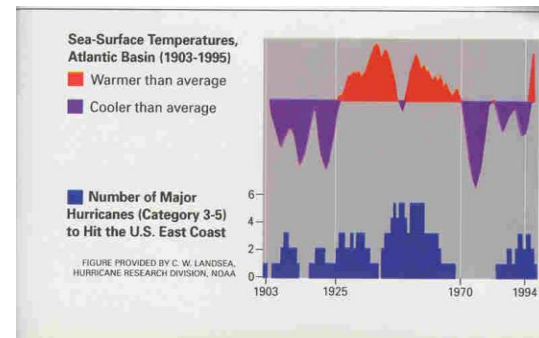


# WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?

1. Sea level rise due to melting of polar ice
2. Increased storminess (hotter seawater will intensify storms)
3. Droughts or flooding



Source National Geographic, 2000. Courtesy Dr. Laura David

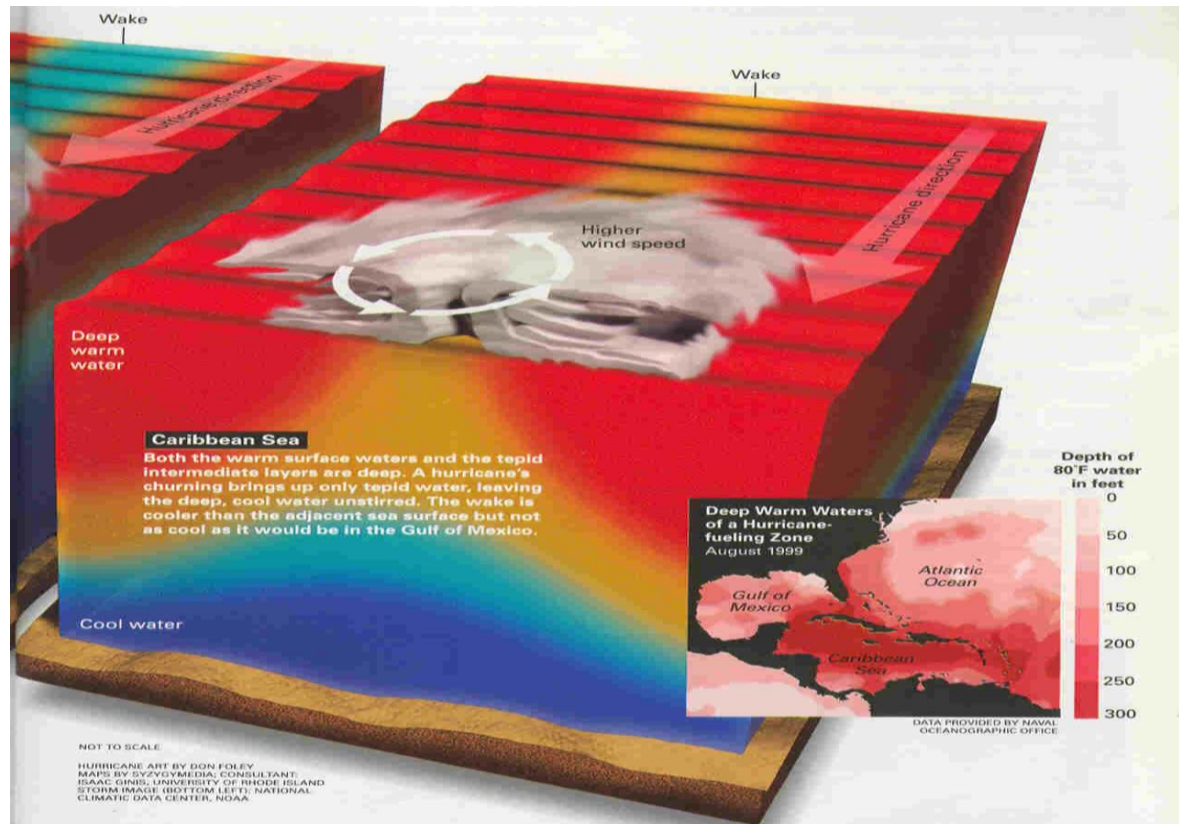


Source National Geographic, 2000. Courtesy Dr. Laura David



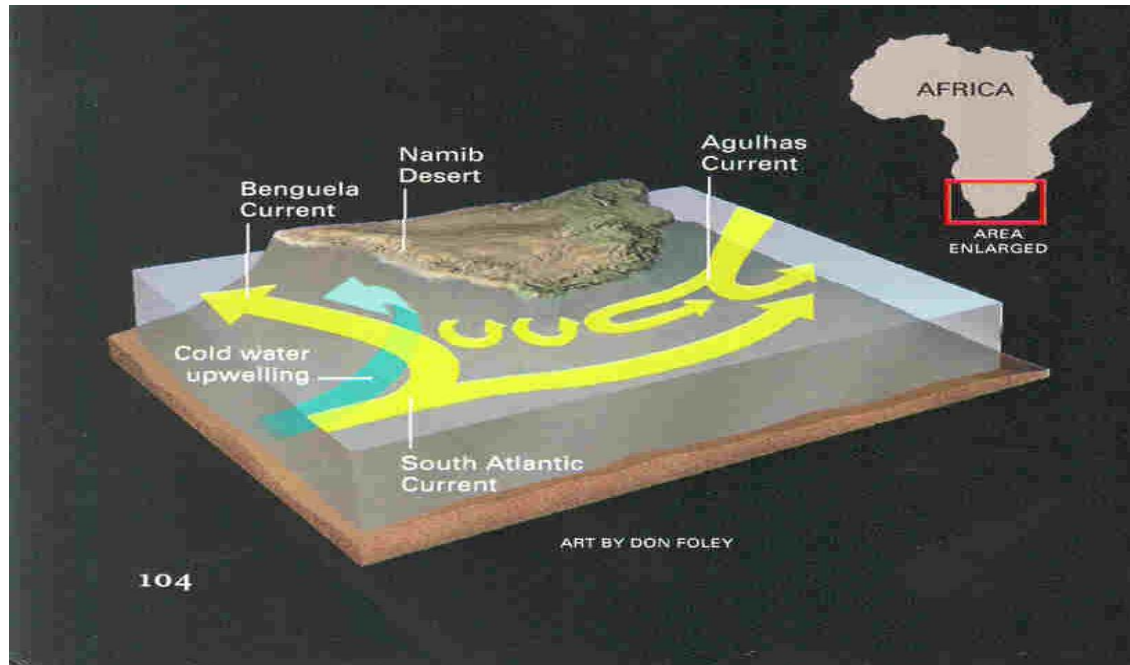
# WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?

## Hotter sea makes hurricanes and typhoons more intense



# WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?

High water temperature disrupts normal water circulation, consequently weather patterns are changed.



# WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?



## Sea Level Rise

The estimated rise in sea level as consequence of melting of polar ice is about 1 cm per year. In the last century, sea level has risen about 1/3 of a meter already.

Sea level rise is not unique in our time, there were similar episodes in the history of the planet yet this present one is at an accelerated rate (short span of time), and perhaps the impacts more severe, because of human-induced causes.

# **WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?**



## **Sea Level Rise**

**Productive coastal ecosystems like corals, seagrasses and mangroves will be inundated.**

**It will affect adversely coastal fisheries as these ecosystems are breeding, nursery and feeding grounds of many commercially important fishes.**

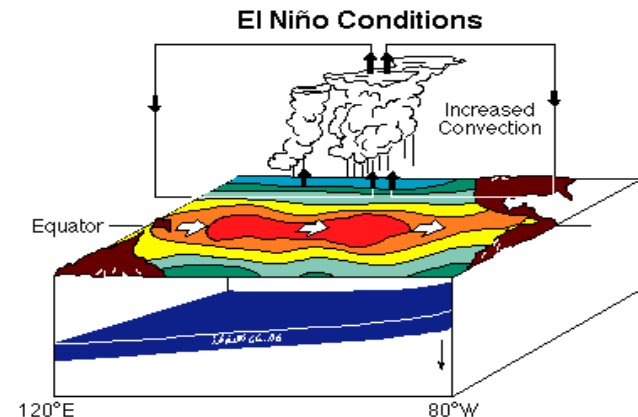
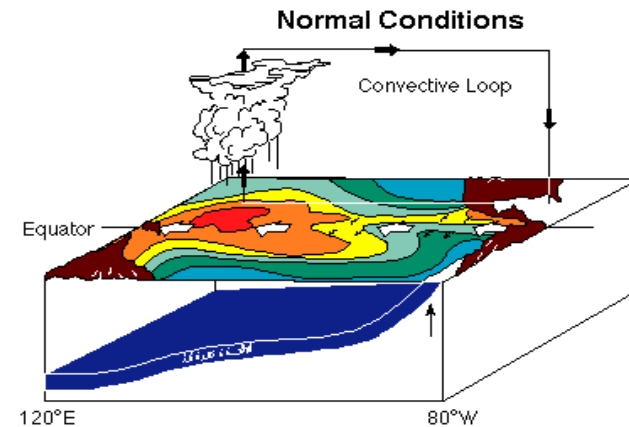
**Marginal fisherfolks using non-motorized boats will be adversely affected since they are limited within municipal waters where the impacts of sea level is most significant.**

# WHAT ARE THE CONSEQUENCES OF CLIMATE CHANGE?

## El Nino and widespread death of corals

Rise in temperature by as much as 2 degrees Celsius will result to widespread coral bleaching.

We have seen this happened during the 1997-1998 El Nino episode.



# Effects of CC to People

## Occurrence of cholera in Bangladesh coincides with periods of high water temperature in Bay of Bengal

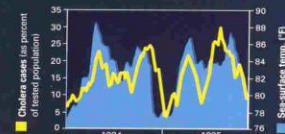
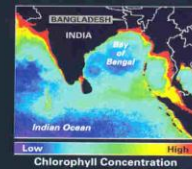
### ASIA FORECASTING EPIDEMICS

A mother soothes her sick child with a bath at the International Centre for Diarrhoeal Disease Research in Bangladesh. Twice a year, in late spring and summer, the number of cholera cases brought here for treatment soars. The increases follow the same pattern as spikes in sea-surface temperature in the Bay of Bengal (graph, right). They also occur around the time of phytoplankton blooms (top right), detectable by their chlorophyll.

Scientists have now figured out the connection. Warmer water encourages the growth of zooplankton, which carry the cholera bacteria, and the phytoplankton

they feed on. Monsoons drive the plankton-laden water into estuaries, where the bacteria contaminate local supplies of drinking water. When the bacteria count reaches one million per milliliter, the water becomes infectious.

"Why not boil the water?" asks Rita Colwell, a microbiologist at the University of Maryland. "If you've never been to Bangladesh, that sounds logical. But there isn't sufficient fuelwood there." Her solution: Teach women to cover water-collection jugs with a filter of sari fabric folded at least four times (below).



SEARHS IMAGE BY BRADLEY M. LOBITZ, AMES RESEARCH CENTER, NASA (TOP); GRAPH: AMES RESEARCH CENTER



# Effects of CC to People

## Damage to properties



Source: [http://www.flickr.com/photos/great\\_commission/340446124/](http://www.flickr.com/photos/great_commission/340446124/)



Source: <http://www.flickr.com/photos/douglas99/2293652983/>

# Effects of CC to People

Inundation of agricultural land or long dry spell- decline in agricultural production



Source: IRRI



Source: <http://www.flickr.com/photos/jrwarden/2388111937/>



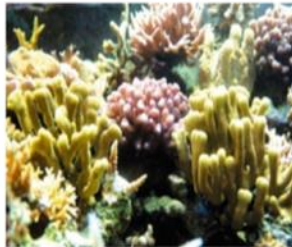
# What are the Impacts of Climate Change?

*Ano ang magiging mga epekto ng pagbabago ng klima?*

## Effects of Climate Change

### Coastal Areas:

Erosion and flooding  
Inundation  
Change in wetlands



### Agriculture:

Changes in crop yields  
Irrigation demands,  
Productivity



### Human Health:

Weather related mortality  
Infectious disease  
Air quality - respiratory illness



### Water Resources:

Changes in water supply  
and water quality  
Competition/Trans-border  
Issues

### Forests:

Change in Ecologies,  
Geographic range of species,  
and  
Health and productivity

### Industry and Energy:

Changes in Energy  
demand  
Product demand & Supply

# How to Address Climate Change



GLOBAL

Mitigate carbon dioxide emission  
Carbon sequestration

# How to Address Climate Change



## LOCAL

Enhance capacity of ecosystems, e.g., forest capacity to absorb carbon through reforestation (carbon sinks).

Stop illegal logging;

Use of energy efficient appliances/  
tools/machines.

# When do you send greenhouse gases into the air?

*Saan nanggagaling ang mga greenhouse gases?*

Whenever you...

watch tv, use air conditioner,  
turn the lights on, use a hair dryer,  
drive a car, play a video game,  
listen to stereo, use a washing machine,  
microwave a meal.



To perform many of these functions,  
electricity is needed.

# When do you send greenhouse gases into the air?

*Saan nanggagaling ang mga greenhouse gases?*



Electricity comes from power plants.

Most power plants use coal and oil to make electricity. Burning coal and oil produces greenhouse gases.


The trash that we send to disposal sites produces methane, a greenhouse gas.

When factories make things that we buy and use everyday, they, too are sending greenhouse gases into the air.



# How do we cope with the impacts of Climate Change?

*Paano natin maiibsan ang mga epekto ng pagbabago ng klima?*




Resilience of ecosystems can be enhanced and the risk of damage to human and natural ecosystems reduced through the adoption of adaptive and mitigating strategies.

- \* Mitigation is about human intervention to reduce greenhouse gas sources or enhance carbon sequestration

# How do we cope with the impacts of Climate Change?

*Paano natin maiibsan ang mga epekto ng pagbabago ng klima?*



- \* Adaptation to climate change is the adjustments in natural or human systems in response to climatic stimuli or their effects, which moderates harm or exploits beneficial opportunities
  - Conservation
  - Disaster Management

# How to Address Climate Change



Most Importantly:

Simplify your lifestyle...

Go back to the basics...



# How to Address Climate Change



## Simple Tips

- ❖ Walk or bike instead of riding a motorized vehicle
- ❖ Cook from local and fresh produce
- ❖ Recycle
- ❖ Avoid using air conditioners, use natural ventilation
- ❖ Turn lights off when not in use
- ❖ Buy energy-saving light bulbs

# How to Address Climate Change



## Simple Tips:

Unplug equipment when fully charged

Keep fridge and freezer doors closed

Think how you cook

Reduce paper consumption

Manage your waste at source!!!

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**Thank You!**

