CLIMATE CHANGE AND JAMAICA

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for

The Environmental Foundation of Jamaica

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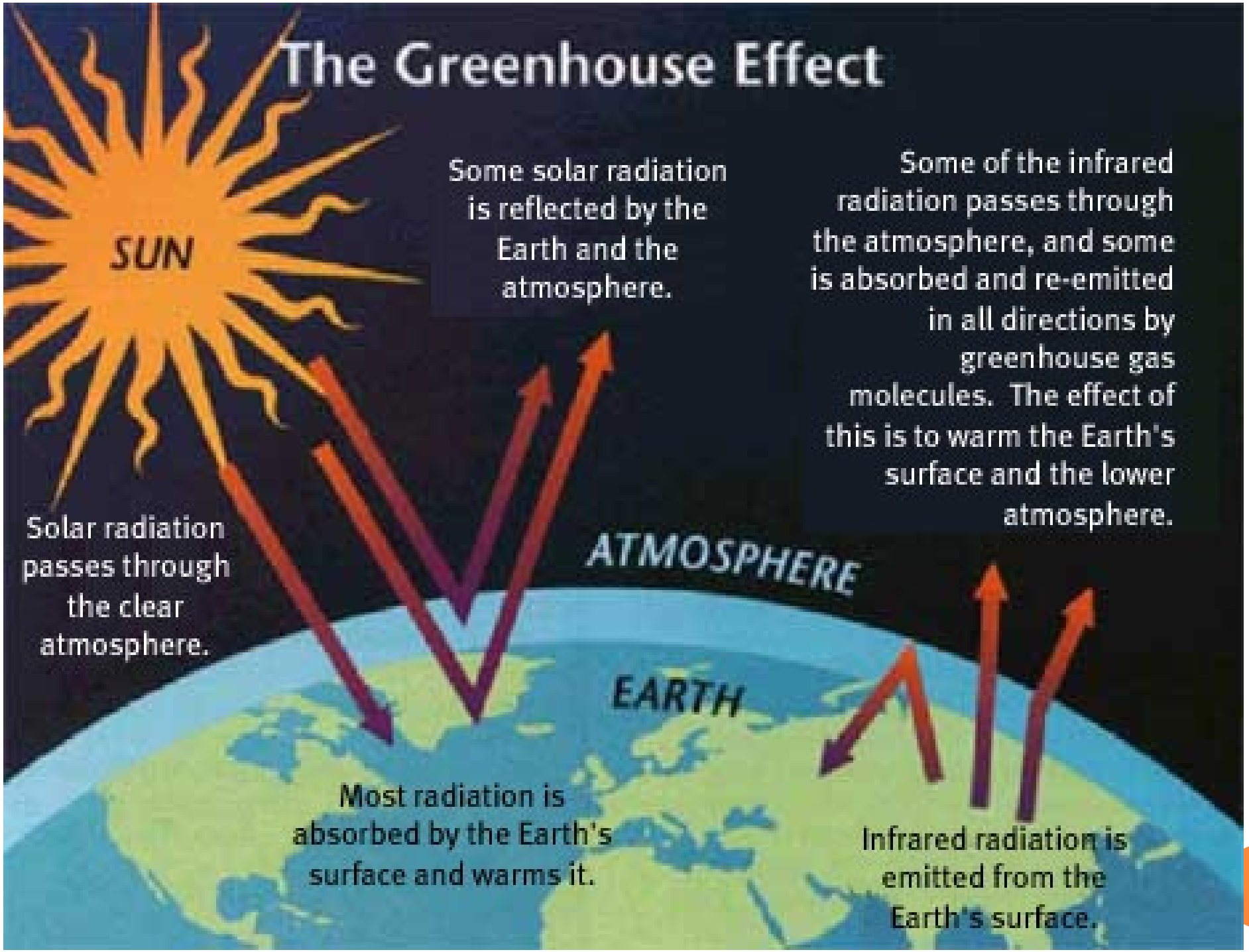
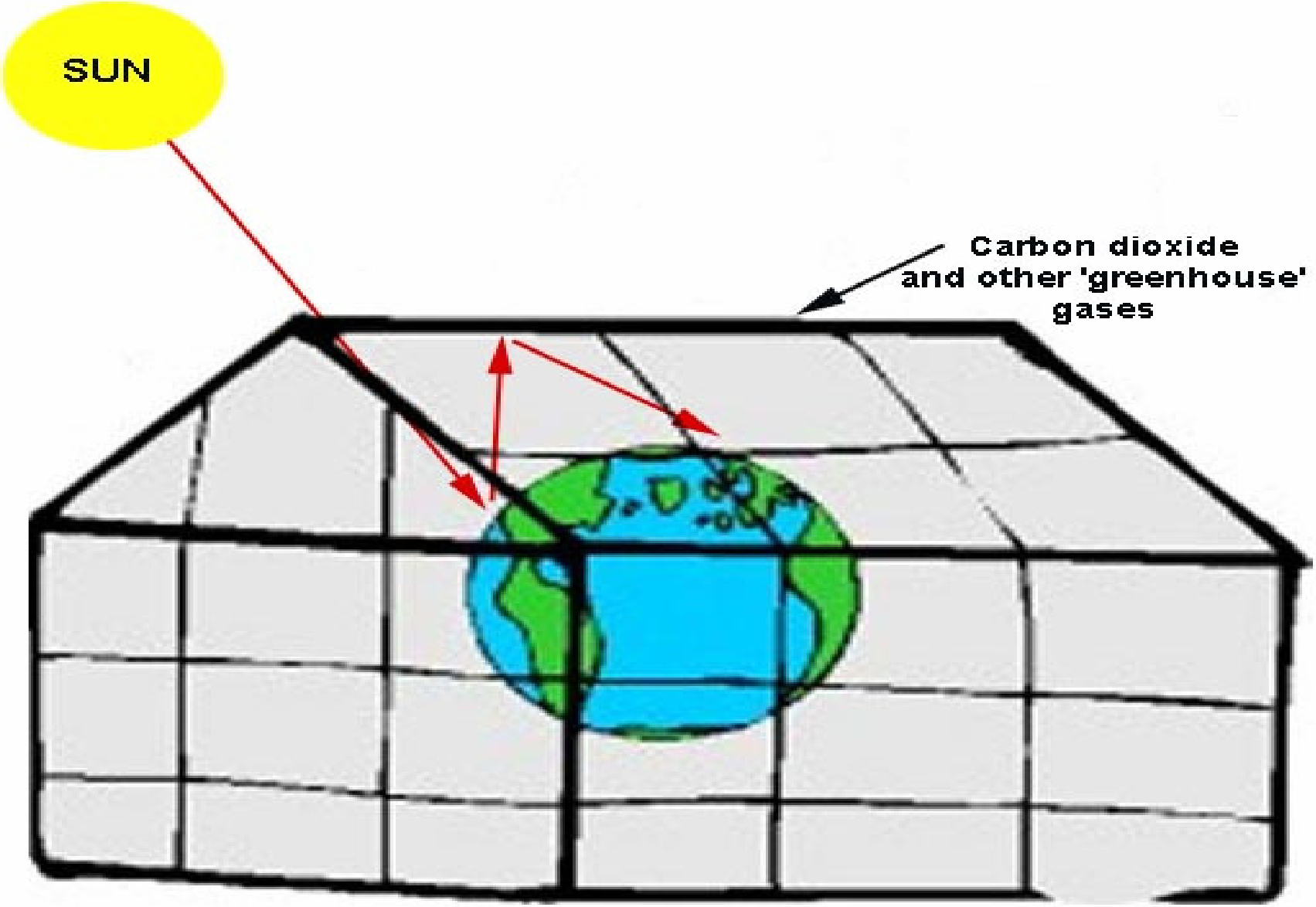
OUTLINE OF PRESENTATION

- What is climate change, and what is special about it today
- What the scientists are saying about the impact on the Caribbean
- Impacts on the economy and the society
- Strategies for Adaptations
  - Government
  - Private Sector
  - Civil Society


The Greenhouse Effect
SUN
Some solar radiation is reflected by the Earth and the atmosphere.
Some of the infrared radiation passes through the atmosphere, and some is absorbed and re-emitted in all directions by greenhouse gas molecules. The effect of this is to warm the Earth's surface and the lower atmosphere.
Solar radiation passes through the clear atmosphere.
ATMOSPHERE
EARTH
Most radiation is absorbed by the Earth's surface and warms it.
Infrared radiation is emitted from the Earth's surface.

GREENHOUSE EFFECT - II

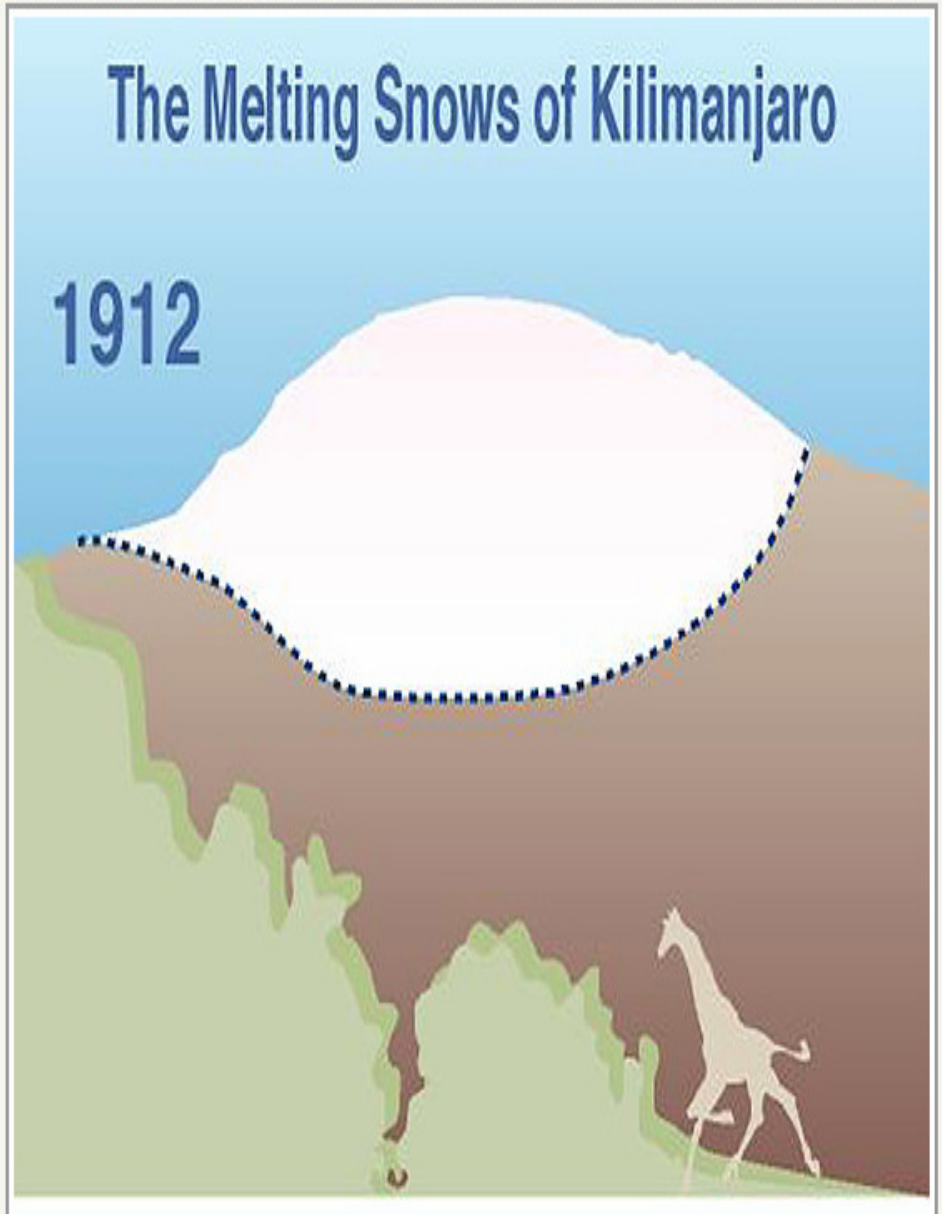


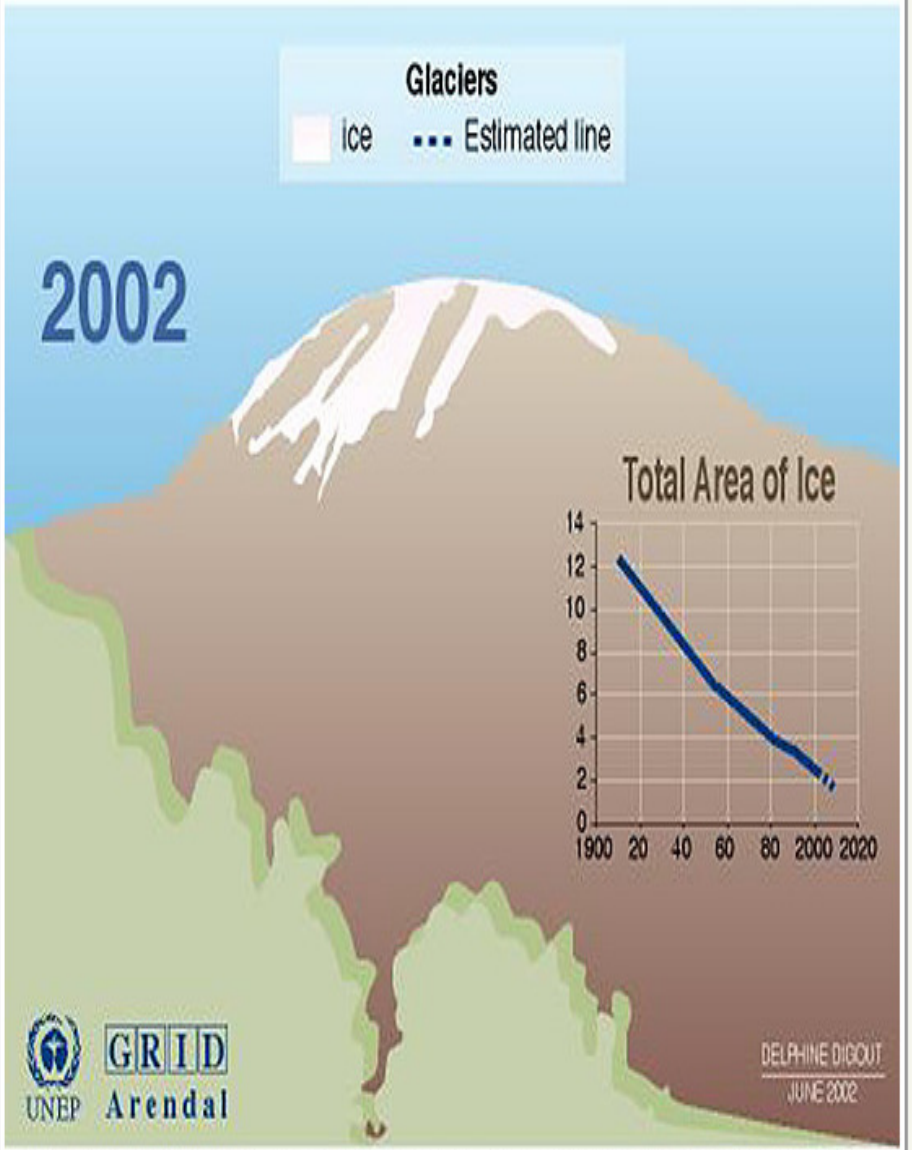
PASTERZE GLACIER, AUSTRIA, 1875

PASTERZE GLACIER, AUSTRIA, 2004

90 YEARS OF WARMING

Melting snow on Kilimanjaro





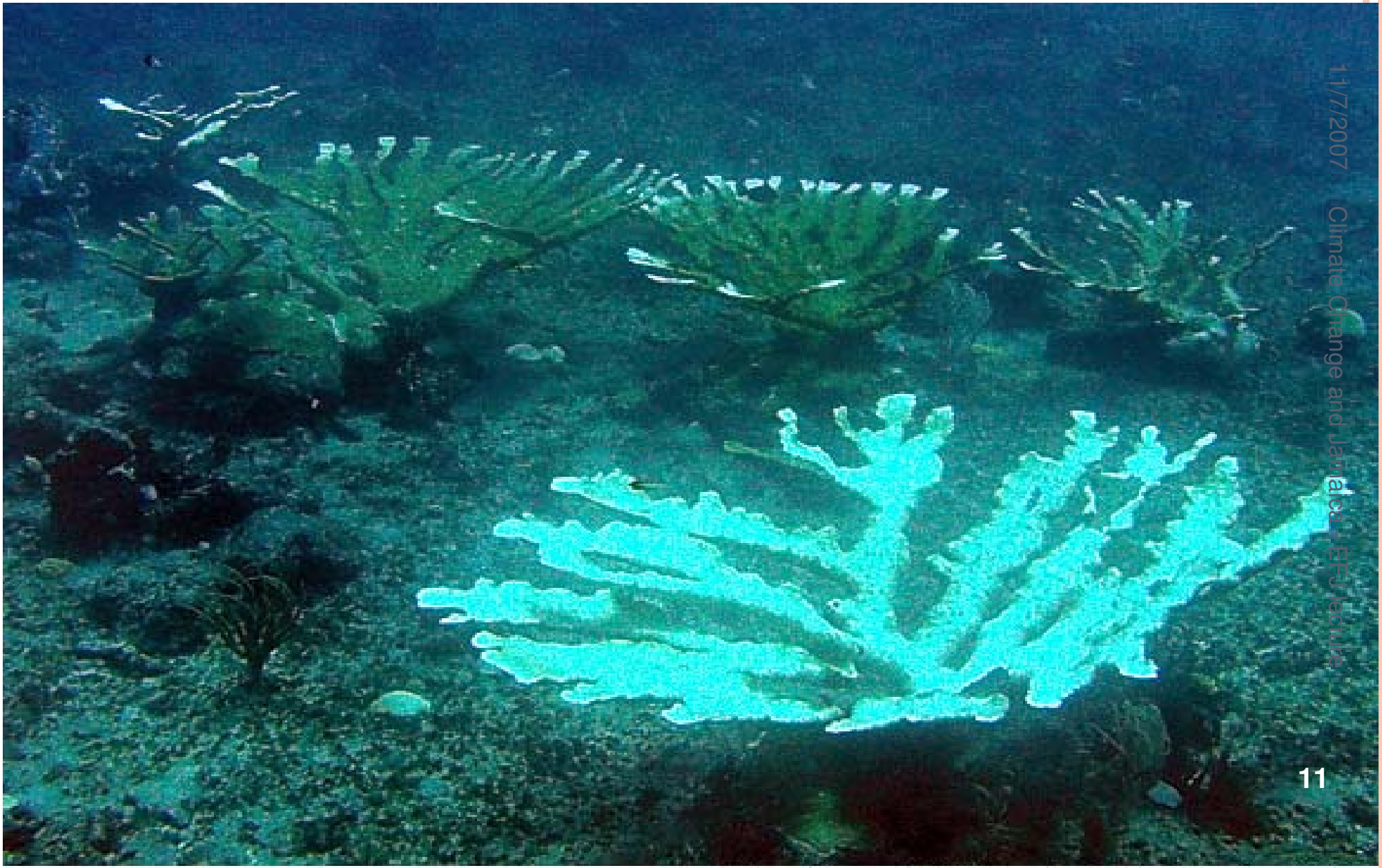
Sources: Meeting of the American Association for the Advancement of Science (AAAS), February 2001 ; Earthobservatory.nasa.gov.

TUVALU, PACIFIC

PALISADOES, JAMAICA, 2006

PALISADOES, JAMAICA, 2006

CORAL – BLEACHING I



National Oceanic & Atmospheric Administration , 2005

CORAL – BLEACHING II

THE AUTHORITATIVE STUDIES - I

- **Stern Review**
  - Economic cost of climate change, mitigation, adaptation
- **Convenient Truth** –Al Gore's documentary

- Recent study from the University of East Anglia found that greenhouse gases are increasing faster than expected

THE AUTHORITATIVE STUDIES - II

- **IPCC – 4th report**
  - Certain that human activity is one of the main factors accounting for the rate of climate change through the discharge of greenhouse gases – **carbon dioxide**, methane, water, nitrous oxide.
  - Note five Caribbean persons on the IPCC – **Agard from St. Augustine, Nurse from Cave Hill, Chen from Mona**, plus 2 others

CHANGES IN CARIBBEAN CLIMATE

Caribbean will probably experience

- Temperatures increasing by 2-3 centigrade (3.6 to 5.4 degrees Fahrenheit) by 2080
- Sea level rise by 0.2-0.5 metre (8 inches – 20 inches) by 2090
- Decreased rainfall June to August, and perhaps more intense rainfall
- Increased intensity of hurricanes, and possibly more frequent

IT COULD BE WORSE ----

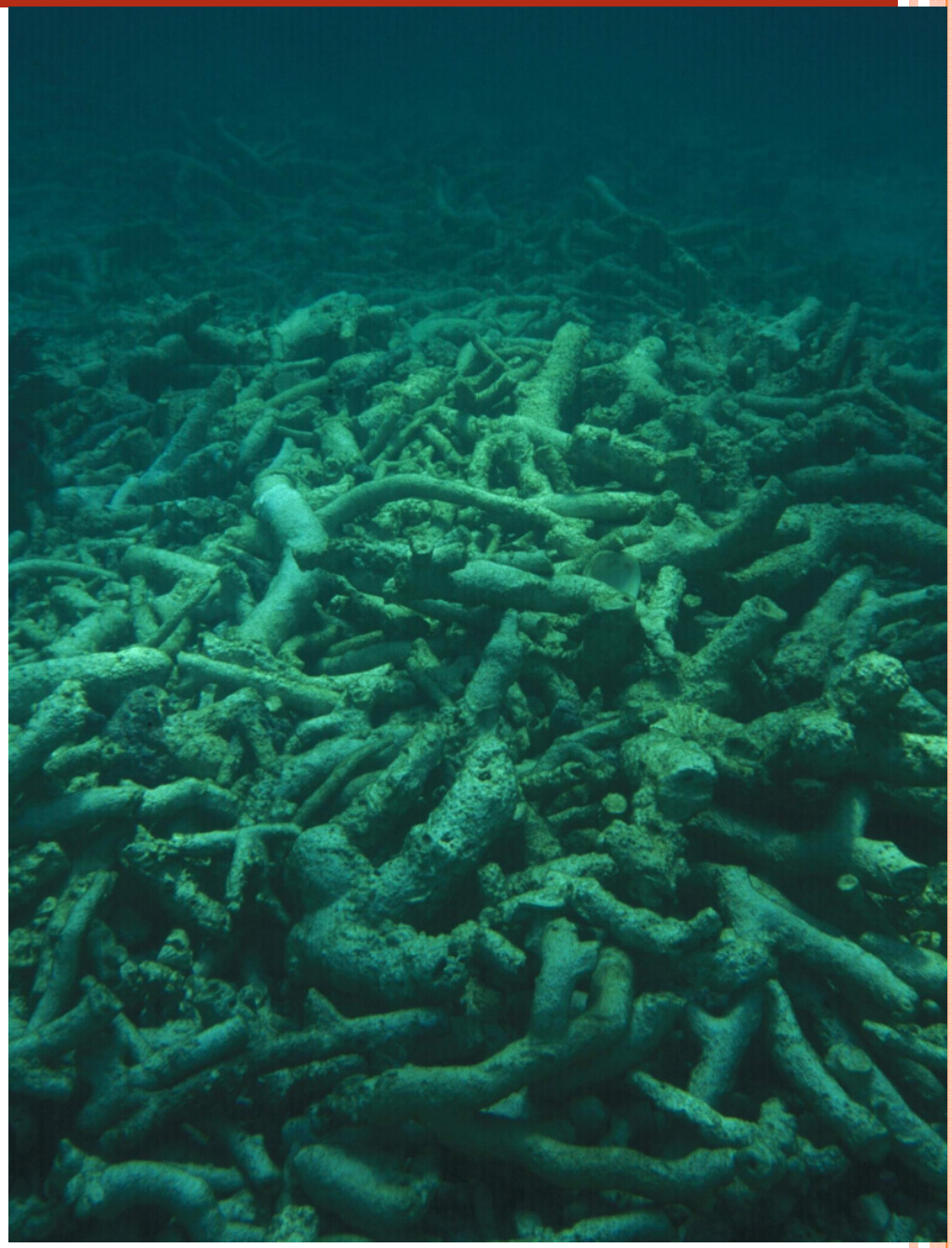
- If the rate of discharge of Greenhouse gases into the atmosphere increases, the climate changes can become more dramatic:
  - hotter temperatures
  - higher sea levels
  - more severe drought
  - more intense hurricane activity
- Note the "Tipping Point"

IMPACT ON TOURISM - I

- **Warmer temperatures** will mean:
  - Less severe winters => less demand for vacations in Jamaica by North Americans
  - **Warmer seas** => coral bleaching => damage to reefs =>
    - less protection for beaches
    - Less fish and other marine life on the reefs => less attractiveness to divers and other tourists
    - **More intense hurricanes** => greater risk of damage to hotels
    - More prevalent diseases, like malaria and dengue

All of which will discourage tourists

LIVE CORAL DEAD CORAL

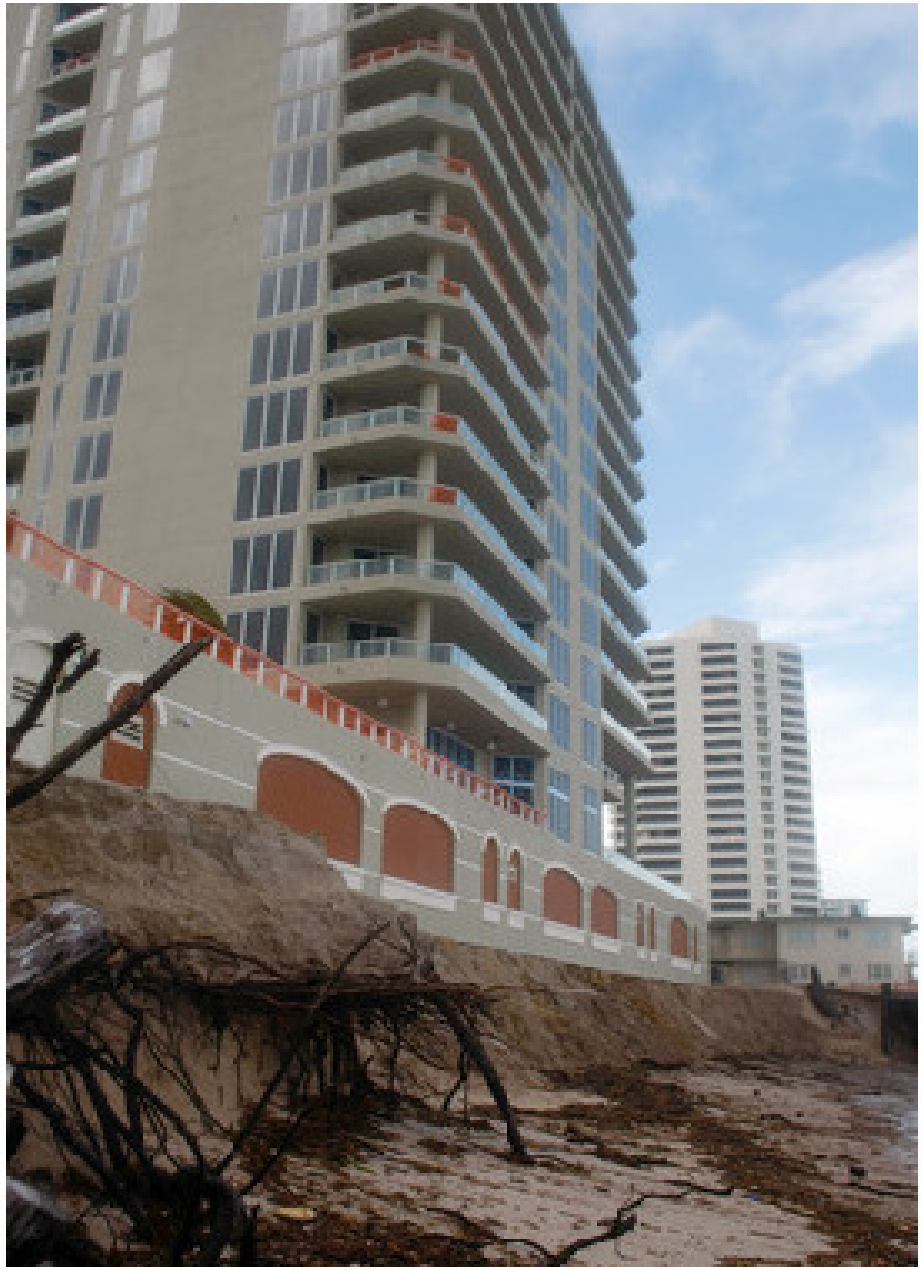


IMPACT ON TOURISM - II

- **Higher sea level =>**
  - beach erosion
  - Damage to coastal structures, like hotels, airports and other infrastructure relevant to tourists
  - Salination of ground water and underground fresh water sources

- **Reduced rainfall=>** slow recharge of freshwater surface and underground supplies. This could become a major constraint on the supply guest services

EROSION IN MIAMI BEACH -2006



TOURISM – GREENHOUSE GASES

- Tourists are major users of fossil fuel for:
  - electricity for lighting and cooling
  - international air and sea transport
  - ground transport
  - recreational vehicles
- The carbon dioxide is emitted in the atmosphere

TOURISM – MITIGATION

The Tourist Industry needs to help to mitigate the rate of climate change by:

- switching to alternate and renewable energy sources, such as solar energy,
- minimising activities that use petroleum energy
- placing high priority on energy and water conservation

TOURISM - ADAPTATION

- **The Tourist Industry** must pay attention to strategic adaptation measures:
  - Locating facilities further from the sea
  - Designing buildings to maximize natural lighting and cooling, and to cope with hurricanes and other extreme weather events
  - Protecting the natural defences of the beach – reefs and wetlands
  - Energy and water conservation

IMPACT ON AGRICULTURE AND FISHING

Agriculture will be impacted by:

- **Warmer temperatures** => reduced productivity of some crops
- **Longer periods of drought** alternating with flooding
- **Salination of water** supplies and soil=> decline in soil fertility
- **Hurricanes** and other extreme wind events

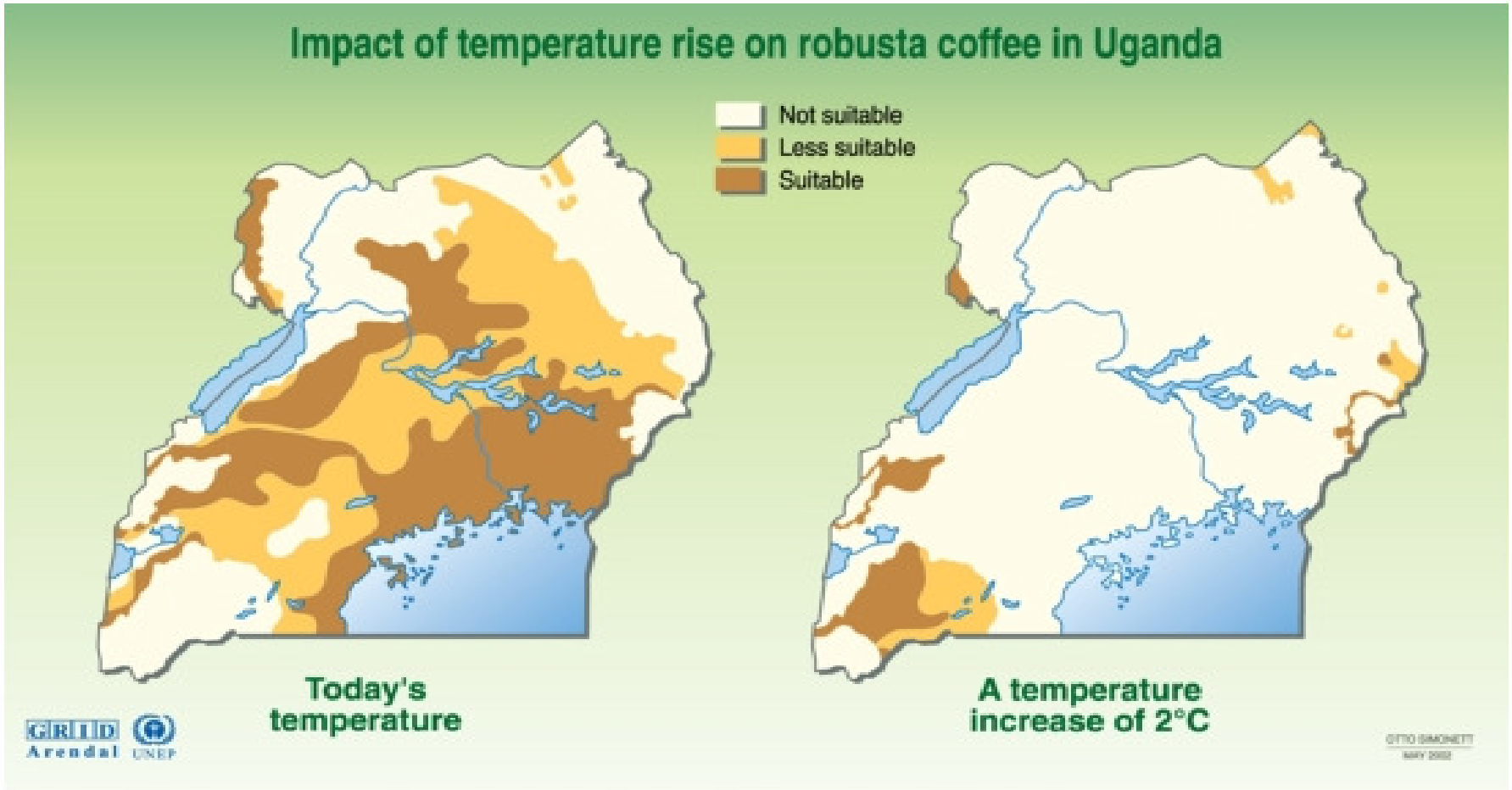
Fishing will be impacted by:

- Damaged reefs
- Disappearance of species

WARMER TEMPERATURE AND SOIL FERTILITY

More information and download links below the graphic.

Impact of Temperature Rise on Robusta Coffee in Uganda



Source: Otto Simonett, Potential impacts of global warming, GRID-Geneva, case studies on climatic change. Geneva, 1989.

Click here, or on the graphic, for full resolution.

Developing countries, whose economies often rely heavily on one or two agricultural products, are especially vulnerable to climate change. This graphic shows that with an increase of only 2 degrees Celsius, there would be a dramatic decrease in the amount of land suitable for growing Robusta coffee in Uganda.

FOOD SUPPLY

- The impact on agriculture threatens the domestic component of the national food supply.
- Decline in food supply=> price increases=> major impact on inflation => impact on macroeconomic stability
- Imported food prices are expected to rise as a result of:
  - Declining productivity in the foreign sources in the temperate countries because of warmer temperatures
  - Increased demand from poor countries because of the weakness of their domestic supplies as well

AGRICULTURE – ADAPTATION I

Some strategies to adapt to climate change are:

- Greenhouse technology for commercial agriculture
- Irrigation systems to cope with drought
- More careful land preparation to manage intense rains and minimize soil erosion and other forms of destruction
- New crop patterns that can cope with higher temperatures, more resilient to hurricanes, and recover quickly from damage

AGRICULTURE – ADAPTATION II

- Avoid extending cultivation on lands that are vulnerable to flooding
- Pull back from the cultivation of steep hillsides without proper terracing
- There is likely to be renewed urgency for land reform to facilitate agriculture that has been losing land to housing and other commercial developments

FISHING - ADAPTATION

- Sustainable fishing practices:
  - Do not catch the young fish
  - Do not disrupt breeding
  - Cease destructive fishing practices such as dynamiting and the use of compressors to keep divers on reefs for long periods
- Cease reef destruction and allow fish stocks to recover and adapt to the increasing sea temperature

SUPPLY I

- increased water supply problems during the dry seasons resulting from lower minimum streamflows and declining water levels.
- more frequent flash flooding due to more intense short duration rainfall
- drier average conditions affecting recharge of water sources
- Saline intrusion => pollution of fresh water sources

CLIMATE CHANGE AND WATER SUPPLY II

- Decreased water quality due to:
  - very low flows
  - lower water levels
  - higher temperatures
- resulting in increased levels of bacterial, nutrient and metal contamination
- Increase in flooding could increase the flushing of urban and agricultural waste into source water systems.
- Increasing water demands with higher temperatures and greater evaporation

WATER - ADAPTATION

- Improved management of water to cope with:
  - Drought; hence storage and irrigation systems
  - Flooding; proper drainage and catchment systems
  - Conservation, e.g low-flush toilets, reduced water use for showers
  - Protection of surface and ground water sources from sea water intrusion
  - Protection of watersheds to maintain rainfall and catchment

IMPACT ON PHYSICAL INFRASTRUCTURE

Note the location of the following on the coast:

- Hotels and tourist attractions
- Airports
- Seaports, and particularly cruise ship piers
- Coastal highway
- Central Bank, Conference Centre in downtown Kingston
- Large sections of the Portmore Community in St. Catherine

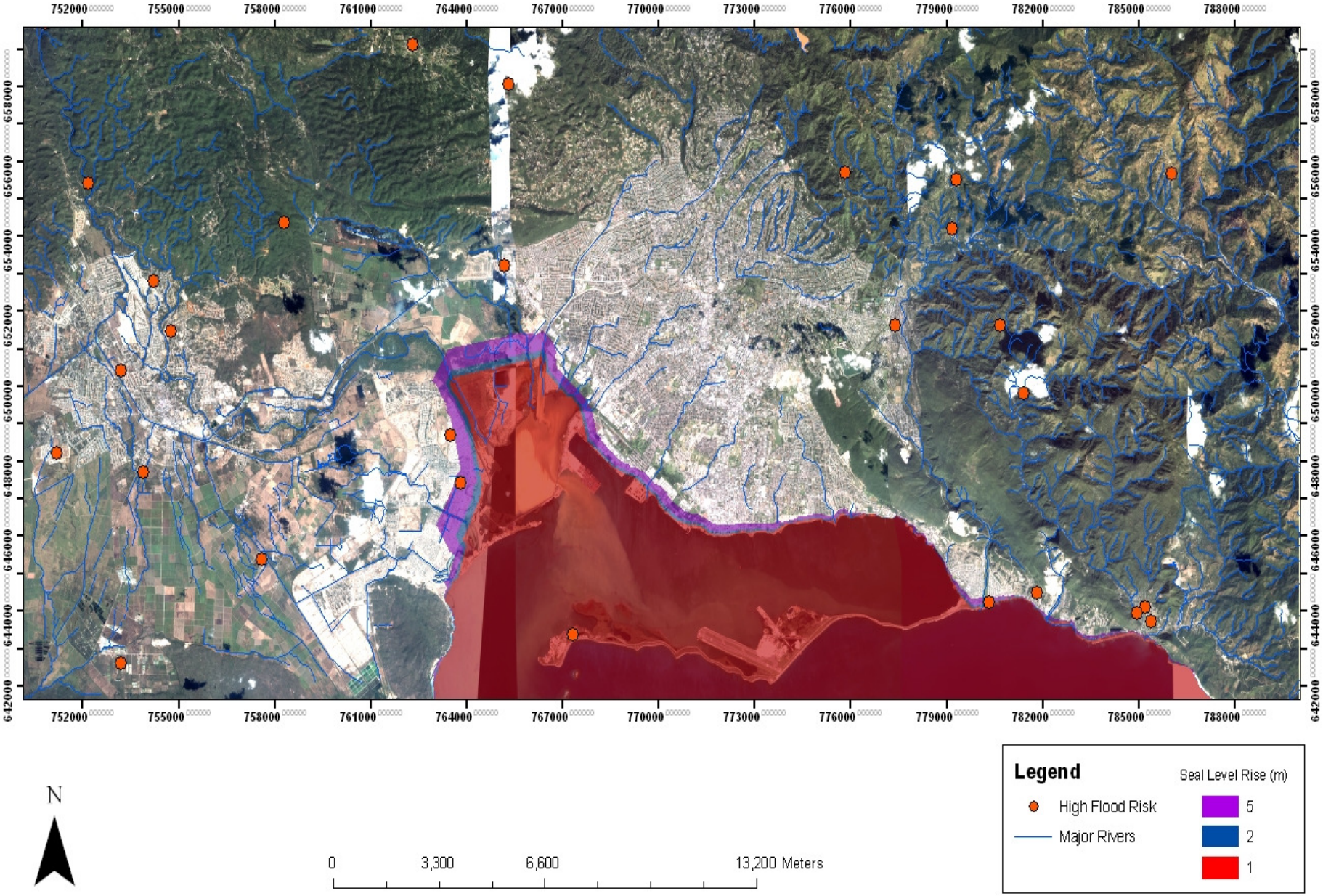
COASTAL POPULATION

- 500,000 persons live within 1 kilometer of the coast
- Coastal towns –
  - Kingston
  - MoBay
  - Port Antonio
  - Black River
  - Port Maria
  - Ocho Rios
  - Negril
  - Annotto Bay
  - Savanna la Mar
  - Falmouth

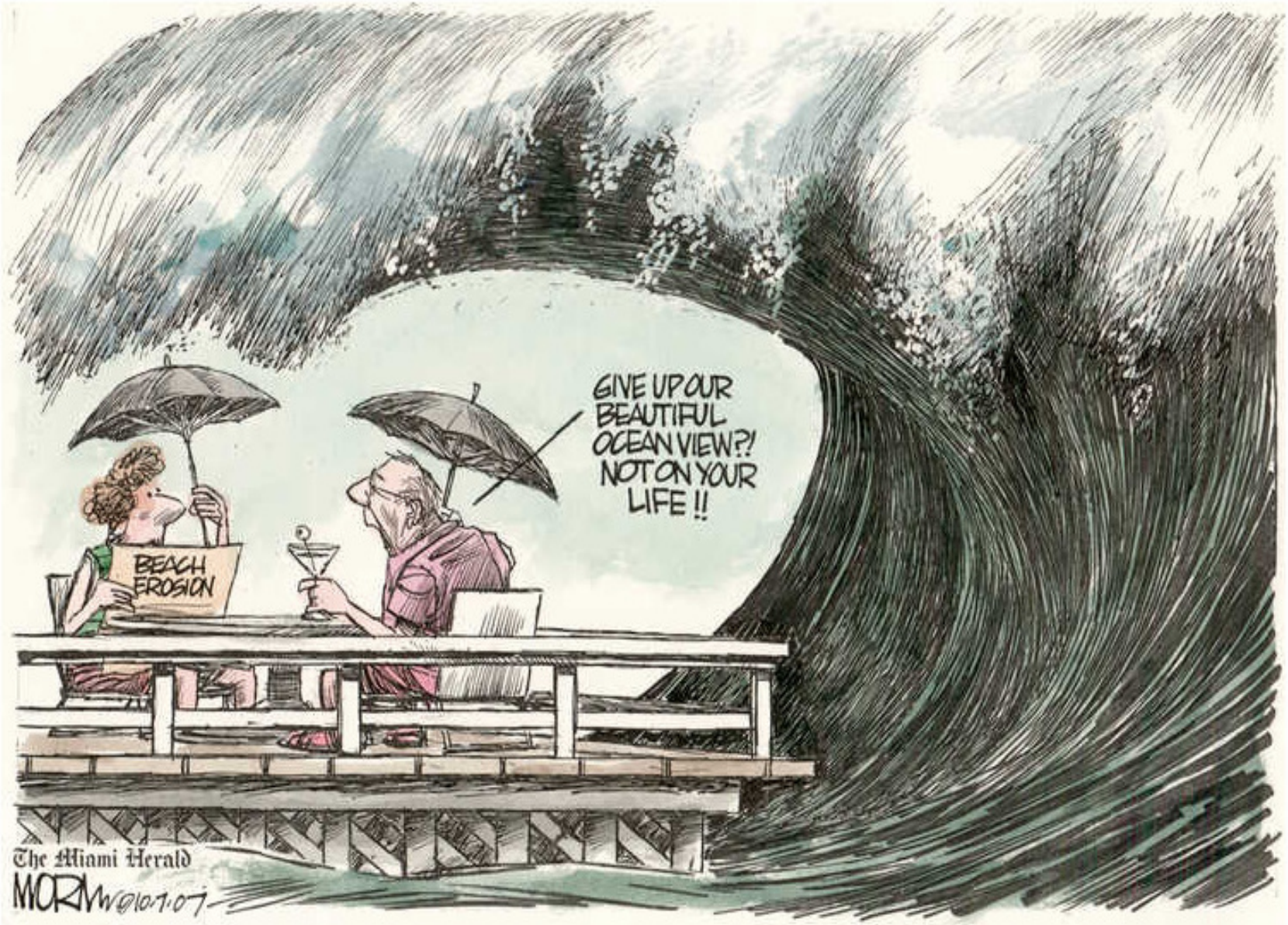
POPULATION AT RISK

- **Poor**, who are most likely to live:
  - on marginal lands that are prone to flooding
  - on coastal lands that are vulnerable to the sea
  - in communities with substandard and inadequate supplies of fresh water, and waste disposal
- **Children and the Aged** who are particularly vulnerable to natural hazards. Some estimates are that 50% of the victims of natural disasters are children

INUNDATION OF THE COAST LINE OF KINGSTON



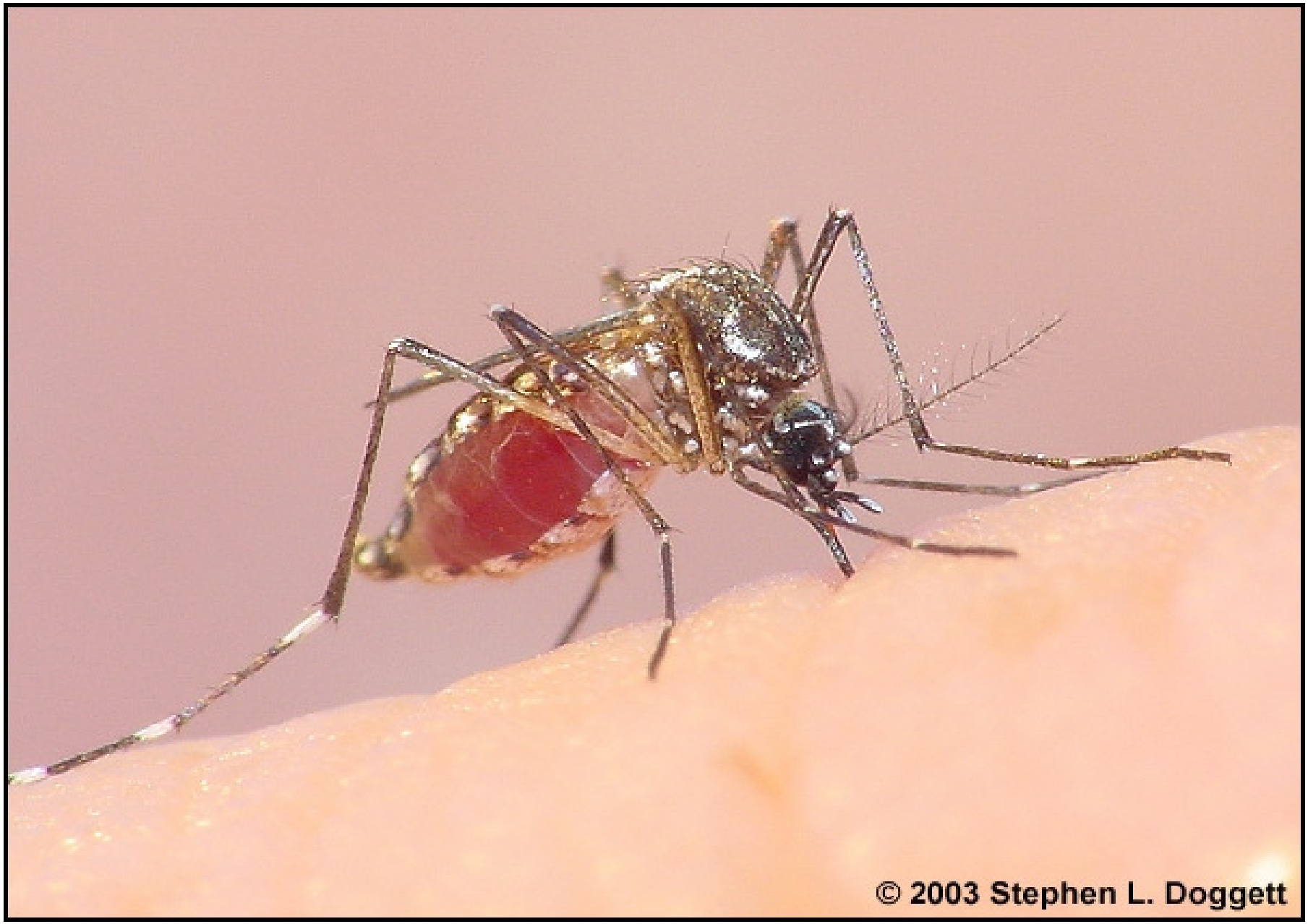
SOME PEOPLE WILL RISK EVERYTHING



HEALTH

- an increase in the incidence of vector-borne diseases such as dengue fever and malaria
- an increased risk of diseases such as cholera, diarrhea and dengue fever due to shortages of fresh water, poor water quality during periods of drought and contamination of fresh water supplies during floods and storms

ADAPTING TO CLIMATE CHANGE



HEALTH - ADAPTATION

- Public Education
  - Government, private sector, civil society must run a continuous programme on health education in general and the impact of climate change in particular
  - Integrated within school curriculum
- Sanitation
  - School children as monitors of community health
- Supply of clean water
  - Monitoring community supplies – again a role for school children to collect samples and run simple tests
- Campaign against mosquitoes as permanent feature of community life

SECURITY

- Both the USA and the UK militaries have issued major studies giving top priority to climate change as a threat to national security due to:
  - Competition for resources, particularly water that may lead to conflict that they feel require their intervention
  - Relief efforts from natural disasters – e.g. Katrina in New Orleans
  - Illegal migrants fleeing disasters in their own countries
- Jamaica also has to pay attention to conflict arising from competition for scarce resources, disaster relief, and illegal migrants from neighbouring countries.

NATIONAL STRATEGY

- National strategy requires the partnership between the Government, Private Sector and Civil Society *over the course of the 21st century*
- Government
  - mainstream climate change in its development strategy, the policies to support the strategy, and the projects to implement the policies.
  - All Ministries and government agencies have to take climate change into account in their plans
  - Support international efforts to mitigate Greenhouse gas emissions

GOVERNMENT AND THE PUBLIC SECTOR

- Government (continued):
  - Regional cooperation to research regional impacts of global climate change, and to implement adaptation measures – e.g joint management of the Caribbean sea, disaster prevention and response, funding for climate change projects
    - Climate Change Centre – regional response; mandated 2002, begun 2004
  - Devise incentives to encourage adaptations to climate change
  - Provide leadership and support to the efforts of the private sector and civil society

PRIVATE SECTOR

- **Private Sector**
  - Invest in adaptation measures for their businesses:
    - man-made defences against the intrusion of the sea, protection of natural defences against the sea
    - Alternative energy solutions
    - Energy and water conservation
    - Siting new investments away from the sea shore
    - Adopting designs for buildings that maximize natural lighting and cooling
  - Support research and public education
  - Participate in public policy making and implementation

CIVIL SOCIETY

- Public education
- Research at the community level
  - Documenting traditional knowledge of local climate
  - Integrating climate monitoring in school curriculum
  - Both of those should feed into a national database
- Mobilizing community action to manage water
- Mobilize coastal communities to protect themselves against rising sea levels – from building defences to relocation
- Mobilize communities for disaster preparedness and recovery

SUSTAINABLE DEVELOPMENT I

- GoJ committed us to pursuing a sustainable development strategy since 1992 in UNCED at Rio, re-committed us in 1994 in the BPOA for SIDS, in the MDGs of 2000, and in many international agreements
- Sustainable development embraces:
  - utilizing the Earth's resources today without depriving succeeding generations
  - Eliminating poverty and inequity
  - Participation of all sectors of society in governance

SUSTAINABLE DEVELOPMENT - II

- Adaptation to climate change is yet another reason for implementing sustainable development strategies because it requires us to :
  - have a more harmonious and respectful relationship with the environment in the interest of the generations to come
  - switch to renewable energy solutions
  - conserve natural resources, especially water

SUSTAINABLE DEVELOPMENT - III

- address the vulnerability of the poor
- adopt a participatory approach to governance.

- Sustainable Development is the strategy for reducing the emissions of greenhouse gases that are accelerating climate change, while adapting to the changes that are well underway and cannot be reversed

THANK YOU