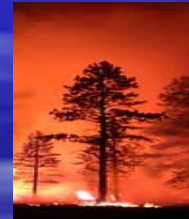


Climate change and adaptation

Habiba Gitay

World Resources Institute
Visiting fellow - Australian National
University

hgitay@wri.org
Habiba.gitay@anu.edu.au



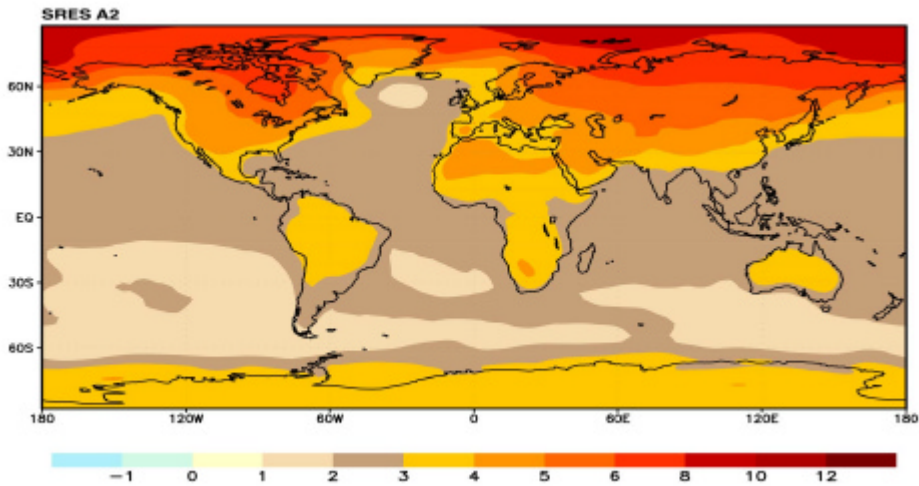
Already observed impacts on ecosystems and human societies



- poleward and upward migration
- earlier spring migration, later departure
- earlier start to growing season, reproduction cycles
- changes in pest outbreaks
- increased incidence of coral bleaching
- high latitude systems most affected, reduction in Arctic Sea ice extent and thickness in summer
- Climate related disaster and associated impacts increasing

Land areas are projected to warm more than the oceans with the greatest warming at high latitudes

Scenario projections - global mean surface temperatures - increase by 3.1 °C

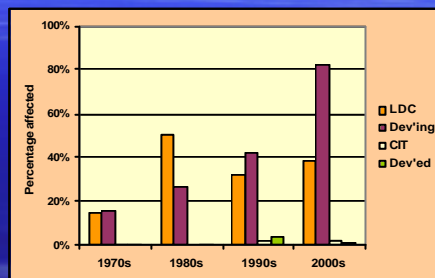
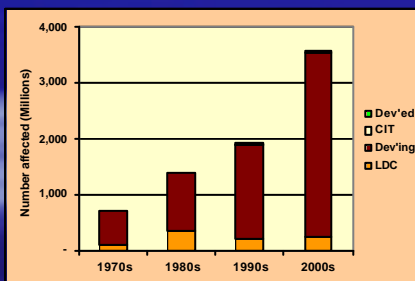


Extreme events are projected to increase

The poor will face the greatest challenges from climate change

2 Billion people in developing countries affected by climate related disaster in the 1990s.

Double in the 2000s?



40 to 80% of the population in developing countries versus a few % in more developed countries

Developing countries and poorest communities

- **low ability to cope with current climatic extremes, so a challenge for future**
- **Impacts are worse** and some already experienced now
- **Lower capacity to adapt** -lack of financial, institutional and technological capacity and access to knowledge
- **Disproportionately high impacts on the poorest** countries and people in any country
- **Human security** will be threatened

Climate change impacts

Water



Human health



Coastal and urban communities

Production systems: forestry, fisheries and agriculture



Energy supply



Tourism



Biodiversity



Climate change impacts on agriculture



- Decreased productivity in tropics and sub-tropics for almost any amount of warming
- increased productivity in mid-latitudes for temperature increase $<2^{\circ}\text{C}$
- decreased productivity in mid latitudes for temperature increase of $2-3^{\circ}\text{C}$



Climate change impacts on water



- decreased water availability in many arid- and semi-arid regions; increases in south east Asia
- increased risk of floods, potential displacement of tens of millions
- changes in permafrost - adverse effect on infrastructure and livelihoods

Climate change impacts on forestry

- increase forest productivity in temperate and boreal, ...
but forest management more difficult (pest, fires)
- may be some increase in tropical forests but risks of fires and pests greater



Climate change impacts on human health

- reduced winter mortality in mid- and high-latitudes
- increased incidence of mortality due to extreme climatic events
- potential for more malnutrition
- increase in number of people exposed to vector-borne and water-borne diseases, especially in tropics



Climate change impacts on biodiversity

Impacts on: individuals, populations, species (distributions), ecosystem composition and function

Directly - through increases in temperature, changes in precipitation (and in the case of marine systems changes in sea level etc)

Indirectly - through climate changing the intensity and frequency of disturbances such as wildfires

Climate change is but one of the pressures

Pressures interact with each other and climate change

Examples:

–Land use and land cover change: habitat loss and fragmentation or unification

–Land and water degradation

–introduction of exotic/invasive species



Need for adaptation

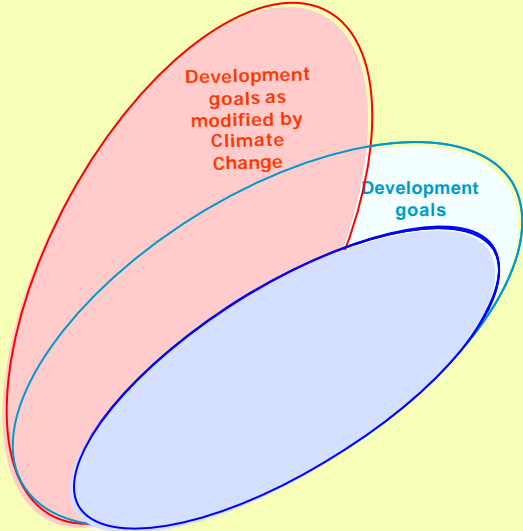
- Reality
 - Observed changes and impacts
 - multiple pressures
- Challenge for the future - increasing rate and magnitude of pressures
- Response: integrated approaches (policy development and implementation)
- Sustainable actions
- Cost of adaptation and who pays?

Adaptation and development for any country

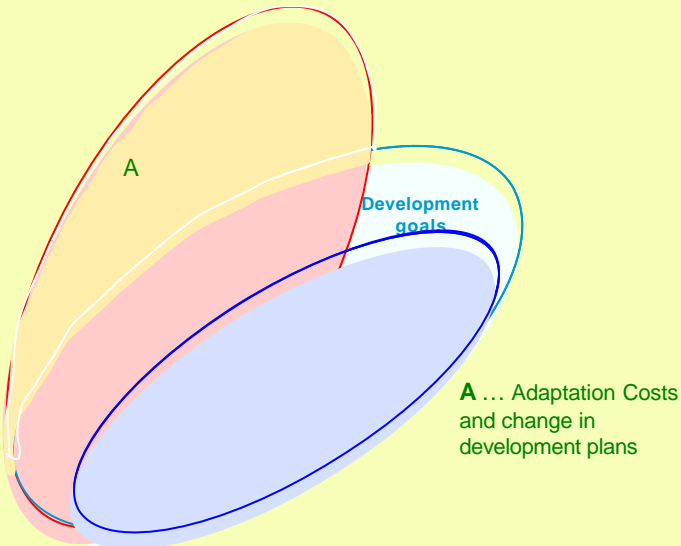


Development goals

Effects of climate change on development plans ...



Effects of climate change on development plans ...



Adaptation - conclusions and challenges

- Will reduce impacts, but cannot prevent all damages
- Greater magnitude and rate of climate change would pose greater challenges for adaptation and increase cost of actions
 - Need mitigation - so more costly
- Adaptation will need to increase the resilience of biological and social systems - do we know how to do this?
- Adaptation - best to integrate in development pathways - can we and what are good approaches?

And finally

- Clear need to adapt
 - Production or socioeconomic sector,
 - Conservation and sustainable use
- Lots of attention to adaptation
- Moving from talking to action
- Synergies between mitigation and adaptation