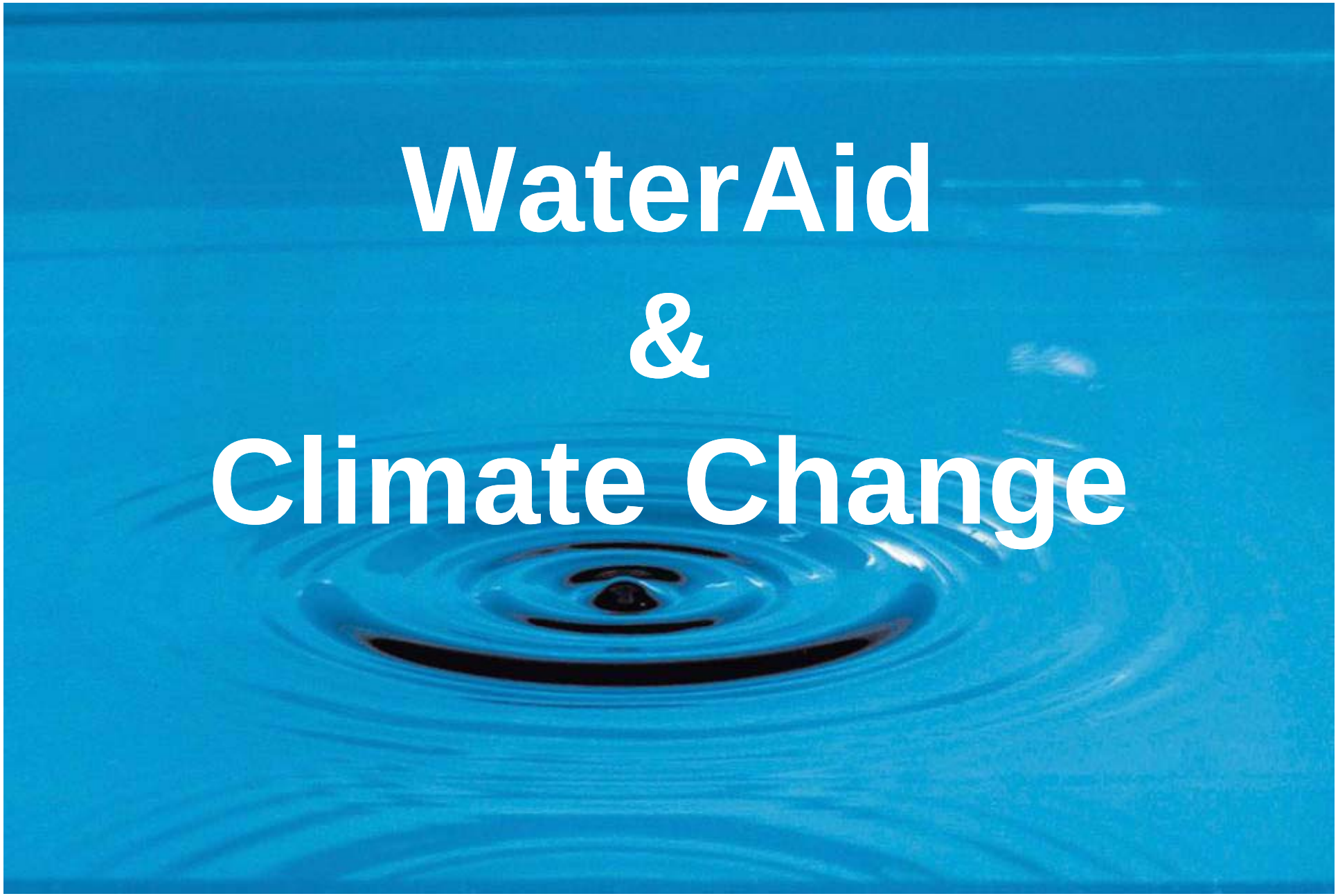

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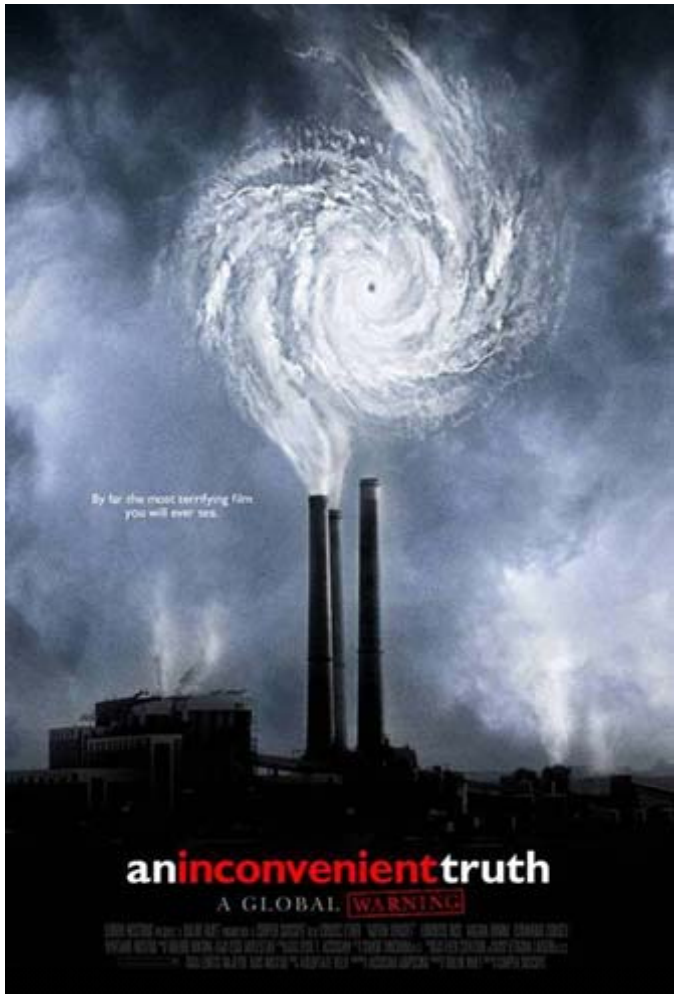
Charity registration number 288701

www.wateraid.org

Introduction



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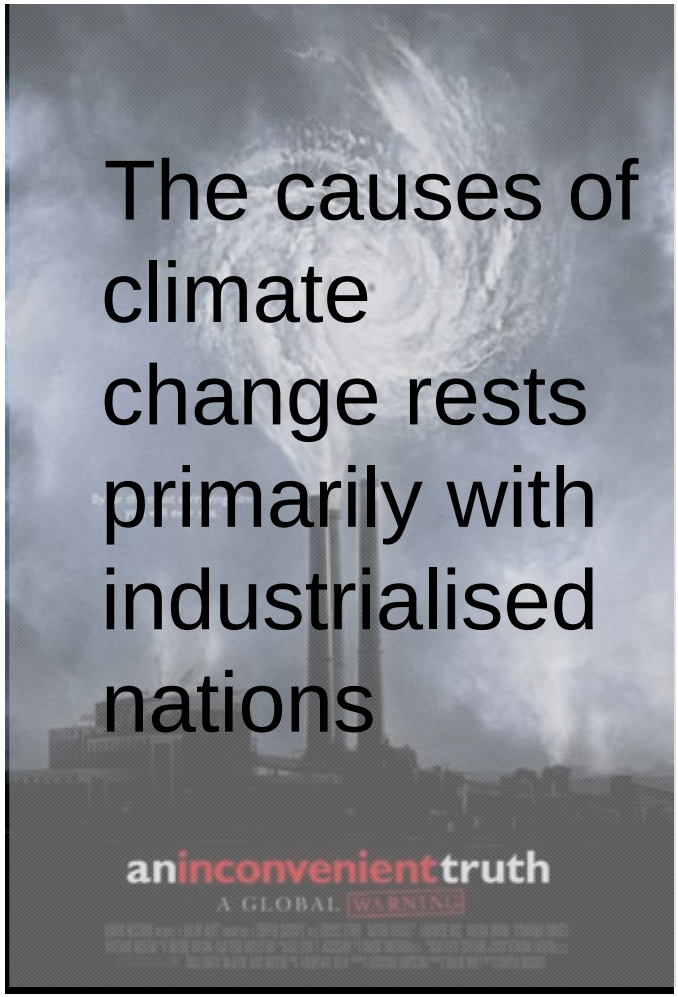

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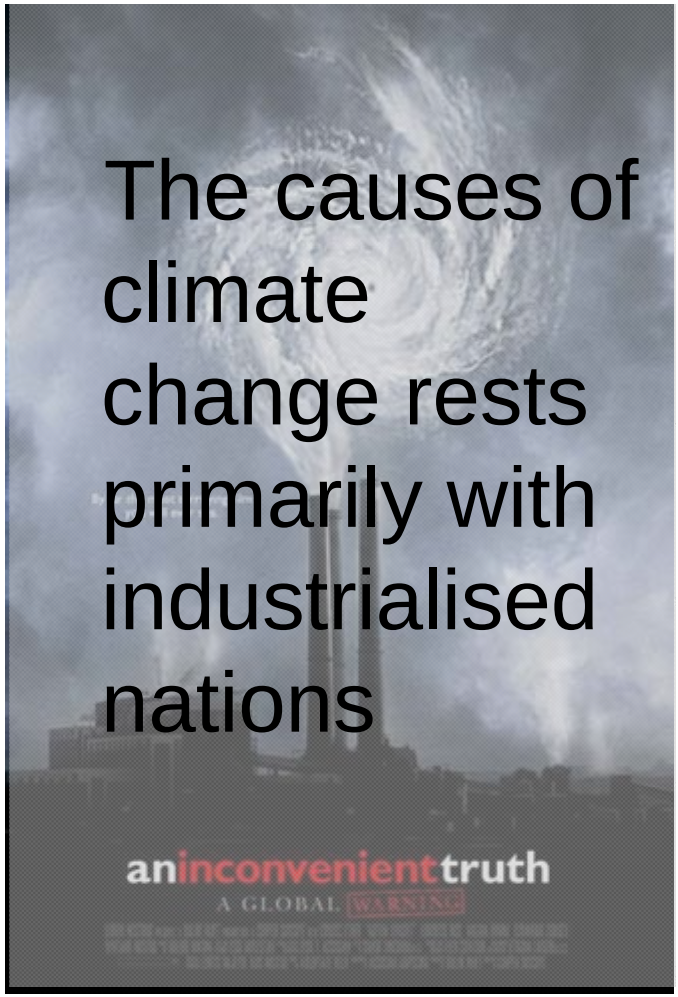

and

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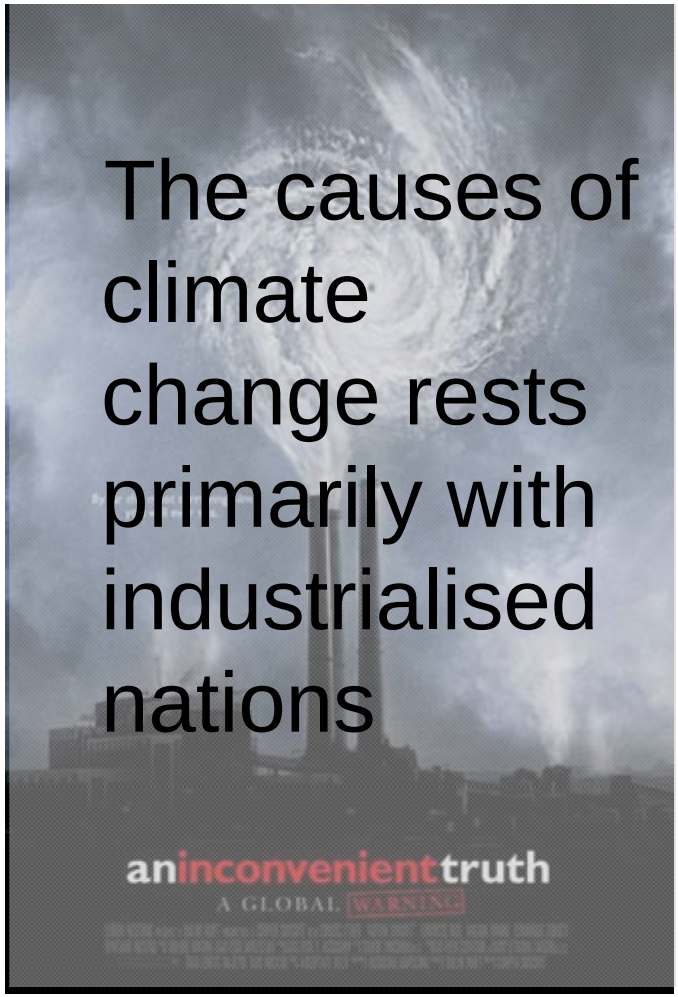

The causes of climate change rests primarily with industrialised nations

and

yet

the implications of climate change will be borne most directly by the poor

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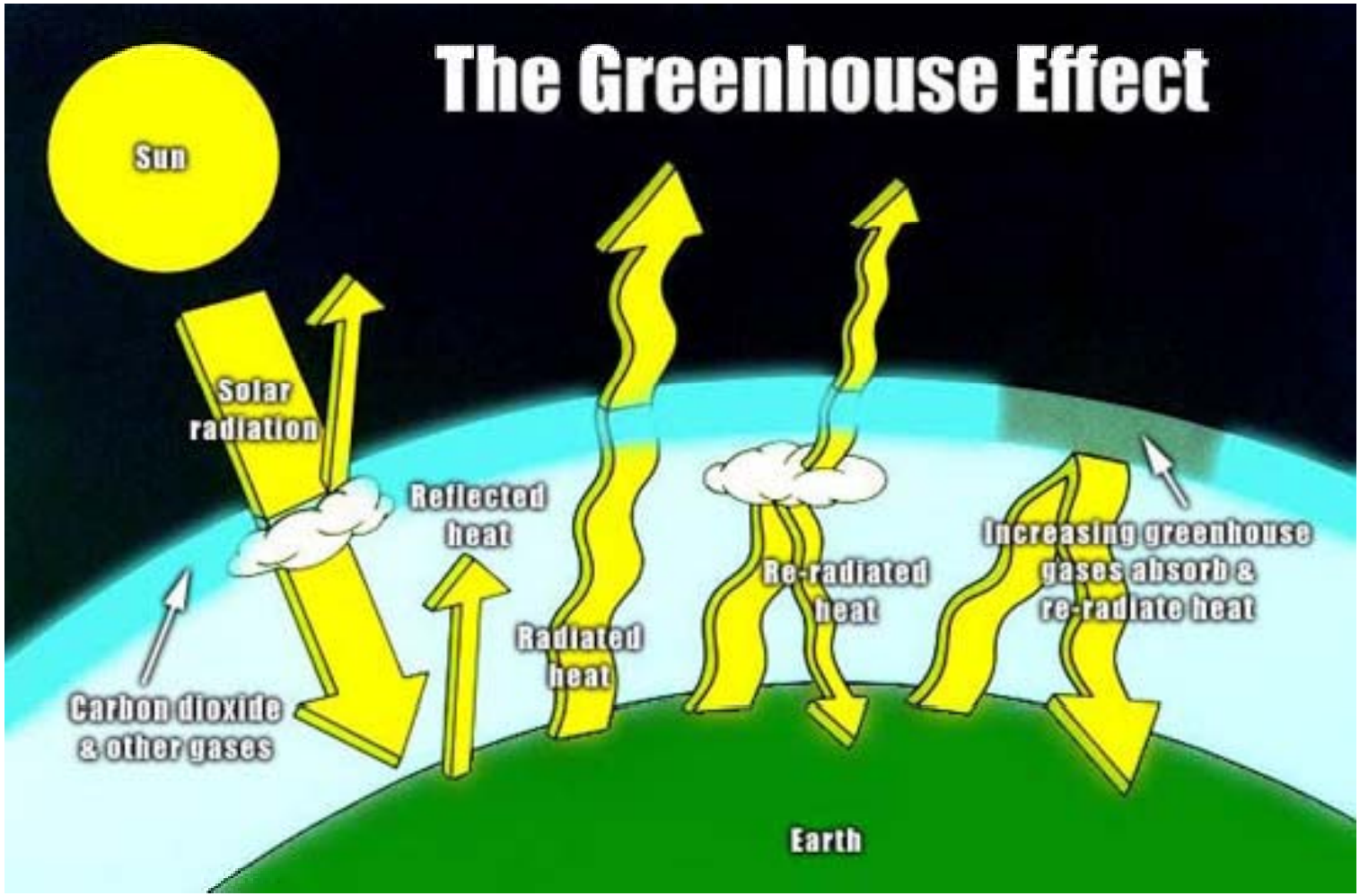
What is Climate Change?



Saskatchewan Interactive http://interactive.usask.ca/ski/media/drawings/agriculture/greenhouse.jpg

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Climate Change Predictions

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- **Large-scale, irreversible system disruption and the destabilisation of the Antarctic ice sheets are serious risks**: changes to polar ice, glaciers and rainfall regimes have already occurred.

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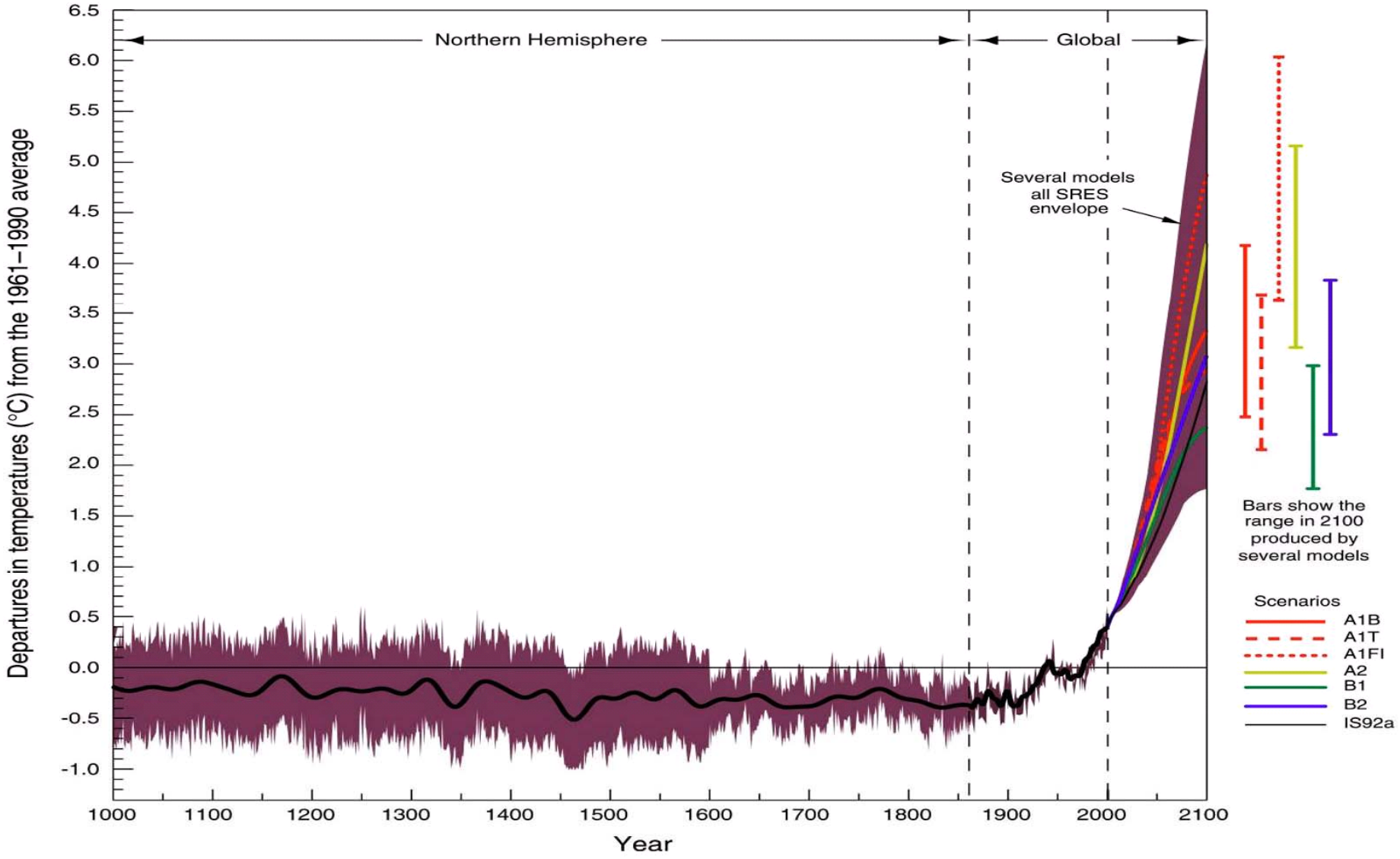
1000 to 1861, N.Hemisphere, proxy data; 1861 to 2000 Global, instrumental; 2000 to 2100, SRES projections



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Climate Change Impacts

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Climate Change Impacts

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Climate Change Impacts

With impacts on the quantity, quality and accessibility of water for households

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Climate Change Impacts

- **AGRICULTURE** – Declining crop yields are likely to leave hundreds of millions without the ability to produce or purchase sufficient food supplies.
- **ECOSYSTEMS** – Forests, land types and species will die back in some areas, but increase in others.
- **HEALTH** – High temperatures expand the range of some dangerous vector-borne diseases, such as malaria. Water-borne diseases will also increase in wet areas. Heatwaves will affect health.
- **SEA LEVEL RISE** – Greater erosion and flooding, plus salt water contamination of groundwater supplies and low-lying coastal land.

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Anticipated Regional Impacts

- Latin America: temperatures are predicted to increase by between 0.2- 2 degrees Celsius (low estimate) to 2- 6 degrees Celsius (high estimate) in the next century. El Niño events will increase in frequency and severity during summer months, and some areas will experience hot and cold waves.
- Africa: greater climate variability, and increasing frequency and intensity of severe weather over the next 50 years. The northern and southern latitudes will become dryer and the tropics will become wetter.
- Asia: summer and winter temperatures rise by 0.1- 0.2 degrees per decade over the next 10-20 years. Heavy rainfall and cyclone intensity may increase due to disruption of the El Niño cycle and increasing sea surface temperatures.

Source: DFID Keysheets on Climate Change and Poverty, http://www.dfid.gov.uk/pubs/files/climatechange/keysheetsindex.asp

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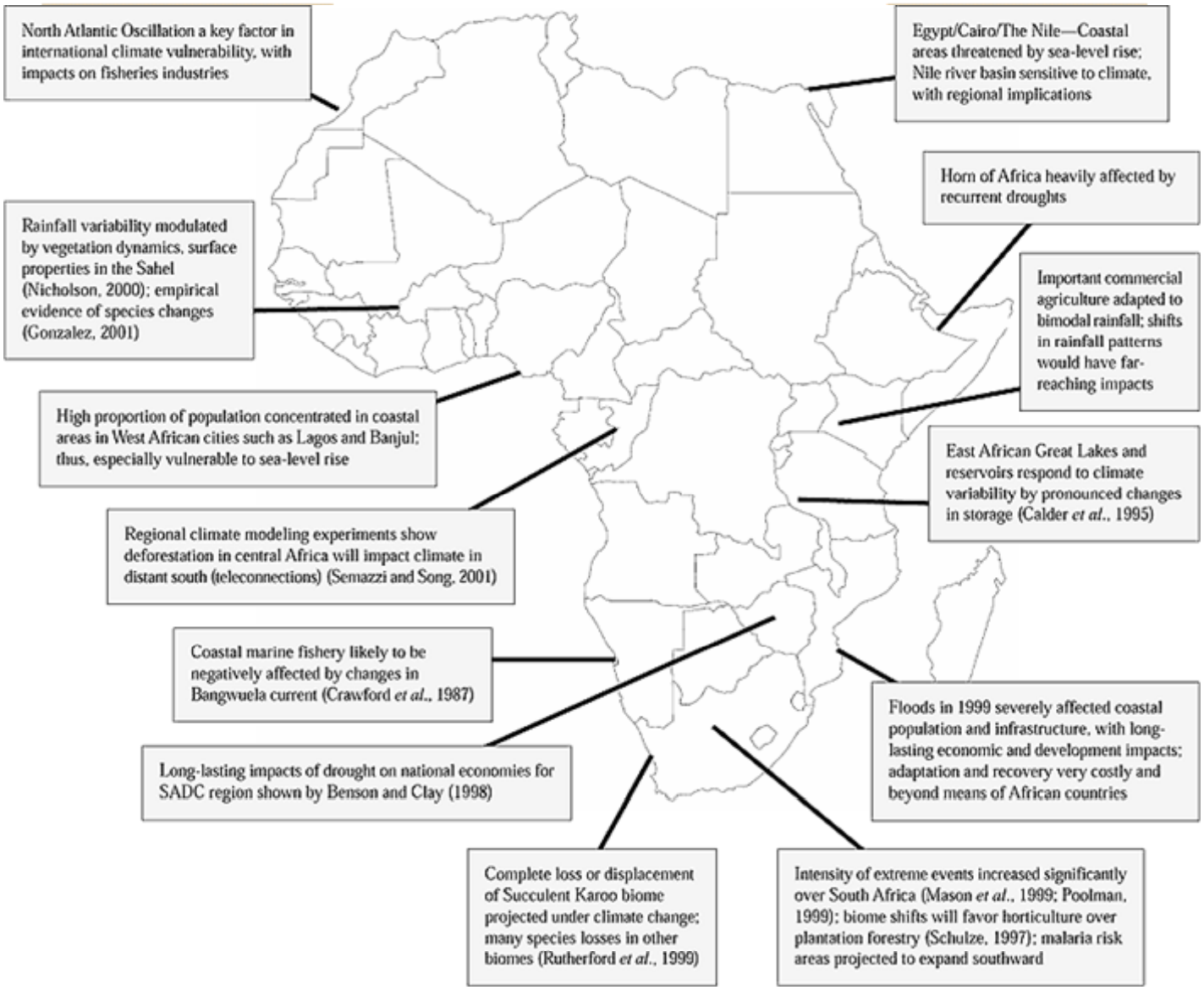
Examples of climate change impacts: Africa



Source: IPCC, Climate Change 2001: Impacts, Adaptation and Vulnerability p. 45

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Examples of Impacts of Climate Change: Asia

Boreal Asia	• Expanded agricultural growing season • Increased active soil temperatures/ better soil climate • Northward shift of agricultural boundary • Change to timing of snowmelt and therefore altered flow regime • Decrease in dry summer season water flow
Arid & Semi-Arid Asia	• Exacerbation of threats caused by land use/ cover change & population pressures • Significant increase in surface air temperatures • Increased evapotranspiration in plants • Acute water shortages
Temperate Asia	• Significant surface warming & rainfall pattern shifts • Increased plant respiration & saturation deficits, decreased agricultural productivity • Intensification of climatic hazards (eg floods, droughts, sea level rise, storm surges
Tropical Asia	• Changes to hydrological regime • Increased flooding, waterlogging, salinity caused by higher runoff in some river basins • Decreased surface runoff in some basins due to increased evaporation • Changes in freshwater availability in coastal regions • Sea level rise, leading to inundation of low-lying areas, shoreline retreat, changes to water table, salinization/ acidification of soil

Source: IPCC, Climate Change 2001: Impacts, Adaptation and Vulnerability

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Possible Climate Impacts

Temp rise (°C)	Water	Food	Health	Land	Environment	Abrupt and Large-Scale Impacts
1°C	Small glaciers in the Andes disappear completely, threatening water supplies for 50 million people	Modest increases in cereal yields in temperate regions	At least 300,000 people each year die from climate related diseases (predominantly diarrhoea, malaria, and malnutrition) Reduction in winter mortality in higher latitudes (Northern Europe, USA)	Permafrost thawing damages buildings and roads in parts of Canada and Russia	At least 10 percent of land species facing extinction (according to one estimate) 80 percent bleaching of coral reefs, including Great Barrier Reef	Atlantic Thermohaline Circulation starts to weaken
2°C	Potentially 20 - 30 percent decrease in water availability in some vulnerable regions, e.g. Southern Africa and Mediterranean	Sharp declines in crop yield in tropical regions (5 - 10 percent in Africa)	40 – 60 million more people exposed to malaria in Africa	Up to 10 million more people affected by coastal flooding each year	15 – 40 percent of species facing extinction (according to one estimate). High risk of extinction of Arctic species, including polar bear and caribou	Potential for Greenland ice sheet to begin melting irreversibly, accelerating sea level rise and committing world to an eventual 7m sea level rise. Rising risk of abrupt changes to atmospheric circulations, e.g. the monsoon. Rising risk of collapse of West Antarctic Ice Sheet. Rising risk of collapse of Atlantic Thermohaline Circulation
3°C	In Southern Europe, serious droughts occur once every 10 years 1 – 4 billion more people suffer water shortages, while 1 – 5 billion gain water, which may increase flood risk	150 - 550 additional millions at risk of hunger (if carbon fertilisation weak) Agricultural yields in higher latitudes likely to peak	1 – 3 million more people die from malnutrition (if carbon fertilisation weak)	1 – 170 million more people affected by coastal flooding each year	20 – 50 percent of species facing extinction (according to one estimate), including 25 – 60 percent mammals, 30 – 40 percent birds and 15 – 70 percent butterflies in South Africa. Onset of Amazon forest collapse (some models only)	
4°C	Potentially 30 -50 percent decrease in water availability in Southern Africa and Mediterranean	Agricultural yields decline by 15- 35 percent in Africa, and entire regions out of production (e.g. parts of Australia)	Up to 80 million more people exposed to malaria in Africa	7 – 300 million more people affected by coastal flooding each year	Loss of around half Arctic tundra. Around half of all the world's nature reserves cannot fulfill objectives	
5°C	Possible disappearance of large glaciers in Himalayas, affecting one-quarter of China's population and hundreds of millions in India	Continued increase in ocean acidity seriously disrupting marine ecosystems and possibly fish stocks		Sea level rise threatens small islands, low-lying coastal areas (Florida) and major world cities such as New York, London, and Tokyo		
More than 5°C	The latest science suggests that the Earth's average temperature will rise by even more than 5 or 6°C if emissions continue to grow and positive feedbacks amplify the warming effect of greenhouse gases (e.g. release of carbon dioxide from soils or methane from permafrost). This level of global temperature rise would be equivalent to the amount of warming that occurred between the last age and today – and is likely to lead to major disruption and large-scale movement of population. Such "socially contingent" effects could be catastrophic, but are currently very hard to capture with current models as temperatures would be so far outside human experience.					

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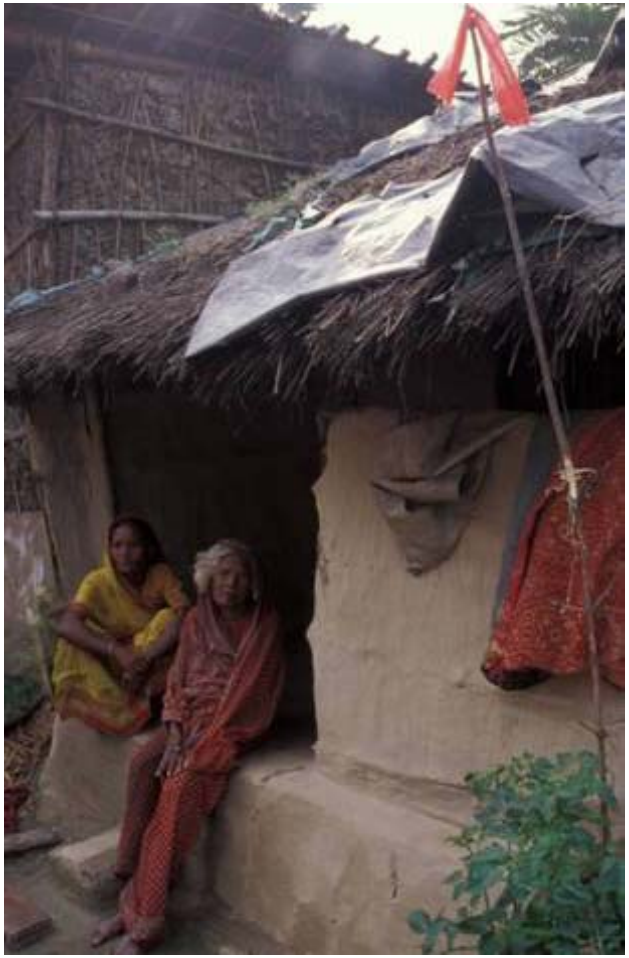
Climate Change & The Poor



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Climate Change & The Poor

Climate change is having, and will continue to have, the greatest impact upon the lives of the poor in developing countries

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Climate Change, The Poor, and Natural Disasters

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- Future increases in flooding are particularly concerning.
- Beyond the direct loss of life and livelihoods, flooding impacts water resources, and hence people. These are:
  - overburdening of wastewater and sewer systems, leading to contamination of water supplies with subsequent outbreaks of dysentery and cholera;
  - disruption of safe water supplies;
  - water in low-lying areas creates breeding grounds for mosquitoes with increased risk of malaria, yellow fever and dengue;
  - exposure to respiratory infections and skin allergies; and
  - inadequate nutrition following disruption of income and food distribution systems.

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Impact on MDGs

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- In the period between the 1970s and 1990s, economic losses reported as a result of natural disasters increased five-fold, from US $131 billion to $629 billion.
- During that same period, the number of reported disasters also rose by three times, from 1,110 to 2,742 – partly due to greater settlement of at-risk areas.

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Impact on MDGs

- MDG1 (Poverty): Increase in temperature in India could reduce farm net revenues by 9- 25 percent;
- MDG2 (Education): In Bihar India, annual flooding shuts schools across the state for 3 months;
- MDG3 (Gender): 90 percent of victims in the 1991 Bangladesh cyclone were women and children;
- **MDG 4,5,6 (Health): Incidence of Cholera increased 6-fold in Nicaragua following flooding as a result of Hurricane Mitch;**
- **MDG7 (Environment, including water resources): Total available water in Africa's large catchment basins of Niger, Lake Chad and Senegal, has already decreased by 40-60 percent.**

Source: Adapted from Multi-donor report, "Poverty and Climate Change: Reducing the vulnerability of the poor through adaptation", http://www.eldis.org/static/DOC11253.htm

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Impact on Water Resources

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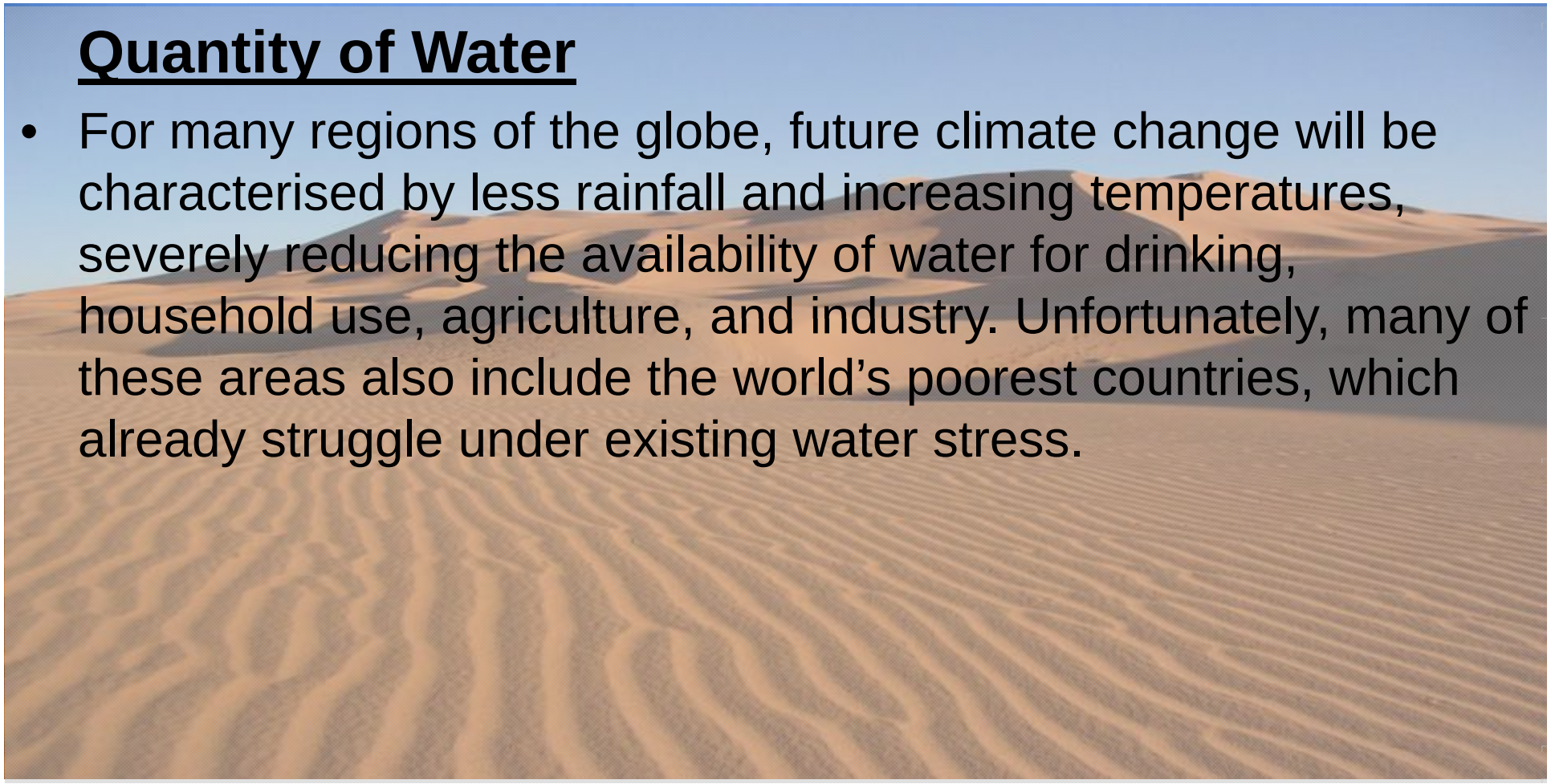

Quantity of Water

- For many regions of the globe, future climate change will be characterised by less rainfall and increasing temperatures, severely reducing the availability of water for drinking, household use, agriculture, and industry. Unfortunately, many of these areas also include the world's poorest countries, which already struggle under existing water stress.

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- The Stockholm Environment Institute estimates that, based on only a moderate climate change, by 2025 the proportion of the world's population living in countries of significant water stress will increase from approximately 34% (in 1995) to 63%.

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Impact on Water Resources

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- Higher ocean levels will lead to salt water intrusion in groundwater supplies, threatening the quality and quantity of freshwater access to large populations.
  - This is already occurring in Israel and Thailand, in small islands in the Pacific and Indian Oceans and the Caribbean Sea, as well as in some of the world's most productive deltas, such as China's Yangtze Delta and Vietnam's Mekong Delta.

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Impact on Water Resources

Accessibility of Water

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- In the event of decreasing water tables, industrial needs will be forced to compete with agricultural and domestic water supply sources, and could lead to conflict.

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Consequences for Human Populations

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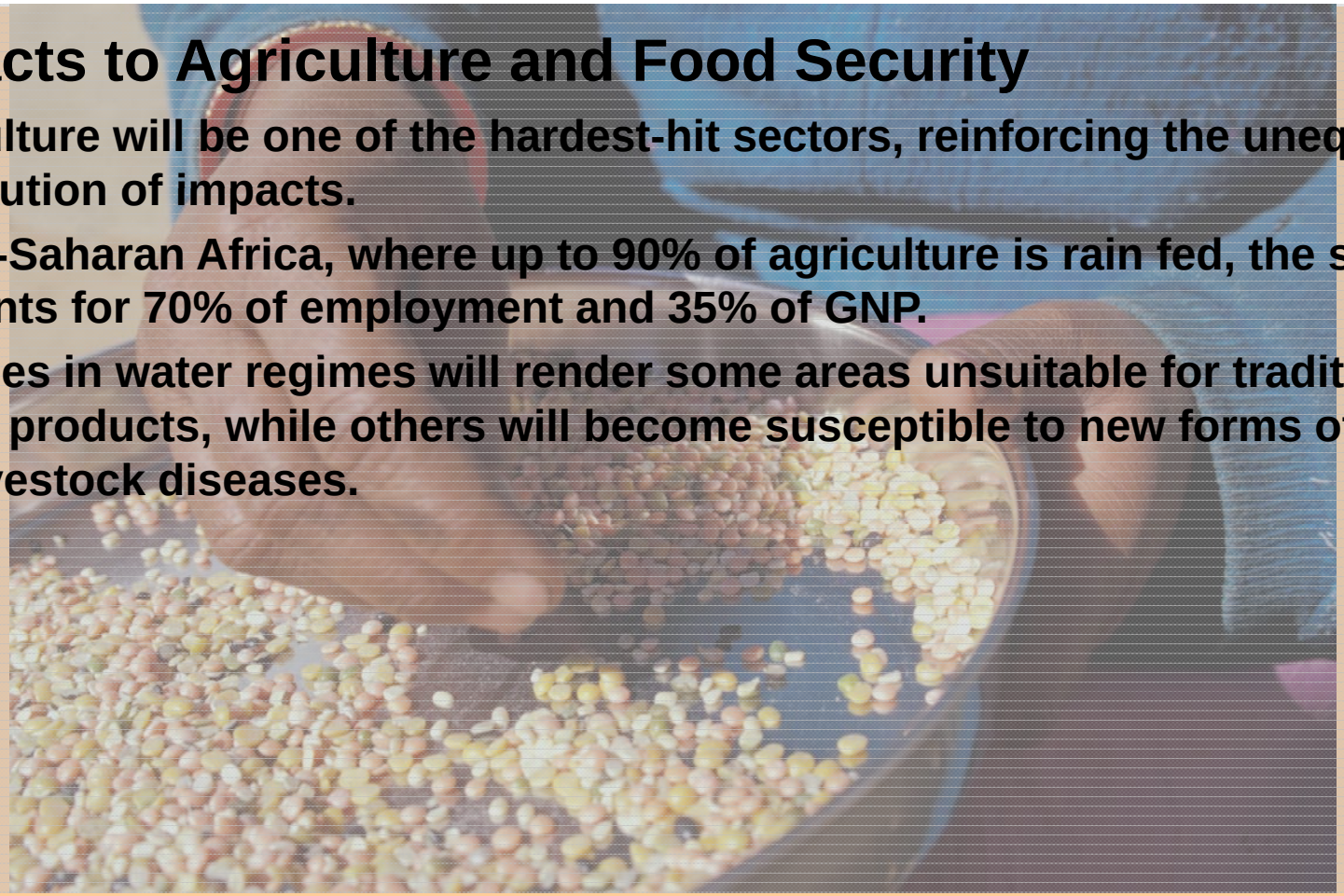

Impacts to Agriculture and Food Security

- **Agriculture will be one of the hardest-hit sectors, reinforcing the unequal distribution of impacts.**
- **In sub-Saharan Africa, where up to 90% of agriculture is rain fed, the sector accounts for 70% of employment and 35% of GNP.**
- **Changes in water regimes will render some areas unsuitable for traditionally-grown products, while others will become susceptible to new forms of crop and livestock diseases.**

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Health Impacts

- **Currently, more than 3 million people die each year from avoidable water-related diseases, most of whom are in developing countries.**
- **The effects of climate change on water will contribute directly to disease transmission through water-borne, -washed, -based, -related and -dispersed diseases.**

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Consequences for Human Populations

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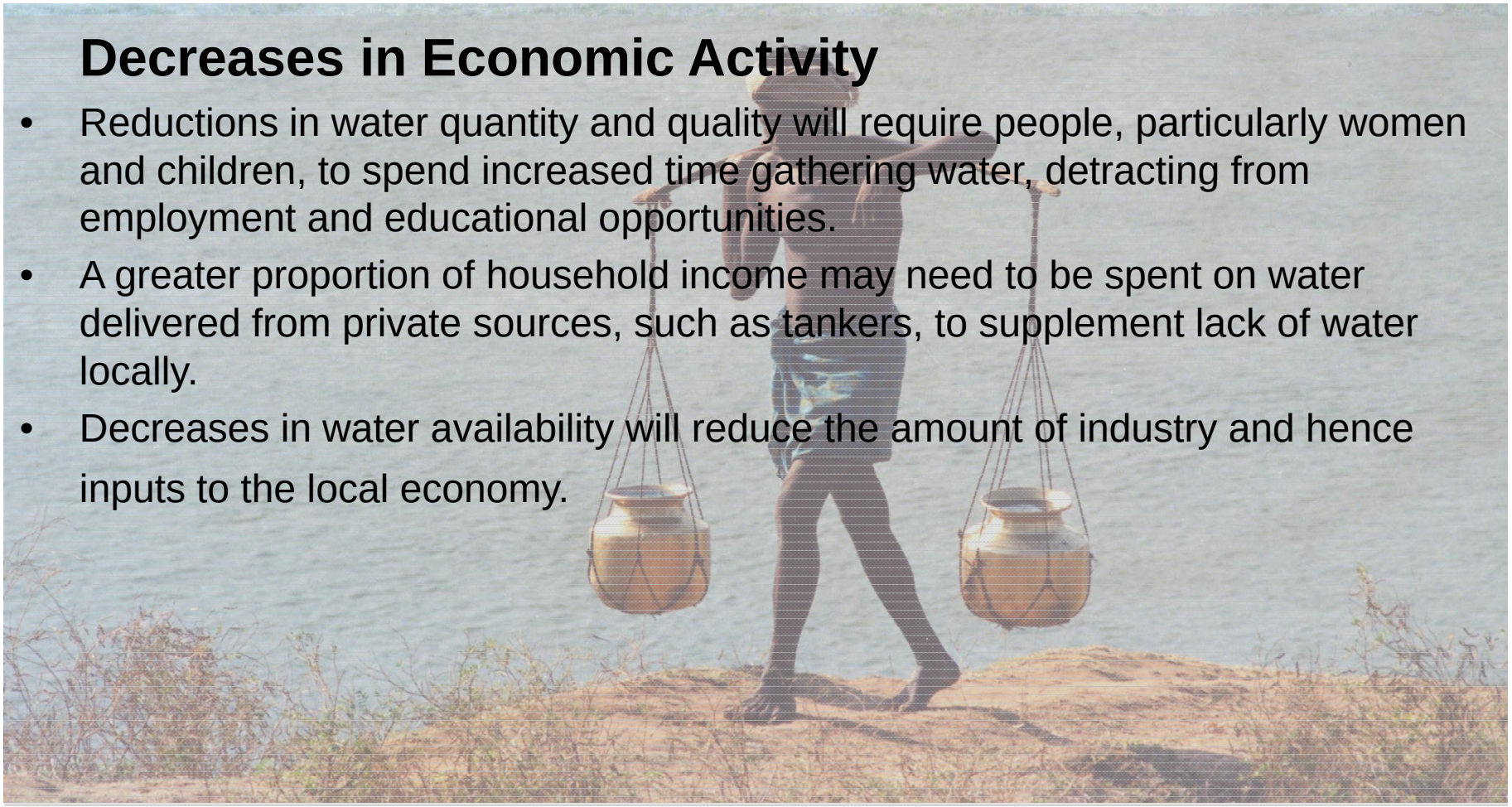

Decreases in Economic Activity

- Reductions in water quantity and quality will require people, particularly women and children, to spend increased time gathering water, detracting from employment and educational opportunities.
- A greater proportion of household income may need to be spent on water delivered from private sources, such as tankers, to supplement lack of water locally.
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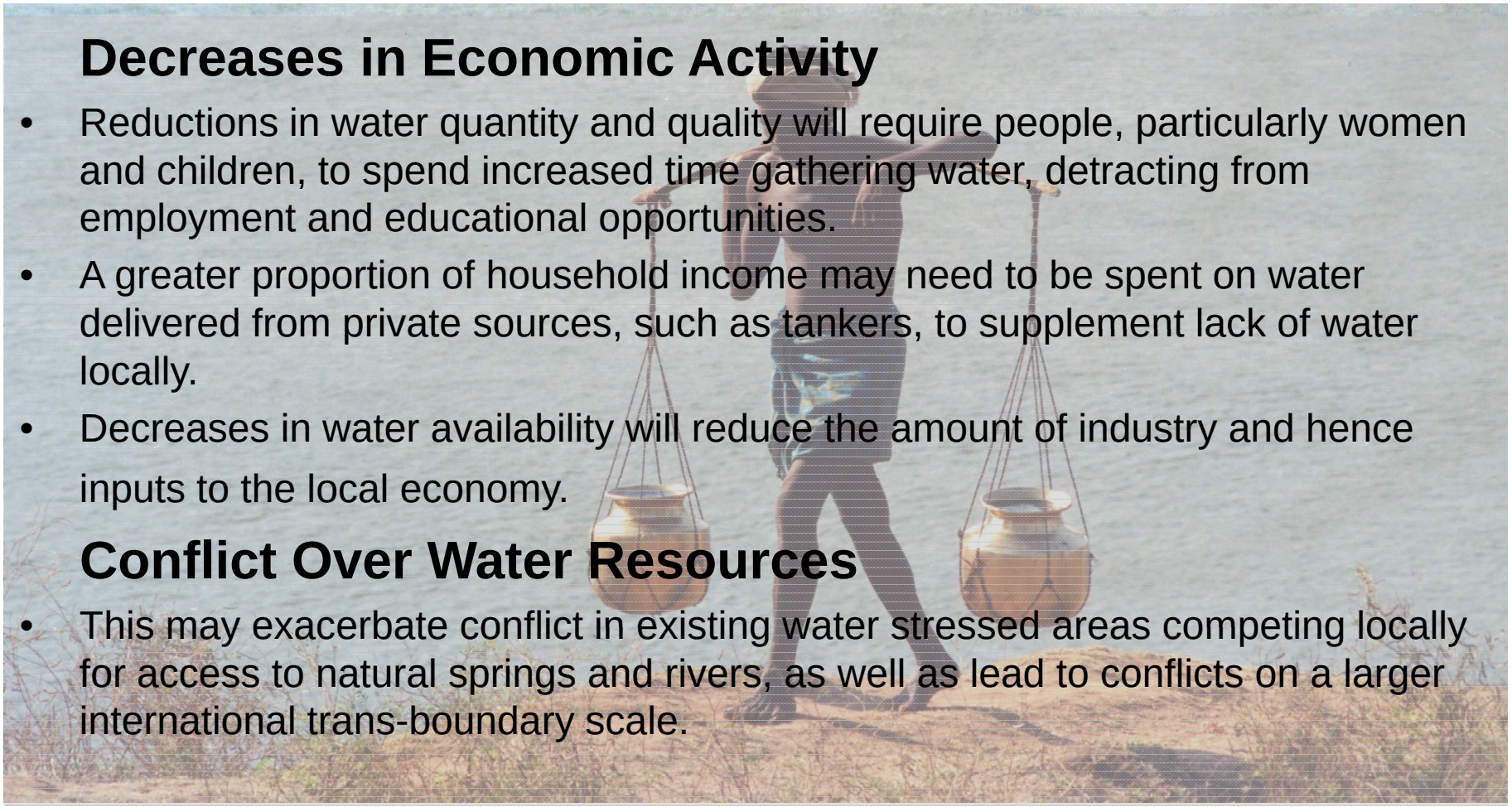

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Conflict Over Water Resources

- This may exacerbate conflict in existing water stressed areas competing locally for access to natural springs and rivers, as well as lead to conflicts on a larger international trans-boundary scale.

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What can be done?

MITIGATION

- **Deals with the causes of climate change**
- **Reduce the levels of GHGs in the atmosphere**
- **Use of appropriate technology to reduce emissions**
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ADAPTATION

- **Deals with the effects of climate change**
- **Responses to moderate the harm, or take advantage of the opportunities**
- **Measures must be integrated within development activities, and increase adaptive capacity**

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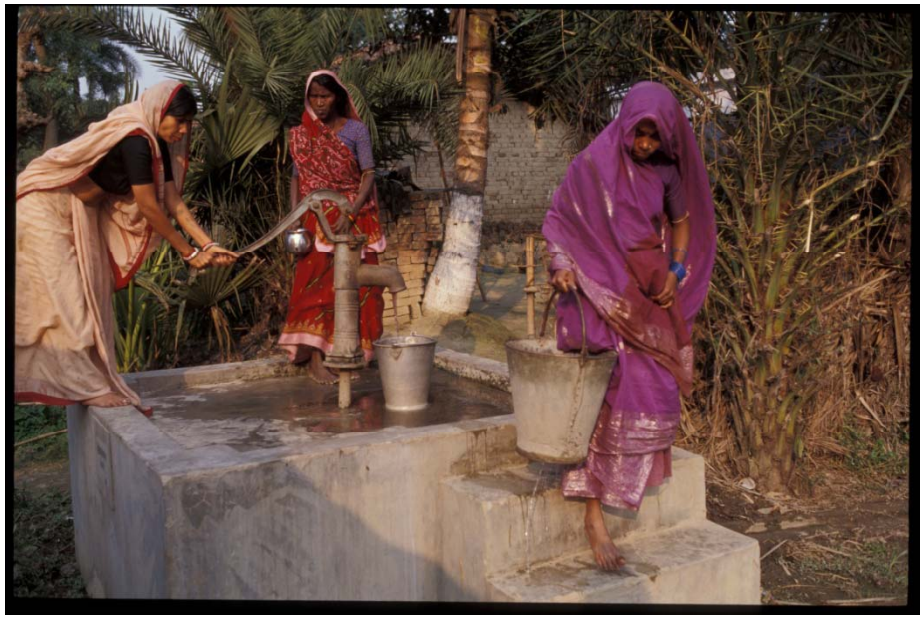

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What can be done?

At the community level, adaptation measures include some of the following institutional, educational and project design changes.

- ***Local watershed management – make authorities more accountable for managing in the interest of all stakeholders, including domestic water users***
- ***Awareness-raising – build the links between climate changes and water resources at a local level***
- ***Household water conservation – encourage the use of grey water for washing, bathing, and water gardens and livestock***
- ***Use of contour bunding, gully plugging, and check dams and dykes to catch rainwater***
- ***Promote rainwater harvesting (i.e. from rooftops) and tanks to augment existing supplies***
- ***Design raised hand-pumps to protect drinking water from flood contamination.***

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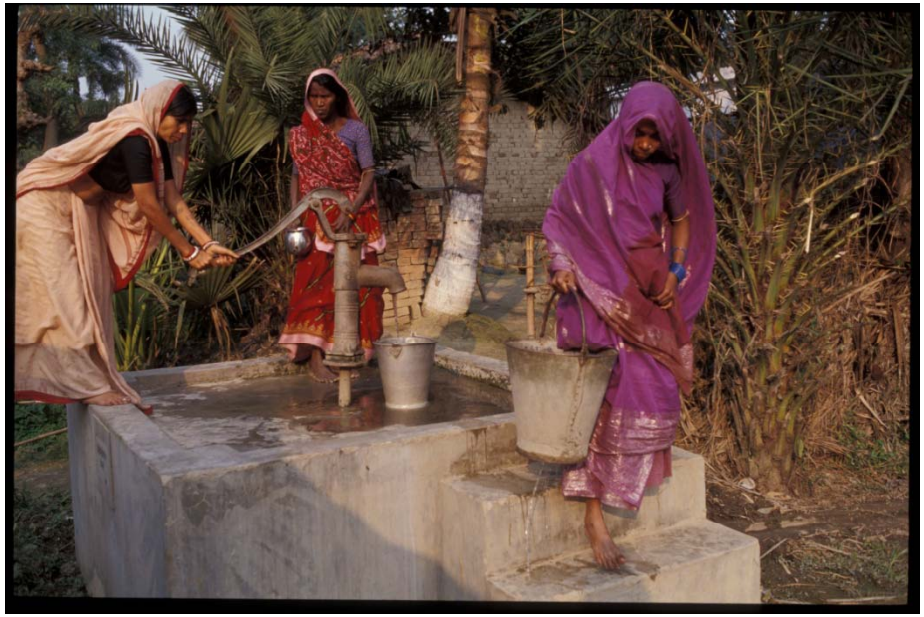
What can be done?

BEFORE



AFTER

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  - ***Integrating local perspectives into national planning on climate change***
  - ***Supporting NGO networks and social movements that prioritise climate change issues.***

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Campaigns on Climate Change

- ***UK Working Group on Climate Change and Development.*** *Members include:*
  - ActionAid, Christian Aid, the Catholic Institute for International Relations, Friends of the Earth, Greenpeace, IIED, ITDG, NEF, Oxfam, People and Planet, RSPB, Tearfund, **WaterAid**, World Vision and WWF
- ***Stop Climate Chaos***
  - *A coalition of environmental and international development organisations*
  - *"I Count" is the campaign of the Stop Climate Chaos coalition. (http://www.icount.org.uk)*
- ***The Climate Action Network***
  - *Global network of 287 NGOs*
- ***Linking Climate Adaptation Network***
  - Experience sharing network for different groups

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