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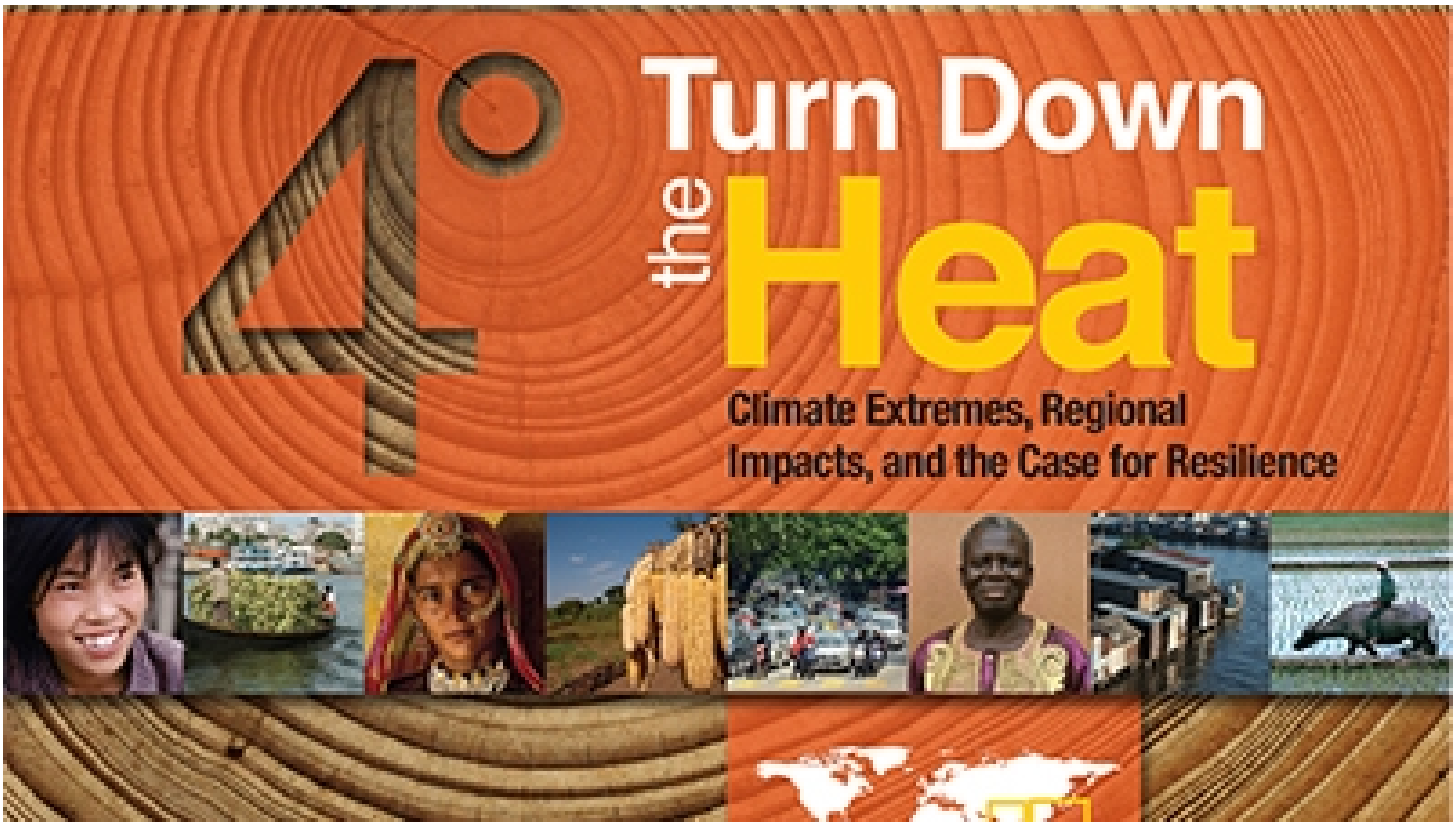
FEATURE STORY | JUNE 19, 2013

India: Climate Change Impacts



To better understand the risks of climate change to development, the World Bank Group commissioned the Potsdam Institute for Climate Impact Research and Climate Analytics to look at the likely impacts of temperature increases from 2ºC to 4ºC in three regions. The

agriculture, water resources, cities and coastal ecosystems in South Asia, South East Asia and Sub-Saharan Africa. Some of their findings for India include:

Extreme Heat

What we know	India is already experiencing a warming climate.
What could happen	Unusual and unprecedented spells of hot weather are expected to occur far more freq Under 4°C warming, the west coast and southern India are projected to shift to new, hi
What can be done	With built-up urban areas rapidly becoming “heat-islands”, urban planners will need to

Changing Rainfall Patterns

What we know	A decline in monsoon rainfall since the 1950s has already been observed. The frequenc
What could happen	A 2°C rise in the world’s average temperatures will make India’s summer monsoon high At 4°C warming, an extremely wet monsoon that currently has a chance of occurring or An abrupt change in the monsoon could precipitate a major crisis, triggering more freq India’s northwest coast to the south eastern coastal region could see higher than avera Dry years are expected to be drier and wet years wetter.
What can be done	Improvements in hydro-meteorological systems for weather forecasting and the install Building codes will need to be enforced to ensure that homes and infrastructure are nc

Droughts

What we know	Evidence indicates that parts of South Asia have become drier since the 1970s with an i Droughts have major consequences. In 1987 and 2002-2003, droughts affected more th
What could happen	Droughts are expected to be more frequent in some areas, especially in north-western Crop yields are expected to fall significantly because of extreme heat by the 2040s.
What can be done	Investments in R&D for the development of drought-resistant crops can help reduce sc

Groundwater

What we know	More than 60% of India's agriculture is rain-fed, making the country highly dependent c Even without climate change, 15% of India's groundwater resources are overexploited.
What could happen	Although it is difficult to predict future ground water levels, falling water tables can be
What can be done	The efficient use of ground water resources will need to be incentivized.

Glacier Melt

What we know	Glaciers in the northwestern Himalayas and in the Karakoram range - where westerly w On the other hand, most Himalayan glaciers - where a substantial part of the moisture

What could happen	At 2.5°C warming, melting glaciers and the loss of snow cover over the Himalayas are e The Indus and Brahmaputra are expected to see increased flows in spring when the sn Alterations in the flows of the Indus, Ganges, and Brahmaputra rivers could significantl
What can be done	Major investments in water storage capacity would be needed to benefit from increase

Sea level rise

What we know	Mumbai has the world's largest population exposed to coastal flooding, with large parts
What could happen	With India close to the equator, the sub-continent would see much higher rises in sea l Sea-level rise and storm surges would lead to saltwater intrusion in the coastal areas, i Kolkata and Mumbai, both densely populated cities, are particularly vulnerable to the i
What can be done	Building codes will need to be strictly enforced and urban planning will need to prepare Coastal embankments will need to be built where necessary and Coastal Regulation Zo

Agriculture and food security

What we know	Even without climate change, world food prices are expected to increase due to growin **Rice:** While overall rice yields have increased, rising temperatures with lower rainfall a **Wheat:** Recent studies shows that wheat yields peaked in India and Bangladesh aroun

What could happen	Seasonal water scarcity, rising temperatures, and intrusion of sea water would threater Should current trends persist, substantial yield reductions in both rice and wheat can b Under 2°C warming by the 2050s, the country may need to import more than twice the
What can be done	Crop diversification, more efficient water use, and improved soil management practices

Energy Security

What we know	Climate-related impacts on water resources can undermine the two dominant forms of To function at full efficiency, thermal power plants need a constant supply of fresh cool
What could happen	The increasing variability and long-term decreases in river flows can pose a major challe Decreases in the availability of water and increases in temperature will pose major risk
What can be done	Projects will need to be planed taking into account climatic risks.

Water Security

What we know	Many parts of India are already experiencing water stress. Even without climate change Urbanization, population growth, economic development, and increasing demand for v
What could happen	An increase in variability of monsoon rainfall is expected to increase water shortages in Studies have found that the threat to water security is very high over central India, alon

Health

What we know	Climate change is expected to have major health impacts in India- increasing malnutriti Malaria and other vector-borne diseases, along with and diarrheal infections which are Heat waves are likely to result in a very substantial rise in mortality and death, and inju
What could happen	Health systems will need to be strengthened in identified hotspots.
What can be done	Improvements in hydro-meteorological systems for weather forecasting and the install Building codes will need to be enforced to ensure that homes and infrastructure are nc

Migration and conflict

What we know	South Asia is a hotspot for the migration of people from disaster-affected or degraded The Indus and the Ganges-Brahmaputra-Meghna Basins are major trans boundary rive
What could happen	Climate change impacts on agriculture and livelihoods can increase the number of clim
What can be done	Regional cooperation on water issues will be needed.

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