Impact of climate Change

Snow

 Annual average Arctic sea ice has shrunk, with larger decreases observed each decade. Mountain glaciers and snow cover have declined.

Rain and drought There have been significant changes in precipitation patterns globally. The area affected by drought is likely to have increased since the 1970s.

A hotter world Over the past 50 years, cold days & nights, frosts have become less frequent and hot days and hot nights, more frequent.

Extreme weather An increase in intense tropical cyclone activity in the North Atlantic has been observed. Warm air is fuel for cyclones and hurricanes.

Seasons

 Spring events come earlier and plants and animals are moving upwards and pole wards because of recent warming trends.

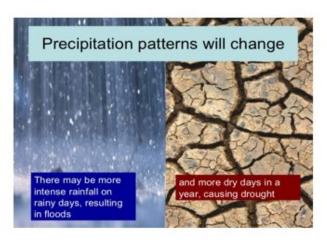
Nature

 Scientists have observed climate-induced changes in at least 420 physical processes and biological species or communities.

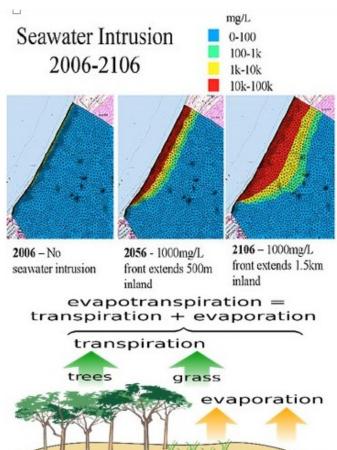
Impact of Climate Change on Water Resources



Reduced per capita availability due to Increased population and Increased variability of water availability both in space & time



Increased drought and Flood like situations. Rise in Extremities

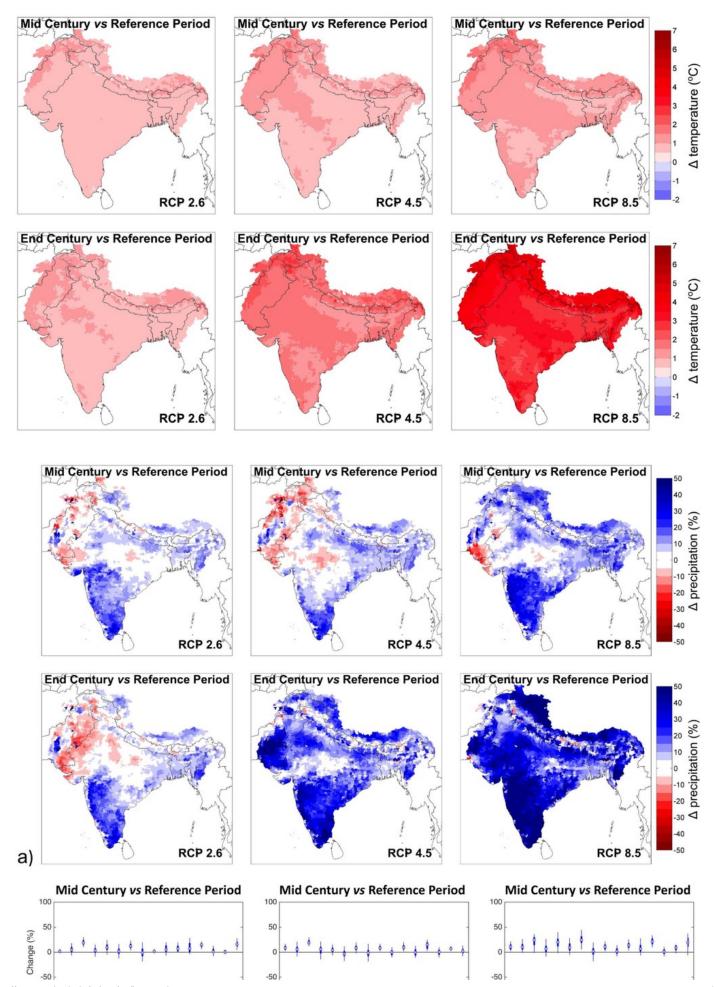


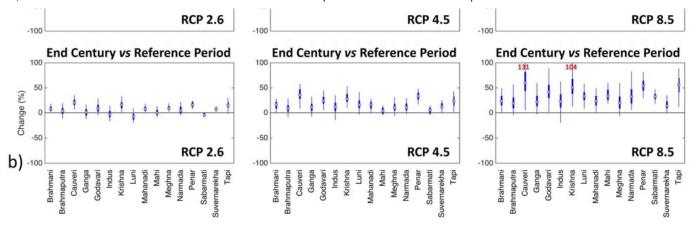
Reducing fresh water in coastal areas due to sea water intrusion as sea level is likely to rise

Rise in evaporation and evapo-transpiration

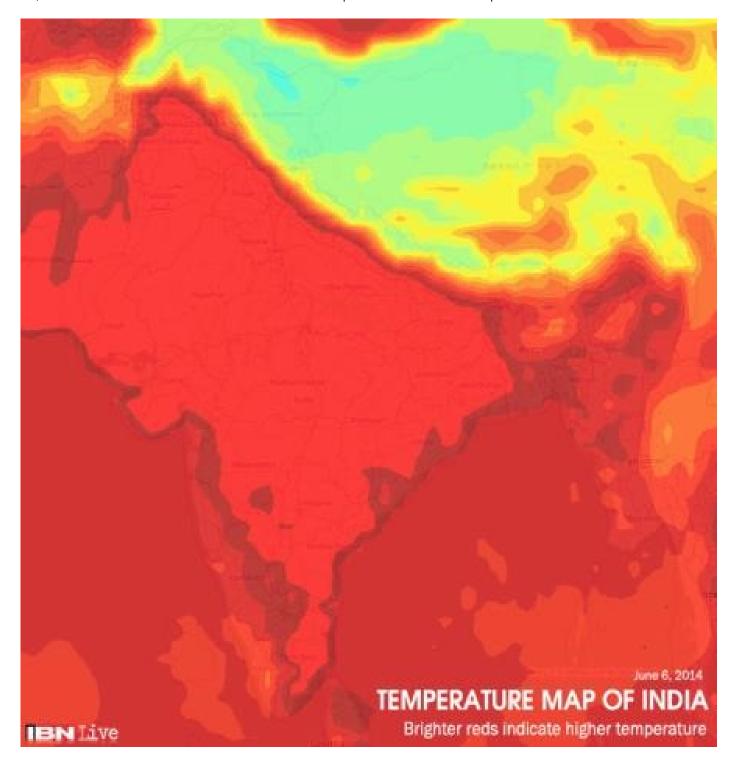


Impact of Climate Change on Indian Sub-Continent





Impact of Extreme Heat





What Can Be Done unprecedented spells
of hot weather are
expected to occur far
more frequently and
cover much larger
areas

The west coast and southern India are projected to shift to new, high-temperature climatic regimes with significant impacts on agriculture

Better planning to reduce "heat-island" effect in built-up urban areas

Impact of Rainfall

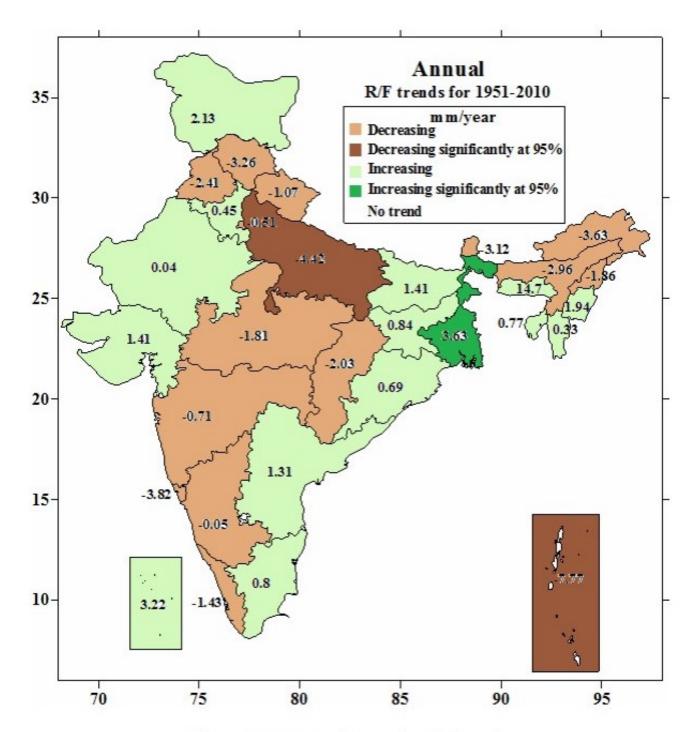
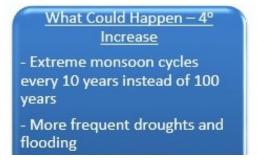
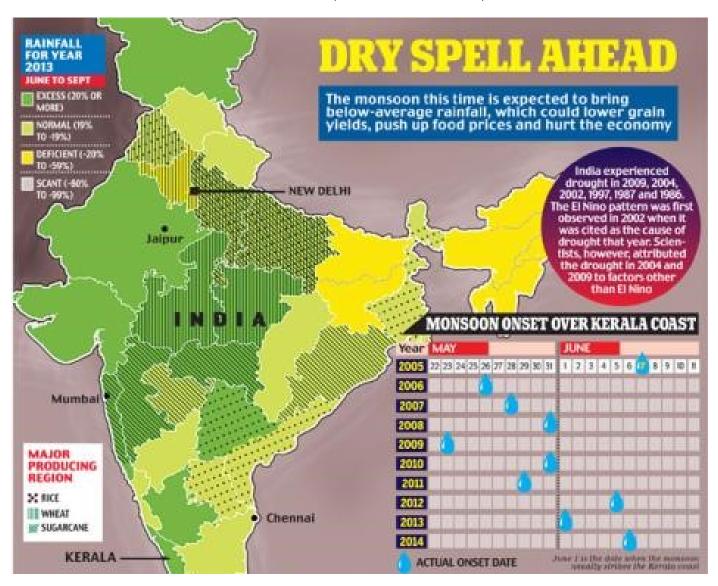


Figure 7: State level annual rainfall trends.



- Dry years drier and wet years wetter What Can Be Done - Better weather forecasting What Could Happen - 2° - Installation of flood warning Increase systems - Unpredictable summer - Improved evacuation procedures Indian Monsoon - Improved building codes to withstand severe flooding /rainfall **Current Status** A decline in monsoon rainfall since the 1950s has already been observed. The frequency of heavy rainfall events has also increased

Impact of Drought



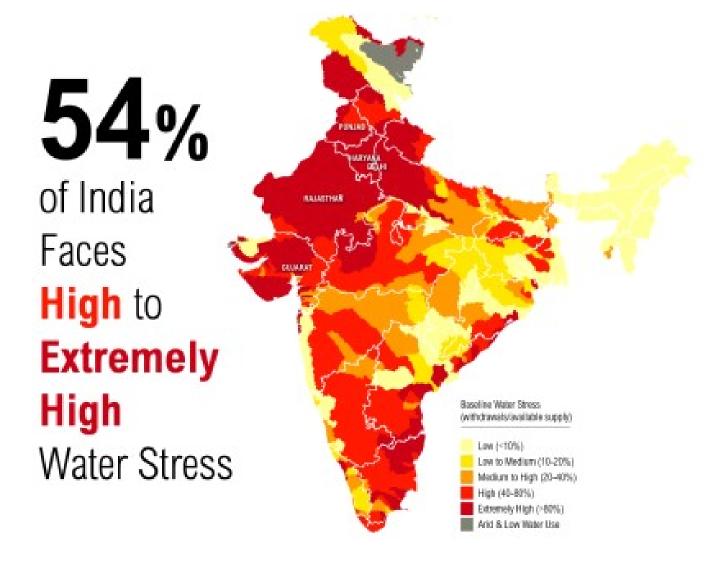
What Could Happen



Increase in frequency of droughts in NW India (Chathisgarh, Orissa, Jharkhand)



Impact of Lowering Ground Water



www.indiawatertool.in

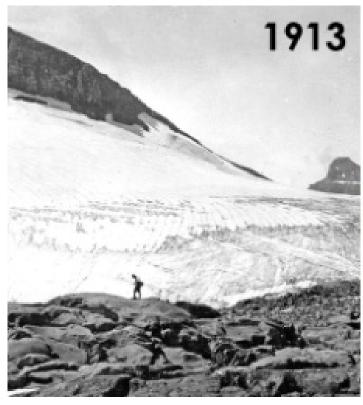


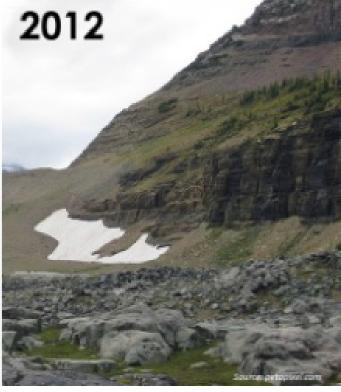
What Could Happen What Can Be Done

More demand on falling water

tables can be expected on account of increasing demand for water from Incentivize efficient a growing population, more affluent use of groundwater life styles, as well as from the (Rain water services sector and industry harvesting/judiciou s use/drip irrigation) This will further decrease the groundwater levels

Impact of Melting Glaciers





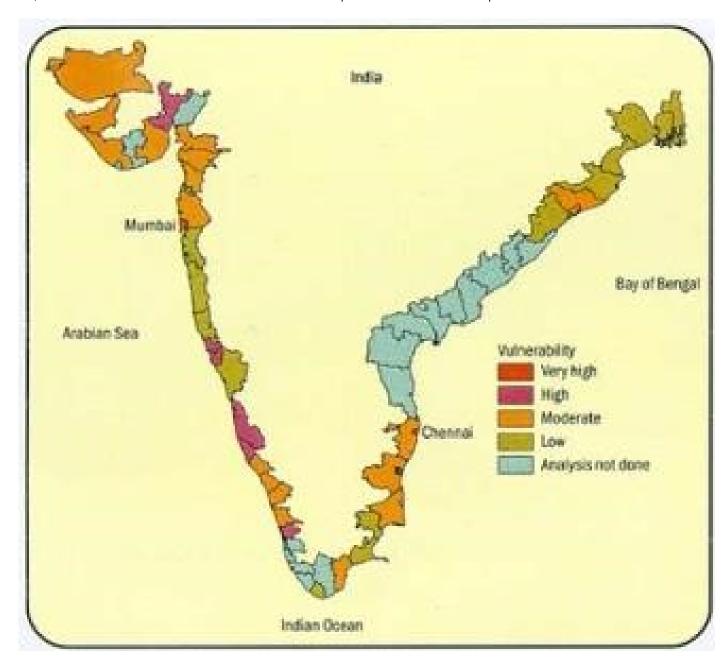
What Could Happen What Can Be Done

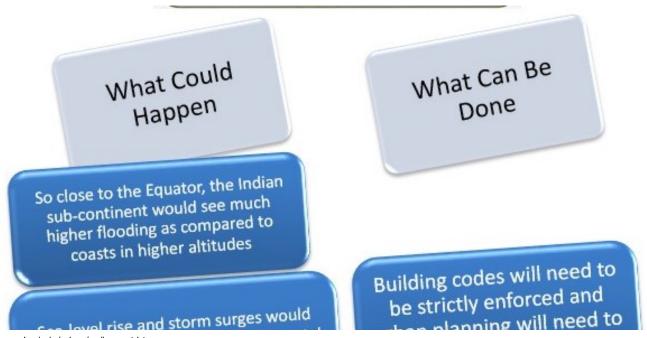
At 2.5°C warming, melting glaciers and the loss of snow cover over the Himalayas are expected to threaten the stability and reliability of northern India's primarily glacier-fed rivers, particularly the Indus and the Brahmaputra

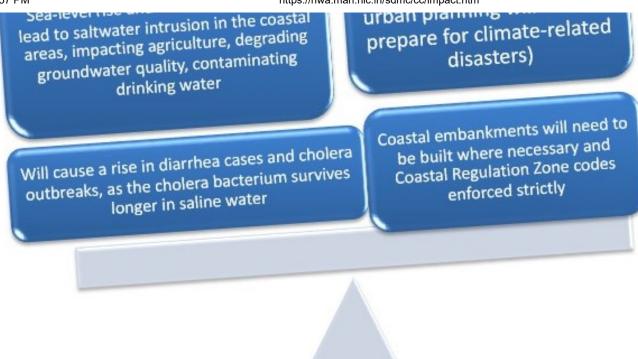
Alterations in the flows of the Indus, Ganges, and Brahmaputra rivers could significantly impact irrigation, affecting the amount of food that can be produced in their basins as well as the livelihoods of millions of people (209 million in the Indus basin, 478 million in the Ganges basin, and 62 million in the Brahmaputra basin in the year 2005).

Major investments in water storage capacity would be needed to benefit from increased river flows in spring and compensate for lower flows later on.

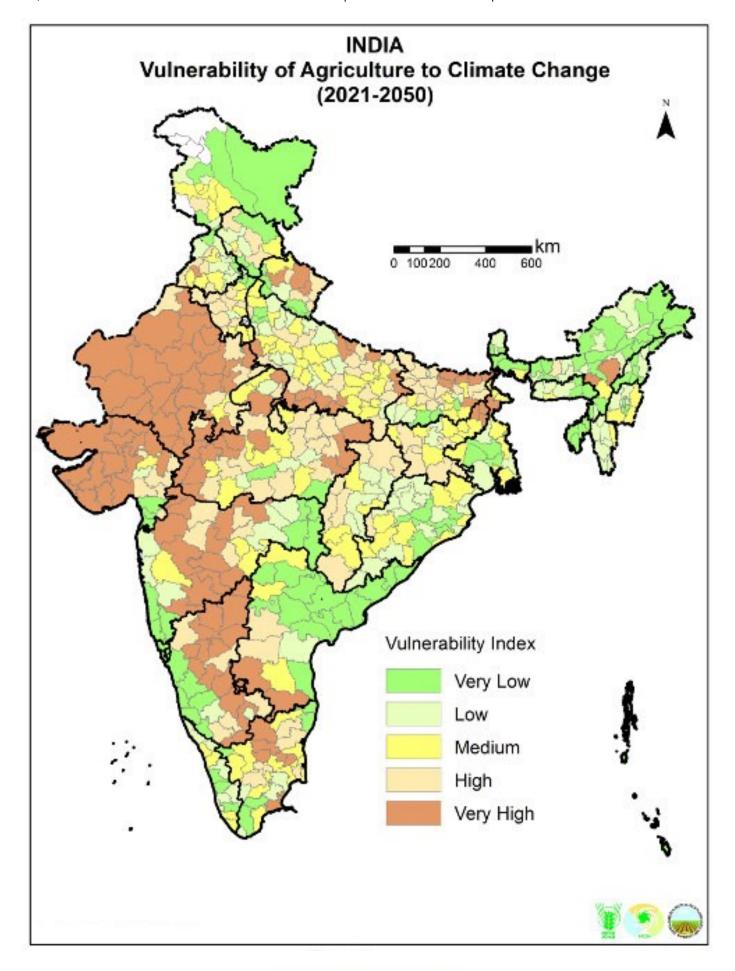
Impact of Rising Sea Level







Impact on Agriculture and Food Security



What Could Happen

- Seasonal water scarcity, rising temperatures, and intrusion of seawater would threaten crop yields, jeopardizing the country's food security
- substantial yield reductions in both rice and wheat can be expected in the near and medium term

What Could Happen

 - Under 2°C warming by the 2050s, the country may need to import more than twice the amount of food-grain than would be required without climate change

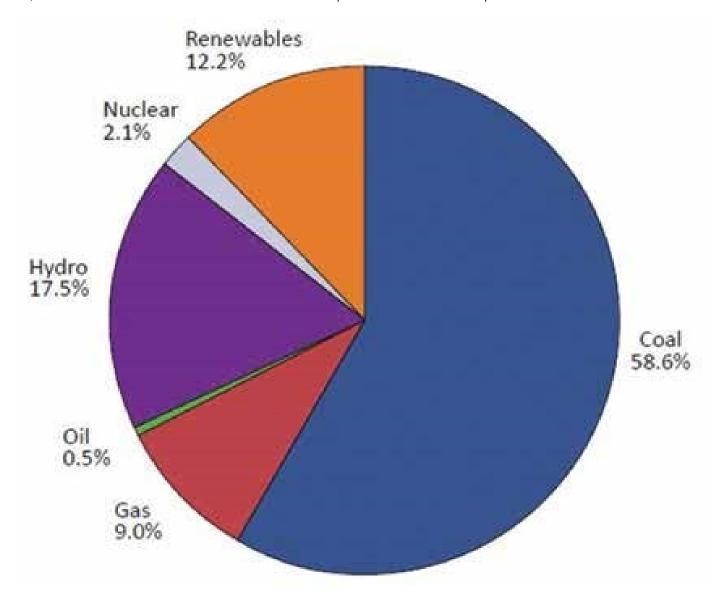
What Can Be Done To Reduce Negative Impact

- Crop diversification
- More efficient water use
- Improved soil management practices
- Development of drought-resistant crops

Current Status

Even without climate change, world food prices are expected to increase due to growing populations and rising incomes, as well as a greater demand for biofuels

Impact on Energy Security



What Could Happen

- The increasing variability and long-term decreases in river flows can pose a major challenge to hydropower plants and increase the risk of physical damage from landslides, flash floods, glacial lake outbursts, and other climate-related natural disasters

Current Status

Climate-related impacts on water resources can undermine the two dominant forms of power generation in India - hydropower and thermal power generation - both of which depend on adequate water supplies to function effectively

What Can Be Done To Reduce Negative Impact

 Projects will need to be planned taking into account climatic risks To function at full
efficiency, thermal
power plants need a
constant supply of
fresh cool water to
maintain their cooling
systems

Next Chapter >> Climate Change Challenges