

## **Climate change impacts and mitigation processes**

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Climate change is considered to be one of the most serious threats to sustainable development, with adverse impacts on rising sea levels, desertification, extreme storms, loss of farmland and food sources, salinization of fresh water, and other physical and health-related effects can lead to increases in civil strife, the number of environmental refugees, and conflicts among nations. Scientists agree that rising concentrations of anthropogenically produced greenhouse gases in the Earth's atmosphere are leading to changes in the climate. The local observations of climate change in India are witnessed by fact that the frequency of hot days and multiple-day heat waves have increased in past century followed by the increase in deaths due to heat stress in recent years ; the entire Himalayan Hindu Kush ice mass has decreased in the last two decades. Hence, water supply in areas fed by Himalayan glacier melt, on which hundreds of millions of people in India depend, are negatively affected ; precipitation decline and droughts in most delta regions of India due to warmer climate have resulted in drying up of wetlands and severe degradation of ecosystems ; the gross per capita water availability in India will decline from ~1820 m<sup>3</sup>/yr in 2001 to as low as ~1140m<sup>3</sup>/yr in 2050. Serious and recurrent floods and droughts ; sea-level rise leads to intrusion of saline water into the fresh groundwater in coastal aquifers and thus adversely affects groundwater resources ; for two small and flat coral islands at the coast of India, the thickness of freshwater lens was computed to decrease from 25m to 10m and from 36m to 28m, respectively, for a sea level rise of only 0.1m ; more than 1million people in the Ganges-Brahmaputra delta will be directly affected by 2050 from risk through coastal erosion and land loss, primarily as a result of the decreased sediment delivery by the rivers, but also through the accentuated rates of sea-level rise. The world is already 0.3°C warmer than the recommended maximum temperature cap and we are 50ppm CO<sub>2</sub>e above the maximum greenhouse gas cap. It is clear that we have already commenced the process of causing dangerous climate change now. Raising public awareness of climate change through mass media is crucial for transforming individual behaviour and amassing support to policy measures. Adaptation and mitigation to the adverse impacts of climate change increasingly becomes a necessity across the globe. This is not for its own sake, but to ensure that sustainable development will be possible, that investments into poverty reduction, food and water security and health will not be undone and that progress achieved towards the Millennium Development Goals will not be reversed. The key strategies for cutting greenhouse gas emissions to zero are resource efficiency backed up by the substitution of renewable energy for fossil fuel sources. The major drawing down of CO<sub>2</sub> can be achieved by using natural carbon sinks and deliberate human capture and sequestration of this gas such as growing biomass for use as biofuel and capture the CO<sub>2</sub> when the fuel is combusted and then geosequester it or by growing forests that create water dynamics that efficiently capture heat from the land surface and redistribute it to the upper boundary of the troposphere where it can more easily radiate into space.

