

Climate Change Impacts - South Asia -

The IPCC 4th Assessment Report states that climate change, in particular increased risk of floods and droughts, is expected to have severe impact on South Asian countries, which economies rely mainly on agriculture, natural resources, forestry and fisheries sectors. In fact, although South Asia has low GHG emissions, climate change has already deeply affected the economic growth and development of the region.

About 70% of South Asians live in rural area and account for about 75% of the poor, who are the most impacted by climate change.

Some of the projected impacts of climate change on main sectors that specifically apply to the South Asia are listed below.

Agriculture

Food security is the primary concern in the region since most of the rural poor depend on agriculture for their livelihood.

Changes in the intensity of rainfall events, and the break cycles of the moonson, combined with an increased risk of critical temperatures being exceeded more frequently, could significantly change crop yields. In fact, temporal and special changes in temperature coupled to water stress will have key implications for agriculture, in particular for falling crop yields. Effect on agriculture will vary according to locality, but models project a 15-30 % decline in the productivity of most cereals and rice across the region. For example, facing with 2-4 C° temperature increase rice yields are expected to decline by 0,75 tons/ha.

The overall crop yields are expected to decrease up to 30% in the region by mid-21 century. The most dramatic negative impacts are expected in the arid zones and flood-affected areas, where agriculture is already at the edge of climate tolerance limits. Furthermore, irrigation demand for agriculture in arid and semi-arid regions is likely to increase by 10% for temperature increase by 1%.

Even though climate change impacts could imply significant changes in crop yields, production, storage, and distribution, the net effect of the changes in the region is not certain mainly because of local differences in growing season, crop management, etc.; non-inclusion of possible diseases, pests, and microorganisms in crop model simulations; and the vulnerability of agricultural areas to episodic environmental hazards, including floods, droughts, and cyclones. Low-income rural populations that rely on traditional agricultural systems or on marginal lands are particularly vulnerable.

Coastal Systems

Densely populated low-lying areas of mega deltas are at risk. Sea-level rise is the most obvious climate-related impact in coastal areas. The impacts of sea level rise will be

mostly felt in Bangladesh, Maldives, and east India by poor rural people, where significant economic and social disruption will occur, with environmental refugees further pressing already stressed cities. Densely settled and intensively used low-lying coastal plains, islands, and deltas are especially vulnerable to coastal erosion and land loss, inundation and sea flooding, upstream movement of the saline/freshwater front, and seawater intrusion into freshwater lenses.

Especially at risk is the large deltaic region of Bangladesh. Other consequences will include increased salinization of surface water and groundwater, loss of wetlands such as the Sundarbans, and public health risks. Socioeconomic impacts could be felt in major cities, ports, and tourist resorts; commercial and small scale fisheries; coastal agriculture; and infrastructure development. The displacement of several million of poor people is expected from the region's coastal zone in the event of a 1m rise in sea level. The costs of response measures to reduce the impact of sea-level rise in the region could be immense.

Ecosystems

Human pressures together with changing hydrology are having a discernible impact on the productivity and resilience of South Asia's ecosystems. Some of the most significant sites threatened are the Terai grasslands and forests of the southern Himalayas, the Western Ghats biosphere of western India; and the Sundarbans wetlands of West Bengal and Bangladesh. The mountain ecosystems are the one affected most. In particular, Himalayan ecosystems are vulnerable to Glacial Lake Outburst Floods and flash floods.

Changes in the distribution and health of rainforest and drier monsoon forest are foreseen. In Sri Lanka, for example, a significant increase in dry forest and a decrease in wet forest could occur. Moreover, increased dryness during pre-summer season may speed up the forest fire incidences. Potential increases in evapotranspiration and rainfall variability are expected to have a negative impact on the viability of freshwater wetlands, resulting in shrinkage and desiccation. In particular, regional studies project a 54,900km² of wetland lost in the region. Sea-level rise and increases in sea-surface temperature are the most probable major climate change-related stresses on coastal ecosystems. Coral reefs may be able to keep up with the rate of sea-level rise but may suffer bleaching from higher temperatures. Landward migration of mangroves and tidal wetlands is expected to be constrained by human infrastructure and human activities.

Water

Availability of fresh water is highly seasonal, with about 75% of the annual rainfall occurring during the monsoon months. Water supplies will be threatened by higher temperatures, changes in river regimes, and greater incidence of coastal flooding. In particular, water availability is expected to decrease dramatically especially in dry season.

The main expected climate change impact is glacier melt in Himalayas, which is projected to increase flooding and affect water resources aggravating seriously the conditions of poor rural people reliant on them. Meltwater from Himalayan glaciers - which plays a key role in the provision of water to the region -and snowfields currently supplies up to 85% of the dry season flow of the great rivers of the Northern Indian Plain. This could be reduced to about 30% of its current contribution over the next 50 years, if forecast of

climate change and glacial retreat are realised. This will have major implications for water management and irrigated crop production.

Furthermore, temperature and increased seasonal variability in precipitation are projected to result in accelerated recession of glaciers and increasing risk from glacial lake outburst floods. A reduction in flow of snow-fed rivers, accompanied by increases in peak flows and sediment yields, would have major impacts on hydropower generation, urban water supply, and agriculture. Availability of water from snow-fed rivers may increase in the short term but decrease in the long term. Runoff from rain-fed rivers may change in the future, although a reduction in snowmelt water would result in a decrease in dry-season flow of these rivers.

Larger populations and increasing demands in the agricultural, industrial, and hydropower sectors will put additional stress on water resources. Pressure will be most perceived on drier river basins and those subject to low seasonal flows. Hydrological changes in island and coastal drainage basins are expected to be small, apart from those associated with sea-level rise. Regional studies state that a loss of 1.7 billion USD in total costs in the water resources sector is associated to projected 2% temperature increase, and an increase by 7-924 million of the number of poor rural people experiencing water stress associated to 2-4% of temperature increase.