

Climate Change Impacts - South East Asia -

The IPCC 4th Assessment Report states that South East Asia is expected to be seriously affected by the adverse impacts of climate change since most economies are relying on agriculture and natural resources.

South East Asia is annually affected by climate extremes, particularly floods, droughts and tropical cyclones, while large areas of the region are highly prone to flooding and influenced by moonsons. Such climatic impacts will severely threaten the livelihood of poor people living in rural areas with limited adaptive capacity.

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

Agriculture

Climate change is expected to affect the agriculture in South East Asia in several ways. For example, irrigation systems will be affected by changes in rainfall and runoff, and subsequently, water quality and supply. Yet the region already faces water stresses, and future climate change effects on regional rainfall will therefore have both direct and indirect effects on agriculture.

Facing with 2-4 °C, studies suggest the potential for both gains and losses. For example, for less than 2 °C, agricultural losses are experienced in the Philippines, while rice yields in Indonesia and Malaysia are projected to increase. In fact, although climate change impacts could result in significant changes in crop yields, production, storage, and distribution, the net effect of the changes around the region is uncertain because of local differences in growing season, crop management, etc.

However, climate studies generally indicate increasing rainfall throughout much of the region. But even with rainfall increases, temperature increase may threaten agricultural productivity, stressing crops and reducing yields.

In particular, scientific studies document a high sensitivity of major cereal and tree crops to changes in temperature, moisture, and carbon dioxide concentration of the magnitudes projected for the region. For example, projected impacts on rice and wheat yields suggest that any increases in production associated with CO₂ fertilization will be more than offset by reductions in yield resulting from temperature and/or moisture changes.

Such agricultural impacts particularly affect low-income rural populations that depend on traditional agricultural systems or on marginal lands.

Coastal Systems

The coastlines of South East Asia are highly vulnerable to the effects of climate change due to the geology and geography of some of the region's coastal areas, the growing density population and infrastructure in the coastal zone. Moreover, large tidal variations, tropical cyclones, coupled with the potential increase in regional rainfall, suggest the potential for increased coastal hazard.

Sea-level rise and increases in sea-surface temperature are the most probable major climate change-related stresses on coastal ecosystems. In particular, sea-level rise is the most obvious climate-related impact in coastal areas. 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 are the large deltaic regions of Bangladesh, Myanmar, Viet Nam, and Thailand, and the low-lying areas of Indonesia, the Philippines, and Malaysia.

International studies have projected the displacement of several million people from the region's coastal zone in the event of a 1-m rise in sea level. The costs of response measures to reduce the impact of sea-level rise (30-50 cm) in the region could amount to millions of dollars per year.

Ecosystems

Ecosystems in the South East Asia region represent a key asset contributing to the regional economy by providing food and water that sustain human life as well as natural resources such as timber and fisheries that support commercial enterprises. Degradation and loss of ecosystems pose a serious threat to the economic, social and cultural stability of the region since poor community are dependent upon such ecosystems.

Land-use change and degradation, overexploitation of water resources and biodiversity, and contamination of inland and coastal water already threaten many species.

Scientific assessment document that coral reef communities, mangrove wetlands, tropical and temperate forest are particularly affected. Coral reefs may be able to keep up with the rate of sea-level rise but may suffer bleaching from higher temperatures. For example, the 1997/1998 El Nino event caused widespread bleaching of coral reefs in the region including Indonesia, Thailand, Cambodia and Malaysia.

Landward migration of mangroves and tidal wetlands is expected to be constrained by human infrastructure and human activities. In particular, mangrove communities are affected by sea-level rise, by rainfall patterns and runoff that change the flow of freshwater to the coastal zone and, consequently, the distribution of proper saline habitat for mangroves. In particular, projected increases in evapotranspiration and rainfall variability are likely to have a negative impact on the viability of freshwater wetlands, resulting in shrinkage and dessication.

Climate studies also suggest that some South East Asia forests and vegetation may experience some positive effects from climate change. They also indicate significant dieback of tropical in some areas of the region. In addition, climate change is expected to

change disturbance regimes within forest communities, affecting the frequency and intensity of pest outbreaks and wildfire. While changes in the distribution and health of rainforest and drier monsoon forest will be complex. For example, in Thailand the area of tropical forest could increase from 45% to 80% of total forest cover.

Water

Maintaining the security of water resources is a key priority for the South East Asian poor rural population. The region already faces water stresses, and many areas are often dependent upon limited groundwater and rainfall collection. Climate change will further aggravate water shortage by extreme events such as droughts which undermine food security, or extreme rainfall events which increase the risk of flooding. Challenges to water resources management will therefore be exacerbated by sea-level rise which contribute to salt-water intrusion into available freshwater resources.

Scientific assessments project changing patterns of runoff and river flows in the region in the next decades, as well as increase in water management costs and increases of poor rural people affected by water stress.

In particular, a reduction in flow of snow-fed rivers, coupled with increases in peak flows and sediment yields, may have serious impacts on hydropower generation, urban water supply, and agriculture. Availability of water from snow-fed rivers could 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 evident 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.

However, national studies suggest for both gains and losses due to projections of increased runoff in some river basins in response to increasing rainfall. For example, water stress in the Mekong Delta rises, and water shortages in the Philippines may rise of fall.