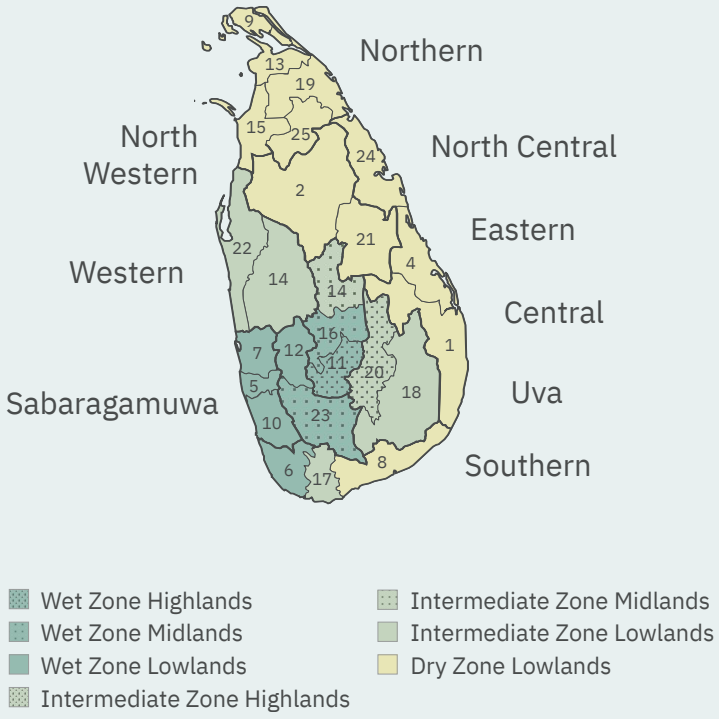
WEATHERING RISK

Sri Lanka Climate Impact Profile

Summary for policymakers

Sri Lanka is particularly vulnerable to the impacts of climate change. This profile provides an overview of climate trends for short-term (2020–39) and medium-term (2040–59) time periods in Sri Lanka under both the higher-emission SSP3-7.0 and lower-emission SSP1-2.6 scenarios, and their impacts across different sectors. Sri Lanka has a hot tropical climate with little annual variation in temperature, except further inland and at higher altitudes. The country experiences two wind-driven seasonal changes (monsoons) and two transitional periods (intermonsoons) each year, which result in high regional and temporal variability in precipitation. Over the last 50 years, mean temperature and annual average precipitation nationwide have been increasing.



Climate Trends

Temperature

Under the SSP3-7.0 scenario, mean temperature rises nationwide by a best estimate of 0.55°C (0.31°C to 0.84°C possible) in the short term and 1.07°C (0.76°C to 1.64°C possible) in the medium term. Under the SSP3-7.0 scenario, Heat Index days above 35°C in the representative province of North Central (Dry Zone) increase by roughly 1.5 months per year (0.5 to 2.5 months possible) in the short term and four months per year (2.5 to six months possible) in the medium term. Tropical nights – with minimum temperatures above 26°C, which can prolong daytime heat stress – are expected to increase nationwide by roughly 1.5 months per year (one to three months possible) in the short term and three months per year (two to 4.5 months possible) by mid-century under SSP3-7.0.

Precipitation

Under the SSP1-2.6 scenario, average annual precipitation increases nationally by a best estimate of +80.88 mm (-53.50 mm to +257.64 mm possible) over the medium term and, under SSP3-7.0, increases by a best estimate of +31.02 mm (-104.32 mm to +190.62 mm possible). In Wet and Intermediate Zone provinces, precipitation deficits over the course of the Yala agricultural season (March to September) occur with higher model agreement under the SSP3-7.0 scenario. Net precipitation amounts over the Yala season on average indicate that existing water scarcity risks may continue in Dry Zone lowlands under the SSP3-7.0 scenario. On the other hand, the October to February agricultural season faces increasing precipitation across all three climate zones by mid-century. The best-estimate frequency of the average largest five-day precipitation events at 25-year, 50-year and 100-year intervals is projected to more than double in Wet Zone provinces by mid-century.

Projected Sectoral Impacts

Human Health

Many climate-related health risks, including heat stress and vector-borne diseases, are projected to worsen over the short to medium term. Extreme conditions will raise mortality and morbidity risks in the short term for particular demographic groups, especially outdoor labourers, older people, pregnant women, children and people with pre-existing health conditions across northern and eastern areas. Increased temperatures, monsoon rainfall and relative humidity correspond with more favourable conditions for disease vectors such as mosquitoes. In the medium term, the Wet Zone faces increased risks related to dengue and leptospirosis, while the Dry Zone experiences increased risks related to leishmaniasis.

Floods and Droughts

Sri Lanka faces both high flood risks and severe water scarcity due to uneven regional and seasonal precipitation, which are expected to intensify under both the SSP3-7.0 and SSP1-2.6 scenarios. High flood risks threaten settlements, critical infrastructure and agriculture. Sri Lanka will maintain medium to high levels of water stress through mid-century (SSP3-7.0). Water shortages disproportionately impact women, reduce income generation, and affect household health and sanitation. Droughts during the March to September agricultural season will continue to occur in the Dry Zone and lowland Intermediate Zone, while droughts during the October to February agricultural season will continue to occur in the northwestern and southeastern Dry Zone.

Food and Agriculture

Changing temperature and precipitation patterns pose high risks to food security, especially for rural and low-income agricultural labourers in the Dry Zone. Expected temperature increases will affect liveable conditions for cattle, dairy animals, poultry, swine and agriculture. Under the Middle-of-the-Road scenario with rising population and rapid GDP growth by mid-century, net food demand is projected to increase along with overall crop yields, and imports of wheat and other cereal grains. Meanwhile, under the SSP3-7.0 scenario, slower projected economic growth, greater population increase and lower annual precipitation nationally will increase the need for key food imports. Higher temperatures will also lead to changes in the sea surface temperature, ocean acidification and sea level rise, threatening habitats and breeding grounds for fish.

Human Displacement

Worsening climate-related impacts can threaten households previously uprooted by generalised violence and conflict (including during the civil war), which often possess weakened social networks and livelihood opportunities. This can increase demand and overwhelm basic health services and specialised care, including psychological support. Sri Lanka continues to experience internal displacement due to frequent flood events (including significant lasting impacts from the 2004 Indian Ocean tsunami. Increasing precipitation intensity poses nationwide risks across seasons.

Critical Infrastructure and Economy

Economic activity and infrastructure networks face significant risks from flooding and sea level rise, and from the effects of water stress and extreme heat on energy costs. Sri Lanka is highly vulnerable to GDP loss from precipitation-driven flooding and extreme heat (both 100% likelihood), as well as severe storms (87%) and water stress (79%) (SSP3-7.0). Inundation from sea level rise poses a high risk to the Colombo-Galle transit corridor, which is important for trade, tourism and service sector activities, with economic activity in coastal areas contributing 45% of GDP. Flooding, water stress, landslide exposure and extreme heat pose particular risks to the forestry and agricultural sectors (15.6% of GDP), and hydropower-generated electricity (c. 40% of GDP nationally).

Ecosystems

Sri Lanka is a biodiversity hotspot, with forests covering approximately 30% of the country's land area across diverse temperature, precipitation and soil regimes. These forests provide critical ecosystem services, helping to manage runoff and erosion, thus reducing flood and landslide risks. Species limited to higher elevations face a greater risk of extinction due to changing climate conditions, especially under the SSP3-7.0 scenario. Meanwhile, monsoon rainforest in the Dry Zone may expand under SSP3-7.0's expected climate conditions. Major risks to biodiversity and ecosystems vary by region, and include the potential for lowland forest and scrubland to expand throughout the Dry Zone, as well as the increasing vulnerability of already threatened species, wetlands and inland fisheries.

Coastal Zone

Sri Lanka's roughly 1,700 km-long coastline, home to 40% of the country's population and a large proportion of economic activity, faces multifold climate impacts. By mid-century, most of the country's major coastal cities face moderately high exposure risks as a result of 23 cm best-estimate sea level rise for Colombo (Western Province). While seemingly small, sea level rise amplifies coastal flooding and storm surge from extreme storm events, worsened by non-climate drivers such as poor drainage and coastal development pressures. Major impacts include high exposure to coastal settlement, transportation infrastructure and paddy agriculture. Increasing sea surface temperatures alter the locations suitable for fish stock breeding and habitation, threatening livelihoods reliant on deep sea fishing. Degradation and destruction of naturally protective reef, mangrove and wetland habitats ultimately raise coastal exposure to storm surge, sea level rise, and associated risks of erosion and saltwater intrusion.