

Climate Change Technical Note

Sikkim Integrated Service Provision and Innovation for Reviving Economies Program (P180634)

Climate and disaster vulnerability context: Sikkim is a northeastern state in India. Its landscape is characterized by high altitude variation, which limits the habitable area to ~20% and plays a key role in controlling the climate and weather conditions. Sikkim records one of the highest rainfalls in the country and lies in Seismic Zone IV/V – due to this, every year, a sizeable proportion of the local population is adversely impacted by calamities such as landslides, floods, and riverbank erosion.

Further, 75% of the Sikkimese population resides in rural areas and a large proportion relies on climatically sensitive sectors, such as agriculture (>60%) and tourism (>75%). Combined with the topography, these factors make Sikkim susceptible to climate risks and it is, thus, classified as the ninth most climate vulnerable state in India. This exposure to climate risks is expected to exacerbate over the next few decades, with the temperature in the state increasing at an accelerated pace.

- **Climate trends:** While there is paucity of comprehensive reliable data across the state, the analysis of annual average temperature and rainfall across the Gangtok and Tadong stations indicate no change in maximum temperature and a 2.5°C increase in minimum temperature (between 1957 and 2009). The overall precipitation level, on the other hand, after rising to a peak of 3700mm post the 2001 drought, has been declining. However, significant regional variations exist – data from the Gangtok station shows that the annual rainfall has been increasing at the rate of ~50 mm per decade. A village-by-village analysis reveals that most of the vulnerable villages in terms of their exposure to climate lie in the drought prone subtropical zone of South and West districts.
- **Climate change projections:** By 2050s, the average maximum temperature in Sikkim is expected to increase by 1.8-2.6°C, with temperature change gradually increasing from lower to the higher latitudes. Similarly, the minimum temperature is likely to change and vary across altitudes. Precipitation is also projected to alter with respect to the baseline, with the southern part of Sikkim likely to experience a negative change of about 25%.
- **Disaster risks:** Sikkim has one of the steepest landscapes in the country, with slopes, on an average, having an incline of 45°. This makes it vulnerable to various hazards such as earthquakes and landslides. The changes in climate and weather patterns, as previously noted, add to these risks. Firstly, the rising temperature poses a threat to the 100+ glaciers that are currently the state's lifeline. Secondly, owing to the recent erratic rainfall patterns, monsoons have become delayed and torrential rainfalls frequent. This has led to a rise in surface runoff and resulted in drier winters, with higher incidence of forest fires and 'drying up of springs i.e., discharge of springs has reduced and many of them have started becoming seasonal'.

Livelihoods and climate change: Sikkim's current demographic and economic distribution make its population highly vulnerable to climate change and associated risks. Its current adaptive and mitigation capacities are subpar.

- **More than 60% of the local population is directly dependent on agriculture.** However, the sector is at high risk since recent climatic changes, such as increased temperature and variations in rainfall, have depleted the water available for irrigation and reduced the soil fertility. This has resulted in loss of production and quality, which is likely to exacerbate given the climate change projections outlined previously.
- **Close to 75% of the workforce is engaged, either directly or indirectly, in tourism related activities.** Further, the industry is currently dominated by high volume, low value tourists and is concentrated in specific areas within the state. While the high tourism density stands to worsen the state's climate

vulnerability index, increase in climate change (for e.g., increased frequency of natural calamities, risks to the survival of high-altitude wetlands, etc.) is also likely to jeopardize the industry's resilience capacity.

Sikkim's overall climate change resilience capabilities, therefore, by way of the economy's skewed reliance on climate sensitive industries, is at risk. The 'Sikkim State Action Plan on Climate Change' has recognized climate proofing livelihoods as one of the most significant measures to manage climate change risks. It has recommended expanding Sikkim's non-farm economy and identified MGNREGA, trade, non-farm labor, and migration as some measures already being taken to this effect.

Resilience among vulnerable groups: Sikkim's women are disproportionately dependent on climate sensitive sectors such as agriculture. In 2022, almost half of the female population, aged 15-59 years, was employed in agriculture and related occupations, compared to 20 percent of men. By virtue of this lopsided dependence on agriculture, limited access to economic resources, and social barriers in decision-making, Sikkimese women have significantly lower future resilience to climate risks compared to their male counterparts. Similarly, 41 percent of the youth is employed in agriculture, even though the Baseline Survey¹ indicated a clear preference among youth to work in non-farm and emerging sectors.

Alignment of INSPIRES with climate change priorities: In this context, INSPIRES will support positive climate action on three broad fronts:

- INSPIRES will enable the economy to transition from farm to non-farm and emerging sectors such as IT/ITeS, tourism including homestays and farm stays, creative design, environment conservation sector, care economy, etc. This shift away from climate sensitive sectors will ensure that the economy is resilient in the event of a natural calamity.
- By targeting economic upliftment of women and youth in non-farm emerging sectors, INSPIRES will improve the resilience of vulnerable groups. Additionally, in the event of a calamity, it will also allow for enhanced inclusion of women in community planning and disaster response efforts, known to be more effective.
- INSPIRES has identified the "green sector" (jobs, innovation, and entrepreneurship) as a priority. Therefore, all interventions – from entrepreneurship support to skilling – will contribute towards climate change mitigation and the state's transition to net zero.

¹ Conducted for INSPIRES during the preparation stage

Component	Adaptation Measures	Mitigation Measures
Result Area 1: Strengthened institutional systems for planning for economic inclusion		
<p>DLI 1: US\$ 15 million</p> <p>Strengthened state systems to support employment outcomes for women and youth</p>	<ul style="list-style-type: none"> The lack of medium- to long-term economic planning in the state has led to a skewed dependence on climate sensitive sectors such as agriculture and tourism. To overcome this and improve the overall climate resilience, DLI 1 will enable the Sikkim government to efficiently plan for the medium-term, with a focus on expanding non-farm, emerging sectors. DLI 1 will integrate climate related considerations in economic planning and account for opportunities in the green sector. It will be ensured that the policy framework so formulated is aligned with the objectives of the Sikkim State Action Plan on Climate Change. Further, building economic plans that prioritize climate vulnerable population, i.e., women and youth, will incrementally enhance the state’s overall resilience capacity. 	
Result Area 2: Improved labor market inclusion for women and youth in emerging sectors		
<p>DLI 2: US\$ 12 million</p> <p>Enhanced entrepreneurship in priority sectors for women and youth</p>	<ul style="list-style-type: none"> DLI 2 will support the growth of the nascent entrepreneurship ecosystem. This will improve the state’s overall economic outcomes and, therefore, its adaptive capacity in the event of a natural calamity. Fostering entrepreneurship among women and youth will specifically increase the adaptive capacity of climate vulnerable population. Additionally, the DLI will support the growth of the self-help group (SHG) network in Sikkim. In the event of a natural calamity, this network can be leveraged to deliver last-mile support. 	<p>The special emphasis on the following priority sectors will enable innovation of solutions to mitigate climate risks:</p> <ul style="list-style-type: none"> Encouraging green entrepreneurship will boost the development of sustainable products and industries, which will help expedite transition to net zero. This will include, among other things, fostering innovation and interventions in the renewable energy sector. Promoting entrepreneurs in the eco-tourism sector, who create experiences aimed at attracting low volume high value tourists, will reduce tourism-induced stress on the environment.
<p>DLI 3: US\$ 12 million</p> <p>Improved management and operational capacity in the tourism sector</p>	<ul style="list-style-type: none"> DLI 3 will facilitate capacity enhancement of existing tourism institutions in the state and allow them to train tourism entrepreneurs, with an emphasis on expanding eco-tourism. This will promote tourism establishments to support conservation of natural habitats, use renewable energy and sustainable waste management practices, raise climate awareness through educational experiences, etc. Additionally, the tourism sector in Sikkim is routinely disrupted by climate adversities such as floods and landslides. To overcome this, the Program will aim to diversify tourist destinations. This will encourage tourism establishments to move away from areas known to be more vulnerable to climate change, such as South and West districts, and expand into unexplored destinations, thereby improving the sector’s overall resilience against climate risks. 	
<p>DLI 4: US\$ 12 million</p> <p>Improved training to placement linkages in priority sectors</p>	<p>To address the demand-supply mismatch of skills, DLI 4 will introduce high-quality short-term skilling courses and streamline placement mechanisms in the priority sectors, including green jobs, tourism, IT/ITeS, creative design, child and elderly care, etc.</p>	<p>DLI 4 will enable human capital development and capacity building focused on climate change mitigation – women and youth will be trained in green skills and the growth of green jobs, specifically in the renewables sector, will be supported. This will help the green sector in the</p>

	<ul style="list-style-type: none"> The green skilling courses will include modules on climate science, climate risks, and resilience strategies. Additionally, placement to green jobs will be facilitated. By prioritizing emerging sectors, DLI 4 will support economic and occupational diversity in Sikkim that will reduce the local population's dependence on climate-sensitive sectors and, therefore, their vulnerability to climate-induced economic shocks. 	state to grow and reduce the environmental impact of enterprises.
DLI 5: US\$ 15 million Increased investments at district-level for integrated results on economic inclusion	Given the regional climatic variations in Sikkim, climate action in the state will have to be tailored at the district-level. INSPIRES, through Integrated Economic Inclusion Action Plans (IEIAPs), will facilitate planning at the district-level, which will enable targeted interventions that support the economy to shift away from climate-sensitive sectors such as agriculture. This will increase the economic resilience during climate disasters. Additionally, in the event of a natural disaster, such robust district-level delivery mechanisms will be utilized for climate action.	Through IEIAPs, support will also be provided to Joint Forest Management Committees and Eco-Development Committees – this will support forestry projects that sequester carbon through sustainable forest management, improve forest cover via afforestation, and restore degraded forest land.
Result Area 3: Enhanced delivery of enabling services for economic inclusion of women and youth		
DLI 6: US\$ 12 million Enhanced digital readiness for promoting economic inclusion	NA	
DLI 7: US\$ 5 million Strengthened first respondent capacities on mental health management	DLI 7 aims to create a decentralized mental health ecosystem, which will support an enabling environment for increased workforce participation. IPCC and WHO recognize climate change as posing severe risks to mental health and well-being. In the event of a natural hazard, this ecosystem will be used as a grassroots network dedicated to helping vulnerable groups (women and youth) overcome shock and trauma – it will create awareness about recognizing distress and its effects on individuals and families, and conduct crisis counselling for those in emotional distress related to natural disaster.	
DLI 8: US\$ 9 million Creation of a comprehensive care and workplace safety system		

