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# Climate Risk Assessment of Aquatic Resources at District level, Nagaland - Summary and Recommendations

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**Protection and Sustainable Management of Aquatic Resources in the Northeastern Himalayan Region of India (NERAQ)**

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## Background - Context of NERAQ Project

The north-eastern Himalayan region of India has unique aquatic ecosystems that provide livelihoods to a large number of riparian communities. These ecosystems are highly climate-sensitive and are adversely affected due to a rise in temperatures and changes in rainfall intensity and pattern. These are also impacted by some no climatic factors like pollution, silting, and over exploitation of resources by local population. This situation has been negatively impacting food security, livelihoods and the well-being of the population including indigenous people. With the objective to promote the conservation and sustainable use of aquatic ecosystems in India's north-eastern states, Deutsche Gesellschaft für Internationale Zusammenarbeit GmbH (GIZ) partnered with the Government of India's Ministry of Environment, Forest and Climate Change (MoEF&CC) for implementation of the Project 'Protection and Sustainable Management of Aquatic Resources in the North-Eastern Himalayan Region of India (NERAQ)'[1]. This project is funded by the German Federal Ministry for the Environment, Nature Conservation, Nuclear Safety and Consumer Protection (BMUV) and the International Climate Initiative (IKI).

## Scope of Study

The CRA study of the aquatic resources in Nagaland includes:

- Assessment of the current knowledge about observed impacts of climate change on the aquatic resources sector
- Stakeholder consultation to identify vulnerability and associated risks assessment. The parameters and indicators are identified. Appropriate weights are derived from these parameters considering the state specificities and priorities.
- Assessment of future impact and risks due to climate change on the aquatic resources at the district/block level
- Analysis of future aquatic resources availability and use in the context of risks posed due to climate change
- Recommendations for adaptation measures to be implemented at short-term, medium-term and long-term levels for effective utilization and management of aquatic resources at the district/block level
- Analysis of technology needs for implementing adaptation options for the aquatic sector

[1] https://www.giz.de/en/worldwide/117067.html

# Summary of Findings

## Climate Impact Assessment:

- Climate analysis were performed using CMIP6-GCMs multimodel ensemble of 13 GCMs model's climate data on precipitation, maximum temperature, minimum temperature and 21 climate extremes indices.
- Climate analysis were performed for 4 time slices; for baseline (1995-2014), near-term (2021-2040), mid-term (2041-2060) and long-term (2081-2100) and two climate scenarios, namely SSP2-4.5 and SSP5-8.5.

## Maximum and Minimum Temperature Projections:

- Average annual maximum and minimum temperatures are projected to increase in both IPCC AR6 scenarios compared to the baseline.
- The most significant increase in maximum and minimum temperatures occurs during the winter season (JF) for both IPCC AR6 SSP2-4.5 and SSP5-8.5 scenarios across NT, MT, and LT.
- Both scenarios indicate an increase in annual and seasonal maximum/minimum temperatures for Nagaland in NT, MT, and LT, with SSP8.5 showing a higher increase compared to SSP4.5.
- Minimum temperatures exhibit a more substantial projected change across all-time series compared to maximum temperatures in both climate scenarios.

## Rainfall Projections:

- Average annual rainfall is projected to increase in future time series for both IPCC AR6 scenarios in Nagaland, with a moderate to very high percentage increase relative to the current scenario.
- In the winter season (JF), rainfall decrease is projected in NT and MT for all the districts. However, towards LT, rainfall increase is projected for both climate scenarios.
- Post-monsoon season (OND) shows a decrease in rainfall, while the pre-monsoon season (MAM) exhibits the highest increase in rainfall for NT, MT, and LT in both scenarios.
- The monsoon season (JJAS) reveals negligible changes in projected rainfall for SSP2-4.5 and marginal changes for SSP5-8.5.

## Temperature Extremes Projections:

- Temperature extremes indices indicate a warming trend for Nagaland, with significant positive trends in maximum daytime temperature, maximum night-time temperature, minimum night-time temperature, warm days, and warm spell duration.
- Cool nights and cool days indices show significant negative trends.
- Cold spell duration indicator (CSDI) exhibits a negative trend in the baseline without statistical significance. However, towards NT, MT, and LT for SSP2-4.5 and MT and LT for SSP5-8.5, CSDI phenomena do not occur (value exceeds the threshold) for the entire state.

## Rainfall Extremes Projections:

- Rainfall and rainfall intensity are projected to increase in NT, MT, and LT for Nagaland and its districts.
- Indices such as 1-day maximum precipitation, 5-day maximum precipitation, very wet days precipitation, and extremely wet days precipitation suggest an increase in rainfall intensity.
- Consecutive dry days (CDD) exhibit a mixed trend (positive/negative) in BL, NT, MT, and LT for SSP2-4.5, while for SSP5-8.5, the indices show a negative trend towards NT and MT and a mixed trend towards BL and LT.
- Consecutive wet days (CWD) have a positive trend towards BL and NT, while towards MT and LT, it shows a mixed (positive/negative) trend for SSP2-4.5. For SSP5-8.5, the trend is positive for all time series.
- Annual precipitation and average precipitation on wet days are also projected to increase in NT, MT, and LT compared to BL for the districts in both IPCC AR6 SSP2-4.5 and SSP5-8.5 scenarios.

**In conclusion, the climate projections for Nagaland based on IPCC AR6 scenarios (SSP2-4.5 and SSP5-8.5) reveal significant changes in temperature and rainfall patterns, as well as temperature extremes and rainfall extremes. These findings suggest a warming climate with increased temperature and altered rainfall patterns, potentially impacting various aspects of life and ecosystems in Nagaland. Adaptation and mitigation measures may be necessary to address the changing climate conditions in the region.**

## Composite Vulnerability Index (CVI):

- The CVI was constructed for 12 districts in Nagaland, utilizing 68 indicators spanning socio-economic, water, and climate sectors.
- Vulnerability profiles for Nagaland's districts were projected for near-term (NT), mid-term (MT), and long-term (LT) under two IPCC AR6 climate scenarios: SSP2-4.5 (moderate emissions) and SSP5-8.5 (high emissions).
- The overall Composite Vulnerability (CVI) for Nagaland's districts is expected to increase in NT, MT, and LT compared to the baseline for both climate scenarios.
- The most vulnerable districts under the current climate scenario (BL) are Noklak (rank 12) and Kiphire (rank 11).
- Noklak district exhibits high water and socio-economic vulnerability, while Kiphire district has very high water vulnerability but low socio-economic vulnerability.
- Dimapur, located in the southern part of Nagaland, ranks as the least vulnerable district (rank 1), primarily due to its low socio-economic vulnerability and relatively low exposure to climate and water vulnerability.

## Projected Climate Extreme Vulnerability Index (CEVI):

- Climate Extreme Vulnerability is projected to worsen under the SSP5-8.5 scenario when compared to SSP2-4.5 across all timeframes, with a more pronounced increase in vulnerability in the long term due to higher climate exposure conditions.

- Exposure to extreme climate events, including extremely wet days, consecutive wet days, flood discharge, and sensitivity to high night and day temperatures, is projected to increase in NT, MT, and LT compared to current conditions.
- These factors contribute to the overall increase in the Composite Vulnerability Index (CVI) for Nagaland's districts.

## Water Resources Vulnerability Index (WRVI):

- Water resources vulnerability for districts is projected to increase in NT, MT, and LT under the SSP2-4.5 scenario compared to current conditions.
- In the case of SSP5-8.5, districts are anticipated to experience increased water resources vulnerability across all three timeframes. The projected increase in vulnerability is more significant in the long term, attributed to factors such as increased exposure to drought weeks, flood events, high seasonal crop water stress, and reduced surface and groundwater availability.

**In summary, the study reveals the vulnerability of Nagaland's districts to climate change, with both emission scenarios (SSP2-4.5 and SSP5-8.5) indicating an increase in vulnerability in the near-term, mid-term, and long-term. Water resources vulnerability is expected to worsen, and exposure to extreme climate events is projected to increase, leading to an overall rise in vulnerability in the coming years. This underscores the importance of implementing climate adaptation and mitigation strategies in the region.**

# Plausible Adaptation Strategies

Adaptation strategies also assume a pivotal role in aiding communities and ecosystems in dealing with the shifting patterns of temperature and precipitation. Adaptation presents a significant opportunity to ameliorate the negative consequences and harness the positive effects mentioned earlier. The degree to which adaptation is incorporated into the management and governance of aquatic resources will determine the severity of impacts on associated sectors. By transforming aquatic production systems, it also offers the chance to enhance current conditions and bolster food security, especially among impoverished and marginalized groups. Adaptation strategies for aquatic resources are highly context-specific, influenced by the unique climatic, environmental, and social systems present at the local level.

These measures, when implemented collectively and comprehensively, can contribute to the resilience of aquatic ecosystems and the well-being of communities dependent on them, particularly in the unique context of north-eastern states. Efforts to mitigate climate change's impacts on aquatic ecosystems encompass a range of actions, including:

- **Conservation and Restoration:** Preserving and restoring wetlands and riparian habitats can contribute significantly to ecological preservation.
- **Sustainable Water Management:** Implementing sustainable water management practices ensures responsible and efficient use of water resources.
- **Climate-Resilient Agriculture:** Incorporating climate-resilient agricultural practices helps protect crops and livelihoods from climate-related risks.
- **Awareness and Policy Implementation:** Raising awareness and enforcing policies related to climate change adaptation and mitigation are critical for safeguarding aquatic biodiversity and livelihoods.
- **Infrastructure Development:** Constructing recharge tanks and storage structures can mitigate the risks associated with droughts and floods.
- **Springshed Revival:** Reviving and rejuvenating Springsheds and water bodies contributes to the conservation of freshwater resources.
- **Hydrological Modelling:** Developing detailed hydrological models aids in basin planning and scenario analysis to understand the effects of adaptation measures.
- **Capacity Building:** Strengthening the capacity of state departments through training and knowledge sharing enhances their ability to plan and implement adaptation measures.
- **Data Collection:** Installing rain gauges and gauge networks helps build databases for climate study, trend analysis, and prediction. Data driven decision support system can be provided.
- **Community Engagement:** Empowering local communities through awareness programs and active participation in resource management ensures their active involvement in ecosystem conservation.
- **Gender-Inclusive Approach:** Incorporating a gender perspective in adaptation efforts, with a focus on empowering women, helps address the specific challenges faced by vulnerable groups.
- **Climate Information:** Providing climate information through weather forecasts and early-warning systems enhances the resilience of fisher-folk and aquaculture farmers.

  Early Warning Systems are indispensable for timely responses to emerging climate-related threats like flood, drought etc.
- **Research and Knowledge:** Conducting research on local climate change impacts and adaptation options is essential for informed decision-making.

- **Alternative Livelihoods:** Developing alternative livelihood options diversifies income sources and reduces vulnerability to climate-related risks.
- **Policy Integration:** Integrating climate change considerations into national and regional policies and plans ensures a systematic approach to adaptation.
- **Institutional Capacity Building:** Strengthening the capacity of departments dependent on aquatic resources enables better planning and implementation of adaptation measures.
- **Social Protection:** Implementing social protection strategies, especially for vulnerable groups, enhances resilience to climate change effects.
- **Local Institution Strengthening:** Building the capacity of local institutions to manage climate risks and integrate climate risk management into their strategies is vital for effective adaptation.
- **Urban Water Management:** Addressing water quality and scarcity issues in urban areas through sustainable water management practices is crucial.
- **Forest and Vegetation Restoration:** Restoring natural forests and vegetation with native species can help control erosion, conserve water, and regulate local climates.
- **Mountain Communities:** Leveraging the traditional knowledge and coping mechanisms of mountain communities is essential for climate resilience.
- **Implementing EbA measures:** Employing 'grey-green' EbA measures can enhance water availability during dry periods and improve water quality for both the community and livestock.
- **Utilizing Traditional Knowledge:** Leveraging existing sustainable management practices, institutions, and the traditional knowledge of local communities is paramount. Mountain communities have developed extensive traditional coping mechanisms due to their familiarity with high levels of climate variability. They reside in areas prone to risks and have refined approaches and techniques to contend with various challenges. Additionally, the cultural and spiritual values of indigenous mountain communities can play a pivotal role in EbA by promoting conservation, equity, and social cohesion at the landscape level.

  North-eastern mountainous ecosystems often pose unsuitability for modern intensive agriculture due to their harsh and variable climates, rugged topography, and steep slopes. However, diversified agro-ecological farming practices, aimed at conserving and restoring agro-ecosystems, can boost productivity and reduce risks in these mountainous regions. For instance, organic manure can enhance soil fertility and moisture retention, agroforestry techniques can improve soil fertility while preventing erosion, and natural pest control methods can mitigate water pollution, thereby benefiting public health.

- **Crop diversification:** Crop diversification along with the use of resilient local crop varieties, diminishes the risk of crop failure in light of increasing climatic variability and extreme events such as droughts, frosts, pests, and diseases. Furthermore, this approach can enhance nutrition, diversify income sources, and reduce input costs.

  Further research and knowledge enhancement concerning new crop and livestock varieties, guided by climate data and sustainability principles, are imperative.

- **Strengthening local bodies:** The reinforcement of local non-governmental organizations (NGOs) and community-based organizations (CBOs) is essential to facilitate their involvement with local communities in implementing, safeguarding, and revitalizing the state's aquatic resources.
- **Hazard mapping & Monitoring:** The adoption of hazard mapping and monitoring technology is crucial for effective risk management.
- **Ecological restoration:** This includes the conservation and restoration of wetlands and floodplains, can significantly enhance biological diversity in the region.

# Policy Recommendations

India's water sector is experiencing growing variability and unpredictability in aquatic resources due to the impacts of climate change. These challenges are further exacerbated by inadequate infrastructure for water storage, conservation and distribution, as well as the limited integration of climate resilience into water management policies, as underscored in the IPCC's Sixth Assessment Report. Major threats highlighted in IPCC's Sixth Assessment Report include extreme weather events, rising temperatures, erratic monsoon patterns, and sea level rise, all of which pose significant risks to aquatic ecosystem, agriculture, industry, humans, and overall water security.

The maximum and minimum temperatures, along with rainfall patterns, show an increasing trend as outlined in the reports based on IPCC AR6 data analysis. Climate and weather extremes are projected to occur with a certain degree of uncertainty. These trends, including high temperatures and heavy or irregular rainfall, are expected to have significant impacts on the aquatic ecosystems within the north-eastern states. Hotspot analysis has identified threats and their impacts on ecosystem services, biodiversity, and the ongoing efforts by the government through various policies and schemes. However, despite these efforts, the threats and impacts remain significant. Therefore, additional policy measures are proposed, considering the strategies outlined in the revised State Action Plans on Climate Change (SAPCCs).

Aquatic systems have functional linkages with various sectors whose policies have a direct or indirect influence, including agriculture, public health (drinking water and sanitation), transportation (waterways), fisheries, tourism, environmental degradation (water pollution), culture, disaster management, and climate control. To ensure a sustainable future, climate- resilient aquatic resources management strategies are essential that include Integrated Water Resources Management **(IWRM),** nature-based solutions **(NbS)**, advanced technologies, and community participation all supported by effective policies and legislation. Both adaptation and mitigation are crucial: adaptation enhances resilience to immediate climate impacts, while mitigation contributes to long-term sustainability by reducing greenhouse gas **(GHG)** emissions. Establishing robust systems for continuous monitoring of aquatic resources and climate data is critical. To enhance the resilience and sustainability of aquatic ecosystems, the following incremental policy measures are recommended based on the key findings of this study:

1. **Strengthen Existing Legal Frameworks:** To effectively protect aquatic ecosystems from pollution, overfishing, and habitat destruction, it is crucial to enforce and enhance existing laws and regulations. This includes reinforcing the provisions of the **Environment Protection Act** and the **Wildlife Protection Act**, which establish guidelines for conserving biodiversity and regulating human activities that impact aquatic environments. National initiatives, such as the **National Water Policy, National Biodiversity Action Plan**, and the **National Plan for Conservation of Aquatic Ecosystems (NPCA)** provide frameworks for sustainable management of water resources, biodiversity conservation and emphasize the need for integrated approaches to manage aquatic ecosystems while considering the socio- economic contexts of local communities.

2. **Sustainable Fishing Practices:** Implementing sustainable fishing practices is essential to prevent the overexploitation of fish stocks and maintain ecological balance within aquatic ecosystems. This involves adopting management strategies that regulate catch limits, enforce seasonal fishing bans, and establish protected marine areas to allow fish populations to recover. National schemes such as the National Fisheries Policy and the **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** provide frameworks for

promoting sustainable aquaculture and fisheries management. Additionally, community-based approaches, where local fishing communities are involved in resource management and decision-making, can enhance compliance with sustainable practices. Educational programs and awareness campaigns can further empower communities with knowledge about sustainable methods, thus fostering a culture of conservation.

3. **Promote Sustainable Aquaculture:** Encouraging sustainable aquaculture practices is essential for meeting local fish demand while protecting natural water bodies. National initiatives such as the **Pradhan Mantri Matsya Sampada Yojana (PMMSY)** aim to promote responsible aquaculture practices by providing financial assistance, training, and technical support to fish farmers. This program emphasizes the importance of adopting eco-friendly practices, such as integrated multi-trophic aquaculture **(IMTA)** and the use of organic feed, that enhance productivity without depleting natural resources.

4. **Upgrading Meteorological & Hydrological Stations:** Enhancing State's data collection capacity through upgradation of meteorological and hydrological stations is crucial for improving the accuracy and reliability of climate and water-related analyses and predictions. This will facilitate comprehensive monitoring of weather patterns, precipitation levels, and water quality, enabling informed decision-making that strengthens the resilience of aquatic ecosystems. National schemes such as the **National Water Mission** and the **National Action Plan on Climate** Change emphasize the need for robust data collection and monitoring systems for effective water resources management and addressing climate challenges.

5. **Reduce Agricultural Runoff:** Implementing measures to minimize agricultural runoff is crucial for preventing eutrophication in water bodies, which can severely impact aquatic ecosystems. Agricultural runoff often carries excess nutrients, pesticides, and sediments into rivers and lakes, leading to harmful algal blooms and degradation of water quality. To address this issue, it is essential to promote the use of bio-fertilizers, compost, green manure, and organic farming practices to enhance soil health and reduce dependency on chemical fertilizers, thereby decreasing nutrient runoff. The Soil Health Management **(SHM)** scheme under the National Mission for Sustainable Agriculture **(NMSA)** encourages farmers to adopt these eco-friendly practices. Additionally, implementing buffer zones—vegetated areas near water bodies—can help filter pollutants and absorb excess nutrients before they enter aquatic ecosystems.

6. **Industrial Waste Regulation:** To safeguard aquatic ecosystems, it is essential to enforce stringent regulations on industrial waste disposal. This includes implementing the **Environment Protection Act** and the **Water (Prevention and Control of Pollution) Act**, which provide a legal framework for regulating industrial effluents. Furthermore, establishing robust mechanisms for monitoring and evaluating the effectiveness of water pollution control measures is critical which can be achieved through the implementation of the Central Pollution Control Board's **(CPCB)** guidelines, which set standards for effluent discharge and pollution abatement technologies.

7. **Restore Water Bodies and Conserve Wetlands:** Implement comprehensive repair, renovation, and restoration of existing water bodies to optimize their storage capacity and improve water management. Prioritizing wetland conservation is essential as it plays a dual role in both adaptation of climate change and mitigation. These initiatives can be aligned with national programs such as the **National Plan for Conservation of Aquatic Ecosystems (NPCA)**, Ramsar Wetland Sites Conservation and River Rejuvenation Programs, and to ensure a coordinated and impactful approach.

8. **Climate-Resilient Water Harvesting Systems:** Develop and implement climate- resilient water harvesting systems **(WHS)** and engage existing institutional mechanisms for community ownership and integrated management of natural resources. Moreover, integrating traditional water harvesting practices with modern techniques can enhance their effectiveness. Furthermore, aligning these initiatives with national schemes such as the National Water Policy can help streamline efforts and ensure cohesive action.

9. **Leveraging Advanced Technologies:** Employing advanced technologies such as **Remote Sensing (RS)** and **Geographic Information Systems (GIS)** to improve data accuracy and support conservation initiatives. When combined with observed data, these technologies enhance the ability to monitor and evaluate the current state of aquatic resources, enabling more effective management and decision-making for the preservation and sustainable use of these vital ecosystems.

10. **Strengthening Institutional Frameworks:** To enhance the effectiveness of water management policies, it is crucial to integrate climate resilience by revising existing regulations, improving inter-agency coordination, and actively involving local communities in decision-making processes. National schemes such as the **National Water Policy (NWP)** emphasizes the need for integrated water resource management and collaboration among various governmental bodies. Aligning water management policies with national frameworks, facilitates a more resilient and adaptive institutional framework that effectively addresses the challenges posed by climate change. Engaging local communities in decision-making not only enhances policy relevance but also fosters ownership and sustainability of water resource management initiatives.

11. **Groundwater Conservation & Management:** Restoring water bodies plays a crucial role in recharging groundwater and addressing water scarcity issues. Restoration efforts, such as desilting, deepening, and enhancing the storage capacity of ponds, lakes, and wetlands, help retain surface water, allowing it to gradually percolate into the ground. This process improves groundwater levels and supports the sustainability of aquifers, which are vital sources of water for agriculture, domestic use, and industry. Synergies among various national programs like the **National Plan for Conservation of Aquatic Ecosystems (NPCA)**, Atal Bhujal Yojana (ABY), and the **Jal Shakti Abhiyan (JSA)**, facilitate improving water conservation and sustainable groundwater management through community engagement and ecological restoration.

12. **Afforestation in Catchment Areas:** Promote afforestation and reforestation efforts in catchment areas to effectively reduce soil erosion and sedimentation in water bodies. This initiative can be supported through programs such as the Compensatory Afforestation Fund Management and Planning Authority **(CAMPA)** and the National Afforestation and Eco-Development Board **(NEAB). CAMPA** provides financial resources for afforestation, and the **NEAB** focuses on promoting community participation in afforestation activities. Aligning these afforestation efforts can contribute to improvisation of health of aquatic ecosystems and ensure sustainable water resource management.

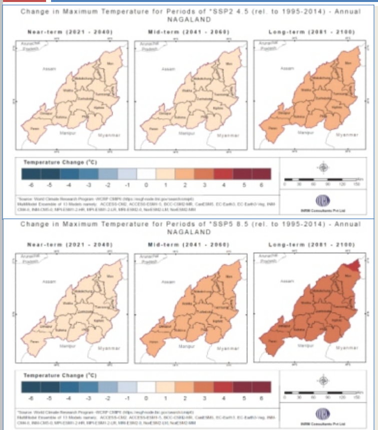
13. **Enhance Resilience to Climate Change:** Develop and implement strategies aimed at strengthening the resilience of aquatic ecosystems to the impacts of climate change, including shifts in agricultural practices and cropping patterns, efficient water uses in agriculture etc. These efforts will ensure that aquatic resources are safeguarded against the challenges posed by climate variability.

14. **Research and Monitoring Programs:** Establishing comprehensive research and monitoring initiatives is critical for assessing the health of aquatic ecosystems and evaluating the effectiveness of conservation measures. Focus should ideally be on data collection on key indicators such as water quality, biodiversity, habitat conditions and partnerships with local universities can facilitate data collection, analysis, and the development of innovative solutions tailored to regional challenges. Incorporating citizen science programs can engage local communities in monitoring efforts, fostering a sense of stewardship for their aquatic resources. Aligning these initiatives with national schemes, like **National Plan for Conservation of Aquatic Ecosystems (NPCA)**, can ensure that research efforts contribute to broader conservation goals and integrating findings into policy frameworks will support adaptive management strategies, for timely adjustments to emerging data and trends.

15. **Training and raising awareness:** Training and awareness raising as an overarching mandate for decision makers, researchers, implementors as well as local communities, ensures understanding of pressing issues, environmental trade-offs as well as fostering synergies across sectors to realize the advantages of the integrated approach. By providing training and resources to local communities, initiatives can foster sustainable practices and empower residents to take an active role in water conservation efforts. Training community members to collect and report data can increase public awareness and involvement in conservation efforts.

# Climate Study – Nagaland

## Long Term – Annual Max Temperature – SSP2 & SSP5



- Average annual maximum temperature for IPCC AR6 SSP2-4.5 scenario is projected to increase by about
  - 0.4°C towards near-term
  - 0.8°C towards mid-term
  - 1.5°C towards long-term
- Average annual maximum temperature for IPCC AR6 SSP5-8.5 scenario is projected to increase by about
  - 0.4°C towards near-term
  - 1.2°C towards mid-term
  - 2.8°C towards long-term

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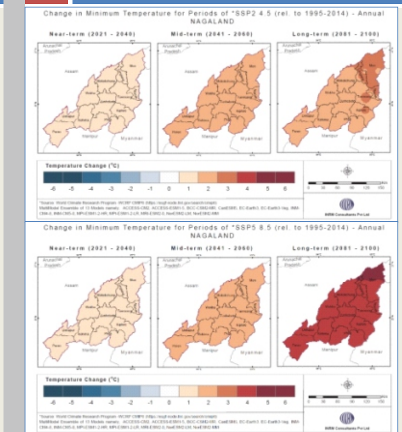
# Climate Study – Nagaland

## Long Term – Annual Min Temperature – SSP2 & SSP5



- Average annual minimum temperature for IPCC AR6 SSP2-4.5 scenario is projected to increase by about
  - 0.6°C towards near-term
  - 1.2°C towards mid-term
  - 2.0°C towards long-term
- Average annual minimum temperature for IPCC AR6 SSP5-8.5 scenario is projected to increase by about
  - 0.7°C towards near-term
  - 1.6°C towards mid-term
  - 3.8°C towards long-term

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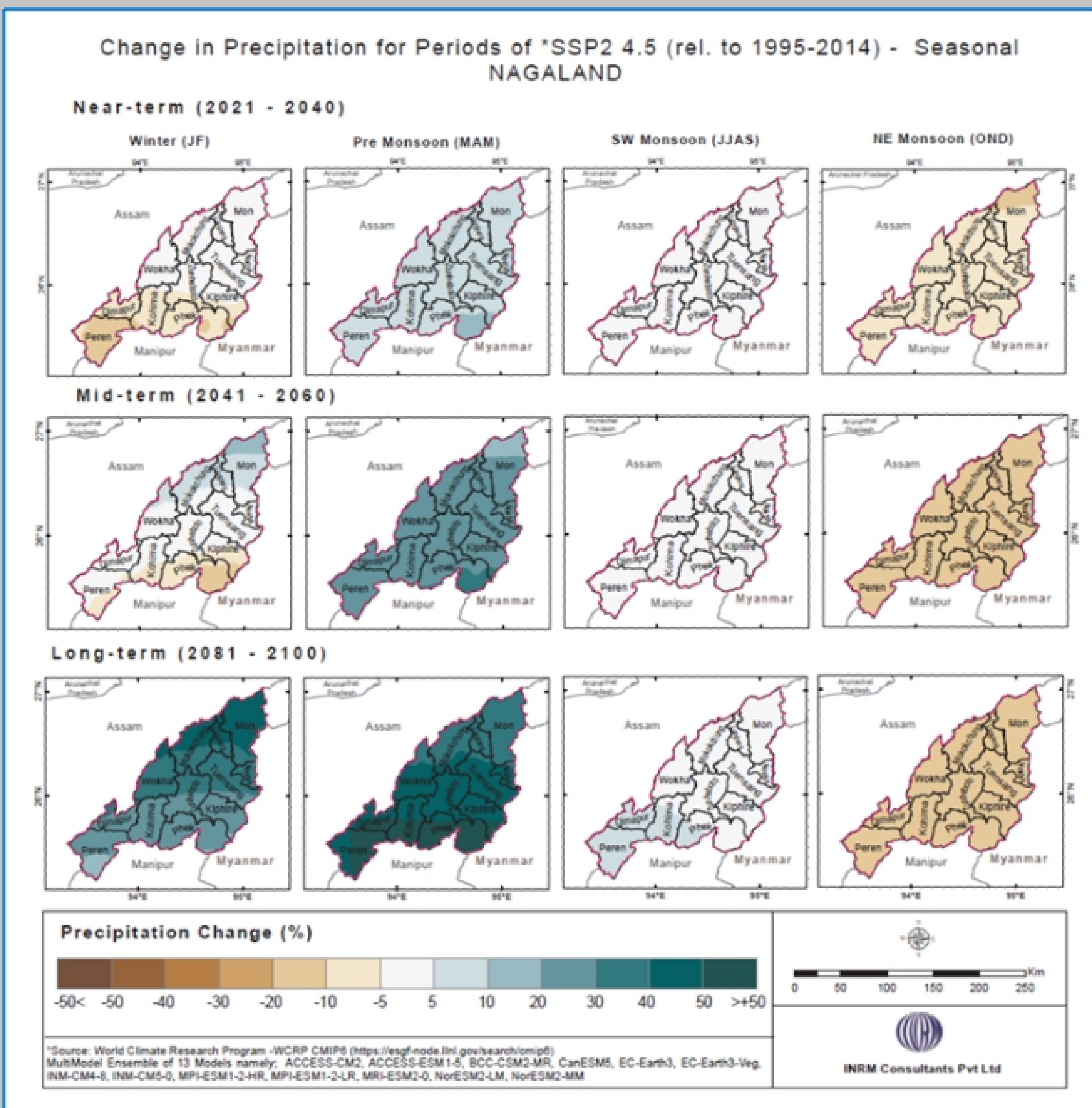
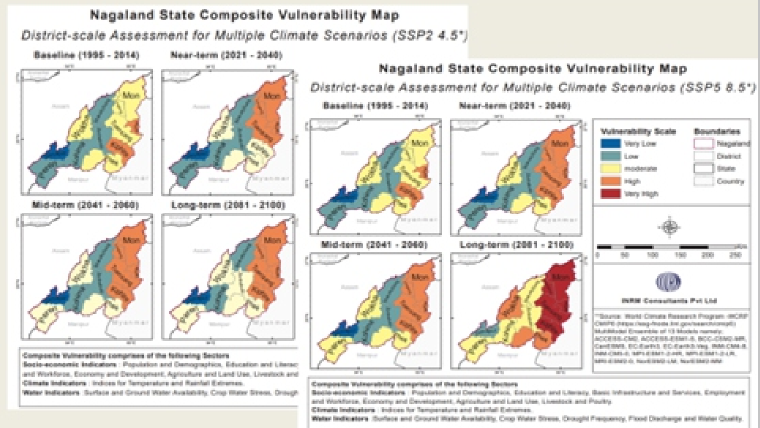


## Climate Extremes - Nagaland

- **Nagaland**
  - **Cool nights** (TN10P) and **cool days** (TX10P) show negative trend in all districts in both the scenarios
  - **Warm nights** (TN90P) and **warm days** (TX90P) show positive trend in all districts in both the scenarios
  - **1-day maximum precipitation** and **5-day maximum precipitation** show positive trend for entire state in both the scenarios
  - **Very wet days precipitation** (R95p) and **extremely wet days precipitation** (R99p) shows significant positive trend for baseline and near-term while towards mid-term it is showing non-significant positive trend for some parts of districts. However, towards LT these indices shows negative trend for IPCC AR6 SSP2-4.5 while for AR6 IPCC SSP5 8.5 scenario the trend is significant positive.
  - **Consecutive dry days** (CDD) shows mix trend (positive/negative) towards BL and LT while towards NT and MT the indices shows negative trend for both the scenarios.
  - **Consecutive wet days** (CWD) shows positive trend towards BL, NT, MT and LT for both the scenarios.
  - **Heavy precipitation days** are projected to increase for all districts towards NT, MT and LT compared to BL for both the IPCC AR6 climate scenarios

## Projected Composite Vulnerability

### Nagaland




## Districts Composite Vulnerability

### Nagaland

| Dist Name | Composite Vulnerability Index (CVI) | | | | | | | | Water Vulnerability Index(WVI) | | | | | | | | Climate Vulnerability Index (CLVI) | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | SSP2-4.5 | | | SSP5-8.5 | | | | | SSP2-4.5 | | | SSP5-8.5 | | | | | SSP2-4.5 | | | SSP5-8.5 | | |
| | BL Rank | BL | NT | MT | LT | NT | MT | LT | BL Rank | BL | NT | MT | LT | NT | MT | LT | BL Rank | BL | NT | MT | LT | NT | MT | LT |
| Dimapur | 1 | VL | VL | VL | VL | VL | VL | L | 1 | VL | VL | VL | VL | VL | VL | VL | 11 | L | M | H | H | M | H | VH |
| Kohima | 2 | L | L | L | L | L | L | M | 6 | M | M | M | M | M | M | M | 10 | L | M | H | H | M | H | VH |
| Mokokchung | 3 | L | L | L | L | L | L | M | 3 | L | L | L | M | L | M | M | 9 | L | H | M | H | M | H | VH |
| Zunheboto | 4 | L | L | L | M | L | L | M | 8 | M | M | H | H | M | H | H | 7 | L | L | L | M | L | L | H |
| Peren | 5 | L | L | M | M | L | M | M | 6 | M | M | M | M | M | M | H | 4 | VL | VL | L | L | VL | L | H |
| Wokha | 6 | M | M | M | M | M | M | H | 5 | L | M | M | M | M | M | M | 12 | M | H | H | H | H | H | VH |
| Phek | 7 | M | M | M | M | M | M | H | 12 | VH | VH | VH | VH | VH | VH | VH | 1 | VL | VL | VL | L | VL | L | H |
| Mon | 8 | M | H | H | H | H | H | VH | 2 | L | L | L | L | L | L | M | 3 | VL | L | L | L | L | L | H |
| Longleng | 9 | M | H | H | H | H | H | VH | 4 | L | M | M | M | M | M | M | 8 | L | M | M | H | M | M | VH |
| Tuensang | 10 | M | H | H | H | H | H | VH | 9 | M | M | H | H | M | H | H | 6 | VL | L | L | L | L | L | H |
| Noklak | 11 | H | H | H | H | H | H | VH | 10 | H | VH | H | H | VH | H | H | 5 | VL | VL | L | L | VL | L | H |
| Kiphire | 12 | H | M | H | H | H | H | VH | 11 | VH | VH | VH | VH | VH | VH | VH | 2 | VL | VL | VL | L | VL | L | H |

**The complete state report can be downloaded by following this QR Code.**

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