Climate Change Impacts on Rural Livelihood in Arunachal Pradesh: Vulnerability and Perception Assessment

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Climate change poses severe and uneven threats globally. Increase in the intensity and frequency of climate related hazards with region specific implications (Rangel-Buitrago et al., 2020) meant region, community and sector specific adaptation is critical. IPCC (2021) reiterated the potential adverse impacts of climate change and associated hazards on livelihoods ecosystems and its services. Populations relying directly on natural resources for livelihoods (Koech et al., 2020) in developing nations will particularly face the heat compared to those with better infrastructure and higher capacity to adapt. Livelihood is multidimensional and reflects how people build their lives and adapt to overcome various threats to their wellbeing and hence is an integral part of climate change induced vulnerability and risk. Vulnerability assessments are critical in not only reflecting the susceptibility and risk of communities to climate change induced disasters, but also needed in directing developmental interventions, strategies to uplift the livelihoods of the communities, facilitating measures to reduce risk and informing authorities to formulate effective policy measures.

Regional level vulnerability assessment is essential for understanding the complexities driven by climate change as the adaptive capacity of the communities depend on the financial, technological, cultural and institutional capabilities (Venus et al., 2021). Emerging livelihood vulnerability assessments use livelihood vulnerability index, household livelihood vulnerability, multidimensional vulnerability index, inherent vulnerability index and hierarchical clustering on principal component (HCPC) analysis (Segnon et al., 2021), etc. While socio-economic and biophysical factors are critical for livelihood vulnerability analysis (Singha et al., 2020), a close examination of adaptation by local communities, generally based on how they perceive the risks, to mitigate the implications is required for understanding the factors that makes certain communities adaptive and resilient.

Since the lack of analytical documentation concerning how vulnerable communities perceive climate risks is a barrier to addressing and averting disasters, this study adopted Arunachal Pradesh, the largest (and potentially the least studied) northeastern state of India, facing severe climate change induced vulnerabilities. To provide a rich understanding, we adopted both qualitative and quantitative method to examine the livelihood vulnerability – using the IPCC's livelihood vulnerability index (LVI) – and perception of households concerning climate change impacts on their livelihood. A total 450 households from 18 villages located in the districts of Arunachal Pradesh were surveyed during October, 2021 for retrieving the ground complexities of climate risk perceptions and vulnerabilities.

Decrease in yields, frequent landslides & floods, livestock losses and unpredictable weather condition were perceived by the sampled households. The LVI analysis indicated that households in Arzoo, Perum, Pekong and Amliang villages are particularly vulnerable, requiring priority for reducing the vulnerability and increasing coping capacity of the communities. Correlation analysis indicated that climate variability, natural disaster, health, food and social components attributed to livelihood vulnerability in the study area. Alternative livelihoods, enhancing preparedness to disasters, inclusion of women in workforce, sustainable livelihood practices and government assistance are some of the suggestions made to enhance the adaptation of local communities in a sustainable way.

Thus, this study suggests that community-based adaptation is required in addition to involving the assistance and support of the government for achieving the sustainable development goals especially in Arunachal Pradesh. Women participation in workforce, sustainable livelihood practices, improvement in health & amenities, social infrastructure, education, equitable work participation and disaster preparedness may help in uplifting the socio-economic status of the communities in the study area. Although, this study did not consider the actual assessment of the implications of disaster susceptibility but households' perception on climate change induced livelihood implications provided a deeper insight of the varying implications. Furthermore, this study may be used as a baseline for framing the policy for the overall development of the region.

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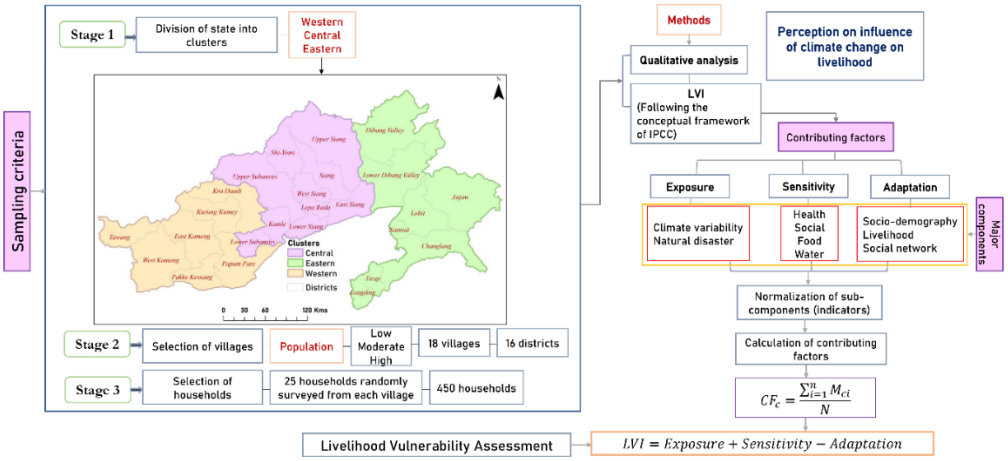

Figure 1. Methodological framework of the study.

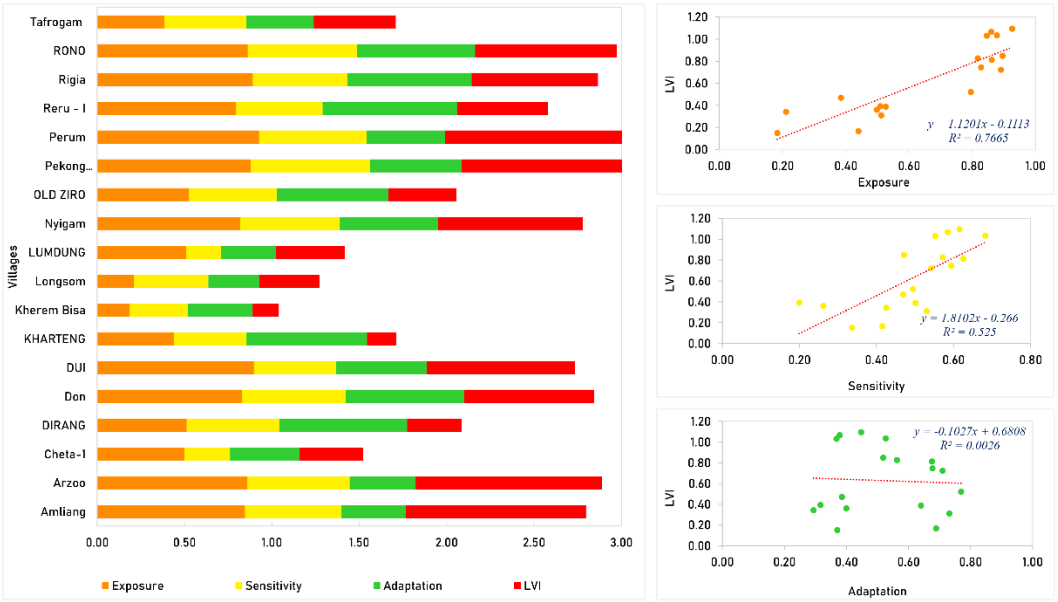

Figure 2. LVI and contributing factors.