

Governance of Climate Adaptation Through Artificial Glacier Technology: Lessons Learnt from Leh (Ladakh, India) In North-West Himalaya

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Abstract : Social-dimension of Climate Change is no longer peripheral to Science, Technology and Innovation (STI). Indeed, STI is being mobilized to address small farmers' vulnerability and adaptation to Climate Change. The experiences from the cold desert of Leh (Ladakh) in North-West Himalaya illustrate the potential of STI to address the challenges of Climate Change and the needs of small farmers through the use of Artificial Glacier Techniques. Small farmers have a unique technique of water harvesting to augment irrigation, called "Artificial Glaciers" - an intricate network of water channels and dams along the upper slope of a valley that are located closer to villages and at lower altitudes than natural glaciers. It starts to melt much earlier and supplements additional irrigation to small farmers' improving their livelihoods. Therefore, the issue of vulnerability, adaptive capacity and adaptation strategy needs to be analyzed in a local context and the communities as well as regions where people live. Leh (Ladakh) in North-West Himalaya provides a Case Study for exploring the ways in which adaptation to Climate Change is taking place at a community scale using Artificial Glacier Technology. With the above backdrop, an attempt has been made to analyze the rural poor households' vulnerability and adaptation practices to Climate Change using this technology, thereby drawing lessons on vulnerability-livelihood interactions in the cold desert of Leh (Ladakh) in North-West Himalaya, India. The study is based on primary data and information collected from 675 households confined to 27 villages of Leh (Ladakh) in North-West Himalaya, India. It reveals that 61.18% of the population is driving livelihoods from agriculture and allied activities. With increased irrigation potential due to the use of Artificial Glaciers, food security has been assured to 77.56% of households and health vulnerability has been reduced in 31% of households. Seasonal migration as a livelihood diversification mechanism has declined in nearly two-thirds of households, thereby improving livelihood strategies. Use of tactical adaptations by small farmers in response to persistent droughts, such as selling livestock, expanding agriculture lands, and use of relief cash and foods, have declined to 20.44%, 24.74% and 63% of households. However, these measures are unsustainable on a long-term basis. The role of policymakers and societal stakeholders becomes important in this context. To address livelihood challenges, the role of technology is critical in a multidisciplinary approach involving multilateral collaboration among different stakeholders. The presence of social entrepreneurs and new actors on the adaptation scene is necessary to bring forth adaptation measures. Better linkage between Science and Technology policies, together with other policies, should be encouraged. Better health care, access to safe drinking water, better sanitary conditions, and improved standards of education and infrastructure are effective measures to enhance a community's adaptive capacity. However, social transfers for supporting climate adaptive capacity require significant amounts of additional investment. Developing institutional mechanisms for specific adaptation interventions can be one of the most effective ways of implementing a plan to enhance adaptation and build resilience.

Keywords : climate change, adaptation, livelihood, stakeholders

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