

## Managing Climate Change: Vulnerability Reduction or Resilience Building

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**Abstract :** Adaptation interventions are the common response to manage the vulnerabilities of climate change. The nature of adaptation intervention depends on the degree of vulnerability and the capacity of a society. The coping interventions can take the form of hard adaptation - utilising technologies and capital goods like dykes, embankments, seawalls, and/or soft adaptation - engaging knowledge and information sharing, capacity building, policy and strategy development, and innovation. Hard adaptation is quite capital intensive but provides immediate relief from climate change vulnerabilities. This type of adaptation is not real development, as the investment for the adaptation cannot improve the performance - just maintain the status quo of a social or ecological system, and often lead to maladaptation in the long-term. Maladaptation creates a two-way loss for a society - interventions bring further vulnerability on top of the existing vulnerability and investment for getting rid of the consequence of interventions. Hard adaptation is popular to the vulnerable groups, but it focuses so much on the immediate solution and often ignores the environmental issues and future risks of climate change. On the other hand, soft adaptation is education oriented where vulnerable groups learn how to live with climate change impacts. Soft adaptation interventions build the capacity of vulnerable groups through training, innovation, and support, which might enhance the resilience of a system. In consideration of long-term sustainability, soft adaptation can contribute more to resilience than hard adaptation. Taking a developing society as the study context, this study aims to investigate and understand the effectiveness of the adaptation interventions of the coastal community of Sundarbans mangrove forest in Bangladesh. Applying semi-structured interviews with a range of Sundarbans stakeholders including community residents, tourism demand-supply side stakeholders, and conservation and management agencies (e.g., Government, NGOs and international agencies) and document analysis, this paper reports several key insights regarding climate change adaptation. Firstly, while adaptation interventions may offer a short-term to medium-term solution to climate change vulnerabilities, interventions need to be revised for long-term sustainability. Secondly, soft adaptation offers advantages in terms of resilience in a rapidly changing environment, as it is flexible and dynamic. Thirdly, there is a challenge to communicate to educate vulnerable groups to understand more about the future effects of hard adaptation interventions (and the potential for maladaptation). Fourthly, hard adaptation can be used if the interventions do not degrade the environmental balance and if the investment of interventions does not exceed the economic benefit of the interventions. Overall, the goal of an adaptation intervention should be to enhance the resilience of a social or ecological system so that the system can with stand present vulnerabilities and future risks. In order to be sustainable, adaptation interventions should be designed in such way that those can address vulnerabilities and risks of climate change in a long-term timeframe.

**Keywords :** adaptation, climate change, maladaptation, resilience, Sundarbans, sustainability, vulnerability

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