CLIMATE CHANGE AND AGRICULTURE: AN ASSESSMENT OF FARMERS' ADAPTATION IN THE FOOTHILLS OF WEST BENGAL, INDIA

ABSTRACT

Climate change is likely to significantly impact the Indian agricultural sector and the lives of millions of farmers. It is expected that with the implementation of adaptation measures, the vulnerability of this sector could be reduced. In praxis, however, not all farm-level adaptations undertaken by farmers are equally effective, and some could be maladaptive. Also, farmers might not perceive climate change accurately and therefore lack in adopting adaptation strategies. In this context, the present study examines farmers' perceptions of climate change, their adaptation strategies, factors influencing the adoption of adaptation strategies, and potential maladaptive outcomes in the Indian Eastern Himalayan foothills of West Bengal by employing various statistical as well qualitative data analysis techniques. By interviewing 300 farming households using a pre-tested semi-structured schedule, this study obtained information on farmers' perceptions of and adaptation to climate change and other data pertaining to various socioeconomic-demographic aspects of households. Further, by involving 51 stakeholders and eliciting information from the scientific literature, this study determined several potential maladaptive outcomes. Besides, secondary data on temperature and precipitation are collected from the Climatic Research Unit (CRU) to examine how farmers' perceptions correspond with instrumental records. Results show that most farmers' perceptions aligned with the increasing summer temperature and decreasing monsoon precipitation. Farmers are responding to climate change impacts by implementing at least one and up to seven adaptation measures. Farmers preferred agroforestry, a shift from cereals to low water-intensive commercials, irrigation, and intensification of winter crops as the most efficient. There is, however, a misalignment between the perceived efficiency of adaptation measures and their scale of adoption. Farmers' perceptions of pest infestation, satisfaction with farming, soil characteristics, farm size, remittances, and access to credit were found to be positively and significantly influencing the adaptation indices, while open-mindedness towards changing farming practices and crop-raiding by elephants are found to be negatively and significantly associated with adaptation indices. Besides, the study determined several potentially maladaptive outcomes of the adopted strategies, such as a decline in groundwater levels, increased greenhouse gas emissions from irrigation systems using diesel pumps, resistance among pests, increased investment costs, financial loss, weakening of social ties as a result of changes in cultural practices, and so on. However, the study identified potential maladaptive outcomes based on qualitative interviews with various stakeholders, which limits understanding of the actual extent of maladaptation in this region. Therefore, future research might concentrate on quantifying the maladaptive outcomes and provide empirical evidence of maladaptation.

Keywords

Climate Change; Farmers; Perception; Adaptation; Maladaptation; Eastern-Himalayan foothills