4th International Conference on Environmental Design, ICED2023

Sustainability / Pollution / Energy / Cities-Buildings / Transportation / Erosion / Climate Change / Policy / Social Acceptance / Health Impacts 20-22 October 2023, Athens, Greece

LIVELIHOOD VULNERABILITY AND ADAPTIVE STRATEGIES ASSESSMENT OF FARMERS LIVING IN RAJAPUR MUNICIPALITY, BARDIYA.

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INTRODUCTION

- The Terai region of Nepal has witnessed the most severe events in recent decades, with severe drought, extreme and repeated floods, landslides, and other natural disasters. This has a direct impact on food production and the livelihood of the people [1].
- Different studies using climate models suggest the number of people affected by the flood could double by 2030. In Nepal, floods can possibly damage physical assets at a value equivalent to 1.4% of its GDP [2].
- Rajapur Municipality of Bardiya district in Lumbini province lies in the lower region of Karnali and has a long history of flooding [3].
- The study was carried out to understand the climate variability, flood impacts on livelihood, and adaptation strategies of farmers in these affected communities of Rajapur, Bardiya.
- For the study, wards 1, 3, 4 and 7 located alongside branches of Karnali River were selected, based on the exposure of and severity of the impact of flood in previous years [4] [5].

OBJECTIVES

- Rainfall and temperature trend analysis of Rajapur.
- Assess the livelihood vulnerability of farmers against flood.
- The adaptive strategies of farmers against flooding in Rajapur, Bardiya

MATERIALS AND METHODS

- **Rainfall and temperature trend analysis:**
  - Daily rainfall and temperature data analyzed from 1992-2021 were used in this study.
  - Annual, monthly and seasonal variations trends in rainfall and temperature were analyzed using MS Excel.

- **The livelihood vulnerability of farmers :**
  - 160 samples of farming households were withdrawn from a simple random sampling technique.
  - The farmers were categorized into small, medium and large farmers with reference to land holding size.
  - LVI developed by Hahn et al. (2009) for vulnerability assessment of climate change was applied.
  - A semi-structured questionnaire survey was prepared and conducted in 160 farming households.
  - FGD, KII, as well as direct observations, were applied in primary data collection.
  - Secondary data from Rajapur Municipality, CBS, Practical Action, ActionAid, thesis, journals and articles were used.
  - LVI includes 8 major components and they were further categorized according to LVI-IPCC which were later used to calculate the exposure, sensitivity and adaptive capacity of small, medium and large farmers.

- **The adaptive strategies of farmers against flooding :**
  - Adaptation practices were observed during the field study.
  - In some cases, observations served as the main source of information while in others, they were utilized to triangulate information to assess its reliability.

RESULTS

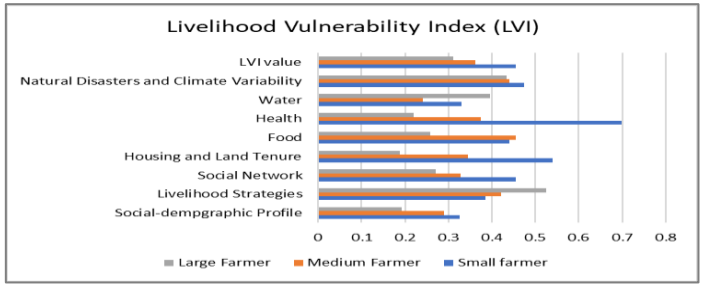

Fig 1. LVI of the small, medium and large farmers

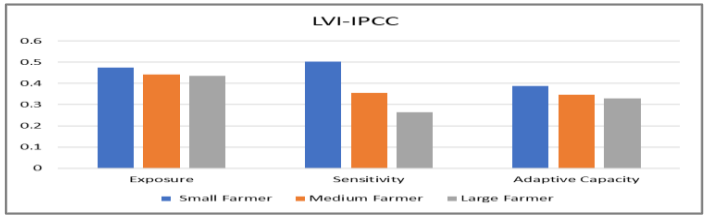

Fig 2. LVI-IPCC value of the small, medium and large farmers

- There were positive trends in maximum and mean temperature while negative trends in minimum temperature.
- The average annual maximum temperature for the study region was determined to be more than 30ºC, which is consistent with the report of Rajapur, LDCRP and the observed climate trend analysis report of Nepal 2017.
- The precipitation trends of Rajapur varied in terms of rainfall frequency and intensity, showing a total annual increase in rainfall of 8.318 mm each year. The winter and post-monsoon precipitation trends are found to be in decreasing trend whereas the pre-monsoon and monsoon are found to be increasing.
- The overall LVI calculated from the major components indicates that small farmers were the most vulnerable to climate change, followed by medium farmers and large farmers with the least index value.
- The LVI-IPCC index also showed a similar pattern with the small farmers with the highest and large farmers with the least vulnerability value.

DISCUSSIONS

- Rising temperatures, more erratic rainfall, and shifts in the commencement and length of the rainy season are among the most widely reported changes. Farmers' assessments of climate change were largely consistent with historical climatic data for the region, which show considerable increases in mean and maximum temperatures across Rajapur but less clear trends in rainfall patterns.
- Small farmers have higher exposure to flooding due to their proximity to the Karnali River. Nonetheless, the chart shows that the small, medium, and large farmers have a similar level of exposure to the flood. However, their sensitivity is varying greatly. The sensitivity of small farmers is 0.5 while it is almost half (0.26) for large farmers.
- The housing and land tenure status was found to be the poorest in the case of small farmers with the majority living under the weak structure house and having farmland that does not yield sufficient crop year-round.
- In totality the contributing components such as health, food, housing and shelter and water among small farmers are more sensitive compared to the other two categories.
- The adaptation strategies of an early warning system, shelter houses, elevated hand pumps, the construction of embankments, and capacity building through disaster risk reduction training were found to be significant against flooding.
- Among these adaptation strategies, the small farmers were having the highest number of temporary non-elevated structure houses, and the settlements were seen near the Karnali river banks which makes them more sensitive to floods.
- Also, the involvement of small farmers with the highest percentage was seen in the practice of the sharecropping system, migration for better earnings, and income generation from labour work, followed by the medium and with the least percentage seen in large farmers which shows that the small farmers were the most vulnerable with adaptation limits.

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