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Flood Risk Mitigation of Households in Khyber Pakhtunkhwa Province, Pakistan

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Abstract: The impact of floods have become more severe over the past two decades in Pakistan. The adaptive capacity, flood mitigation measures in rural households and associated constraints were investigated in the two districts of the Khyber Pakhtunkhwa Province in Pakistan. The findings revealed that households in both districts mostly implemented measures that require less technical knowledge, which is suitable for the short-term but less adapted for long-term risks. Further work is required to address the need for advanced flood mitigation measures for vulnerable communities in rural households.

Keywords: Flood risk mitigation, household flood mitigation, vulnerable communities, Pakistan.

INTRODUCTION

Pakistan is one of the countries most affected by natural hazards, including floods over the last two decades. The worst flood in the country's history was experienced in 2010. The disaster affected 24 million people, damaged more than 2 million hectares of standing crops and caused economic losses of about USD10 billion. In Pakistan, floods are mainly associated with either the rainfall cycle during monsoon season in the lower catchment of the Indus River Basin, or the melting of glaciers in mountain regions upstream of the Indus River. A study was conducted to understand the local adaptive capacity, types of flood mitigation measures and constraints on the implementation of flood mitigation strategies in households. Correlation and probit model methods were used to evaluate flood-affected households. The focus was on two districts of the Khyber Pakhtunkhwa Province that are the most vulnerable areas in the country, which were severely affected by floods in 2010.

CLIMATIC CONDITIONS

The study was conducted in the rural areas of Khyber Pakhtunkhwa (KP) Province (Figure 1). It was selected as the study area because it is plagued by natural disasters such as floods from the Indus River, and earthquakes from the tectonic setting (GOP, 2018). The yearly floods during the monsoon season bring unprecedented damage to property and human lives. The KP Province has experienced several devastating floods in the last two decades. Out of the 22 recorded floods from 1950 to 2014, year 2010 was the most disastrous, affecting millions of households and their livelihoods in the province. In the northern side of the province, avalanches occur, primarily during the winter season while drought occurs during the summer in the southern part of the province. The climate of the KP Province is peculiar due to its large area where it experiences all climate conditions in Pakistan. Rainfall also varies enormously in the province. A majority of the area is usually dry while the eastern side of the province is the wettest especially during the month of June to mid-September.

MITIGATION STRATEGIES FOR FLOOD HAZARDS

Effective flood warnings could be a lifesaving option for households and communities living at the river edges (Qasim et al. 2015). With early warning, people may have enough time to take precautions to protect themselves and their livelihoods from flood risks. However, most of the households reported the poor performance of early warning system due to lack of infrastructure and outdated information dissemination system. Households also reported that they were never trained or provided sufficient information about house building codes,

infrastructure building practices, and adequate spatial planning by the related departments. Furthermore, inadequate resources including emergency funds and relief stock are identified as other constraints faced by the respondents in the study area.

Communities have adopted various measures to mitigate the adverse impacts of floods at the household level to overcome these shortcomings. The most implemented mitigation strategies adopted by households include elevated ground floor (EGF), foundation strengthening (FS), construction of house with reinforced material (CHRM), precautionary savings (PS), deployment of sand bags (DSB) and preparing a place for storage of food items on the second floor (FSP2F) as effective risk mitigation tools. Other least adopted measures include building dikes in front of their homes (BDH), cleaning canals which surround the houses (CCSH), constructing houses with a second floor (CH2F), sump pump in the basement (SP), valve in the sewer system (VSS), lifesaving small boats (LSB), and buying food stock (BFS). The findings revealed that households implemented only well-known measures that require less technical knowledge. For example, implementation of technical and long-term measures such as BDH, LSB and developing storage and alternative living spaces are very rare in the two districts of KP Province that were surveyed.

KEY FINDINGS

Constraints such as lack of financial means (33%), weak land use planning (31%), and ineffective early flood warning system (27%) were found to be key obstacles in flood mitigation at the household level. Financial limitations at the household level may also be observed through daily average per capita of household income (approximately \$1 a day), which is quite below the poverty limit set by the Government of Pakistan (\$2 a day). Furthermore, access and use of formal credit facilities at the local level (especially due to high-interest rate) is also a big challenge. Lack of land management and planning is another major constraint to adapting to flood risks. Sufficient financial arrangements will enable vulnerable communities to adopt advanced flood mitigation measures. Pathways to solutions include the following:-

- There is a need for a focused study on how to overcome constraints in the areas through improvements in the current institutional setup and access to weather forecasting and early warning systems;
- The adaptive capacity of local households has to be enhanced by providing more access to financial means and diversified sources of income to safeguard livelihood sources in case of floods;

Article

- Common mitigation strategies within communities need to be developed and implemented at the local level to reduce cost. This could be done in partnership with the government, private sector and community by developing strong linkages among different stakeholders;
- Furthermore, research needs to be done on low cost and advanced mitigation options for households and communities living near river areas in order to make them less vulnerable and more resilient.

CONCLUDING REMARKS

Households in the Khyber Pakhtunkhwa Province may become more capable in dealing with the impact of disasters due to floods if constraints at the local level are addressed. Urgent action is required to make these flood-vulnerable communities more resilient, and improve their wellbeing.

The strategy in the proposed project may be incorporated as part of relevant policies to address flood challenges in the area, and can be employed by the other regions in Pakistan. Findings from the study could also contribute to the national adaptation policy.

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Figure 1: Location of the two districts (red color) investigated in the Khyber Pakhtunkhwa Province, which are the most vulnerable area in Pakistan.