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## Determinants of Household Vulnerability and Adaptation to Floods: Empirical Evidence from the Indian State of West Bengal

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### Abstract

The study assesses household livelihood vulnerability and adaptive capacity in a flood prone area of the eastern Indian state of West Bengal. The analysis is based on the primary data collected from two administrative blocks of Murshidabad district of the state where frequent occurrences of floods cause damages to both human lives and property. In order to develop a comprehensive livelihood framework to measure the degree of livelihood vulnerability of the flood affected households, the study uses both vulnerability framework proposed by the IPCC and Sustainable Livelihood Framework developed by the DFID. A composite Livelihood Vulnerability Index (LVIs) is estimated by combining the household level data, and a comparative analysis is carried out between two administrative blocks and overall district level scenario. The results suggest that Jiaganj block is more vulnerable than Berhampore block; the overall adaptive capacity of the households was less than the exposure and sensitivity to flood events. Vulnerability elements such as exposure, sensitivity and adaptive capacity are found to be significantly influenced by age of the household head, household income, land holding size and family size. Some of the key household coping and adaptation strategies to floods identified in the study area include borrowing money from friends/relatives, money lender, selling assets and livestock, diversification of livelihoods, migration, elevation of the height of houses, preserving food and fuel stocks.

**Keywords:** Floods; Vulnerability; Adaptation; Livelihoods; West Bengal; India

### 1. Introduction

In recent years, the scientific reports on the effects of climate change and global warming have consistently reported that developing countries are likely to suffer more due to rise in frequency of climate extremes and climate variability (IPCC, 2007; 2013). In large size developing countries such as India, where one-sixth of global population reside, the adverse consequences of climate change in the form of frequent floods, droughts and cyclones have already been felt. During monsoon, Indian states<sup>3</sup> located in low lying coastal zones and river belts face acute floods (McGranahan et al., 2007; Jongman et al., 2012). . Particularly the eastern part of India, which is the region surrounding the Ganges river belt, records thousands of fatalities and millions of people are being affected due to floods every year (Mirza, 2010; Irrigation and Waterways Directorate, 2013). Among all the eastern

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<sup>3</sup>According to Census 2011, more than 50% of towns (2661) and 3827 villages are situated in the coastal regions of India. Also, 64.45% of slum population from nine coastal states in the country lives in utter poverty.

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