

Resilience to flash floods in wetland communities of northeastern Bangladesh



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ABSTRACT

Globally, a number of catastrophic hydrometeorological hazards occurred in 2017 among which the monsoon floods in South Asia was particularly disastrous, killing nearly 1200 people in India, Nepal and Bangladesh. The wetland region (Haor) of northeastern (NE) Bangladesh was severely affected by flash floods early in 2017, affecting nearly 1 million households and damaging US \$450 million worth of rice crops. This study investigates how the NE Bangladesh experienced the 2017 flash floods, and to what degree the wetland communities are vulnerable and resilience to flash floods. Focus group discussion, key informant interviews, and household questionnaire surveys ($n = 80$) were applied in the study area of Sunamganj district. Results from statistical analyses and regression modelling reveal that poor people are particularly vulnerable to floods but they are also more adaptive and thus resilient; middle-income households are vulnerable as they are hesitant to take up any jobs and accept flood relief; and rich households, despite being less adaptive, are able to recover from flood disasters because of wealth. This study reveals that resilience also stems from deep religious faith in the Haor inhabitants that supports communities to move on by accepting that most natural calamities such as flash floods are divine tests. This study also finds that women are particularly vulnerable and less resilient as they are not normally allowed to work outside of their homes and beyond the Haor communities due to cultural and religious reasons.

1. Introduction

Globally, hydrometeorological hazards such as floods, droughts, hurricanes, and coastal storm surges pose a direct threat to human lives and impact livelihoods due to widespread destruction and damage to crops, businesses and critical infrastructure. The frequency and strength of natural hazards varies globally. Nearly all continents were hit by some sort of natural hazards in 2017: flooding in South Asia, hurricanes, earthquakes and wildfires in North America, landslides and droughts in Africa, and volcanic eruption in Southeast Asia. Heavy monsoon rain and floods caused devastation in large parts of Bihar and Assam states of India, Bangladesh and Nepal that killed more than 1200 people over the summer of 2017 and triggered one of the worst humanitarian crises in years with more than 40 million people affected in the region. In Bangladesh alone, 145 people died, more than 100,000 houses were estimated to be completely destroyed and over 8 million people were affected by floods that covered one third of the country [1].

Hydrometeorological hazards, particularly floods and coastal

inundation to storm surges associated with tropical cyclones, are common in Bangladesh. Due to its subtropical monsoon climate and the geographic location – downstream region of the Himalayan Rivers the Ganges, Brahmaputra and Meghna, every year, floods occur in low-lying areas of Bangladesh (Fig. 1) that cover a mean area of 20% (Fig. 2) of the 144,000 km² area of the country. Based on inundation depth, it is estimated that a 10, 50 and 100-year flood event is projected to inundate approximately 37%, 52% and 60% of the country's total land area, respectively [2]. Outside the cyclone-affected coastal region where flooding occurs as a result of storm surges in April–May and October–November [3], there are four main types of flood in Bangladesh [4]: (i) monsoon, riverine floods when the major rivers overflow or cause their tributaries runs off into adjacent floodplains; (ii) flash floods in the eastern (hilly region), northeastern (Haor region) and northern areas (piedmont area) due to heavy and intense rainfall; (iii) localised coastal floods associated with tropical cyclones and storm surges in southern Bangladesh; and (iv) localised urban floods associated with intensive rainfall and/or onrush of river water when

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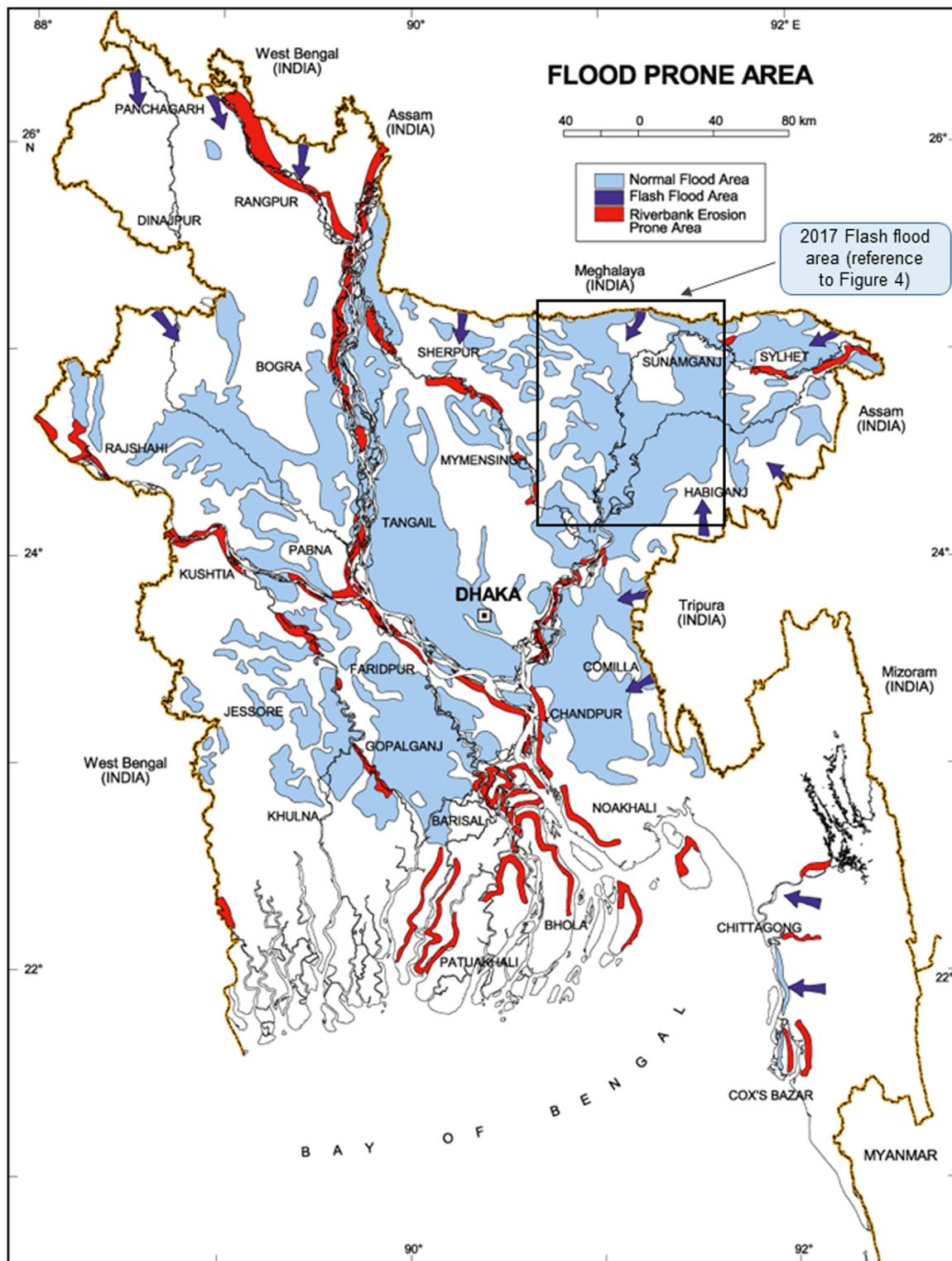


Fig. 1. Map of Bangladesh showing the extent of river flooding, areas of river-bank erosion and indicative areas along the eastern, northeastern and northwestern border that are prone to flash flooding and torrential hilly river flows. Map source: Banglapedia et al., [5].

protective embankments breach takes place. The normal sequence of floods in Bangladesh starts with flash floods in the northeast, southeast and eastern hilly regions caused by pre-monsoon storms in April and May, and prior to the onset of the monsoon rainfall generally commences in June that normally causes riverine flooding.

Globally, with a population density of ~1000 inhabitants per km² [6], Bangladesh is the country with the highest number of people and

assets are exposed to increasing flood hazards [2]. River floods can inundate a large area, for example, nearly 60% area of Bangladesh was flooded in the catastrophic floods of 1988 and 1998 that inundated an area of 70% (Fig. 2) and killed some 2379 and 918 people respectively [7]. Floods in 2007 were one of the 95th percentile flood events inundating 42% of the entire Bangladesh and killed 1110 people [7]. These historical large river floods (e.g., 1987, 1988, 1999, 2004, 2007

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