Natural hazards and climate change in Dhaka: future trends, social adaptation and informal dynamics

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Similar to many megacities in the world, Dhaka is regularly threatened by natural hazards. Risks associated with floods and cyclones in particular are expected to increase in the years to come because of global climate change and rapid urbanization. Greater Dhaka is expected to grow from 13.5 million inhabitants in 2007 to 22 million inhabitants by 2025. The vast majority of this growth will take place in informal settlements. Due to the setting of Greater Dhaka in a deltaic plain, the sprawl of slums is primarily taking place in wetlands, swamps and other flood-prone areas. Slum dwellers and informal businesses are vulnerable, but have somehow learned to cope with seasonal floods and developed specific adaptation strategies. An increase of precipitation extremes and tropical cyclones, however, would put considerable stress on the adaptability of the social and economic system. Dhaka-Hazard, a joint research project of the Department of Meteorology at the University of Bonn and the Department of Geography at the University of Cologne, takes up these issues in an interdisciplinary approach. The project, which begun in November 2008, aims to achieve two main objectives:

1. To link analyses of informal social and economic adaptation strategies to models on future climate change and weather extremes.

2. To estimate more accurately the future frequency and magnitude of weather extremes and floods which are crucial for the future adaptability of informal systems.

To fulfill these objectives, scientists at the Meteorological Institute are studying the evolution of natural hazards in Bangladesh, while researchers at the Department of Geography are undertaking the task of assessing these hazards from a social point of view. More specifically, the meteorologists are identifying global and regional weather conditions resulting in flooding of the Greater Dhaka region, while possible variations in flood-inducing weather patterns are analyzed by evaluating their frequency and magnitude. Findings are then applied to future global climate scenario runs to obtain a first estimate of trends for the frequency and magnitude of weather extremes and their impact on spatial and temporal characteristics of floods in the Greater Dhaka region. From this estimate, a prediction method for the spatial patterns of flooding within the Dhaka area will be developed.

The social part of the project analyzes the vulnerability and resilience of economic and social systems within high-risk areas by utilizing methods such as e.g. quantitative household surveys in Dhaka and qualitative expert interviews. Geographers are hoping to

1. identify adaptation and recovery strategies of slum dwellers and informal businesses (e.g. brickfields, tanneries),

2. analyze the role of social capital as well as formal and informal institutions for building up resilience, and

3. analyze possibilities and limits of adaptation strategies under conditions of further urban growth and climate change.

By paying attention to the important behavioral patterns of the informal sector, a meteorological early warning system can then be developed to make better use of weather predictions to mitigate weather-related risks for

Greater Dhaka. If successful, this project poses as an exemplary intersection of social science and natural hazards research.