B29

Hydraulic and Morphological Consequences of Bank Protection Measures along the Jamuna River, Bangladesh

○Hao ZHANG, Hajime NAKAGAWA, Yasuyuki BABA, Kenji KAWAIKE,
Md. Munsur RAHMAN and Mohammad Nazim UDDIN

The Brahmaputra-Jamuna River (named Jamuna River within Bangladeshi) originates from the Himalayas and flows across China, India and Bangladesh. It meets with some major rivers in its lower part: the Teesta, the Ganges and the Meghna and supplies sediment into one of the world's largest deltas before finally entering the Bay of Bengal. The Brahmaputra-Jamuna River ranks in the top group of the earth's large rivers in terms of both water and sediment discharges. The river is braided and geomorphologically active, characterized by numerous shifting channels and rapid bank erosion. The frequent migration of the Jamuna River consumes large areas of floodplain, makes thousands of people homeless and destroys lots of infrastructures in Bangladesh. Effective management of this river is crucial and urgent to reduce water-related disasters and to eliminate the country's poverty.

In the past several decades, a lot of hard measures have been implemented against bank erosion such as BRE (Brahmaputra Right Embankment), groynes, revetments and recurrent dredging. Unfortunately, many of these measures are expensive but found to be not successful or sustainable. In this study, the hydraulic and morphological consequences of some of the bank protection measures are investigated with field survey methods. Based on the research results, the performance and sustainability of those measures are evaluated quantitatively and suggestions are made for possible improvements.

Field surveys with an ADCP (Acoustic Doppler Current Profiler) and a GPS (Global Positioning System) were conducted in year 2008 and year 2009. Two field sites which are of great importance designated by the Bangladesh government were chosen for the investigation. One is the Sirajganj hard point very near to the Sirajganj Town and the other is the Betil/Enayetpur spur located 25km south of Sirajganj Town. Both measures experienced several times of failures after their completion.

According to the field survey data and related supplement data from the local government, the temporal changes of the local bed level and velocity field in the investigation sites are clarified. The mechanisms of channel bank erosion and frequent failures of existing projects are discussed in details. Finally, new bank protection measures based on research findings and indigenous knowledge are proposed and research results on the performance of the new measures are presented as well.

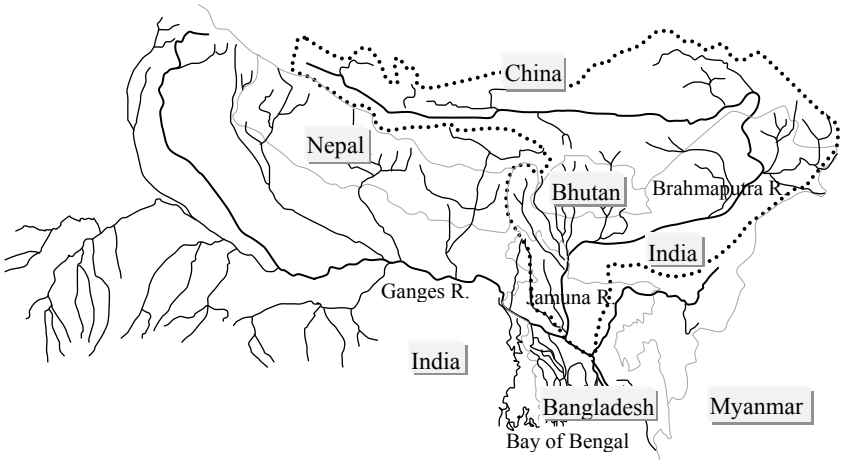

Fig.1 Catchment and location of the Jamuna River