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Article

A Century of Riverbank Protection and River Training in Bangladesh

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Abstract: Protecting against riverbank erosion along the world's largest rivers is challenging. The Bangladesh Delta, bisected by the Brahmaputra River (also called the Jamuna River), is rife with complexity. Here, an emerging middle-income country with the world's highest population density coexists with the world's most unpredictable and largest braided, sand-bed river. Bangladesh has struggled over decades to protect against the onslaught of a continuously widening river corridor. Many of the principles implemented successfully in other parts of the world failed in Bangladesh. To this end, Bangladesh embarked on intensive knowledge-based developments and piloted new technologies. After two decades, successful, sustainable, low-cost riverbank protection technology was developed, suitable for the challenging river conditions. It was necessary to accept that no construction is permanent in this morphologically dynamic environment. What was initially born out of fund shortages became a cost-effective, systematic and adaptive approach to riverbank protection using improved knowledge, new materials, and new techniques, in the form of geobag revetments. This article provides an overview of the challenges faced when attempting to stabilize the riverbanks of the mighty rivers of Bangladesh. An overview of the construction of the major bridge crossings as well as riverbank protection schemes is detailed. Finally, a summary of lessons learned concludes the impressive progress made.

Keywords: Brahmaputra; Bangladesh; riverbank protection; river training; geobag revetments; adaptive approach

1. Introduction

1.1. The Disaster Prone Ganges and Brahmaputra Delta

> ***"He had heard it said, by one who knew them well, that the longer one studied the Bengal rivers the less one understood them; dread of their vagaries certainly increased with closer acquaintance."*** *Mr. J.N.D. La Touche in correspondence with Sir Robert Richard Gales on the Hardinge Bridge over the Lower Ganges at Sara, reported by Gales in 1917 [1].*

The development of river training works and riverbank protection in Bangladesh is closely linked to how the fast-growing and developing population attempts to deal with one of the most hazard-prone deltaic landscapes on earth. The Ganges and Brahmaputra (named the Jamuna in Bangladesh) are among the ten largest rivers of the world [2]. Both rivers join in Bangladesh to form the Padma River (Figure 1). The Padma River has a discharge of approximately 150,000 m^3/s during a 100 year flood event [3] and an estimated annual average sediment load between 0.5 and 1 billion tons [4]. With an annual average discharge of 30,000 m^3/s, the Padma is the third largest river in the world (in terms of discharge), only surpassed by the Congo and Amazon.

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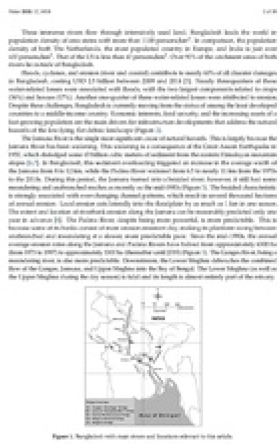

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Blue Gold Program Wiki

The wiki version of the Lessons Learnt Report of the Blue Gold program, documents the experiences of a technical assistance (TA) team working in a development project implemented by the Bangladesh Water Development Board (BWDB) and the Department of Agricultural Extension (DAE) over an eight+ year period from March 2013 to December 2021. The wiki lessons learnt report (LLR) is intended to complement the BWDB and DAE project completion reports (PCRs), with the aim of recording lessons learnt for use in the design and implementation of future interventions in the coastal zone.