

**Blue Gold Program  
Lower Bhadra River Erosion Damage  
Breach to Polder 29 near Chandghar Village  
Briefing Note**

**Background**

Chandghar village is located in Sharafpur union of Dumuria upazila in Khulna district, close to the eastern perimeter bund of Polder 29 and adjacent to the Lower Bhadra river. Since the creation of the polder in 1968, the embankment has been prone to river erosion and the embankment in this reach has been eroded eleven times. During IPSWAM (2004-2011), the embankment was eroded twice.

The considerable area that has been eroded in the vicinity of Chandghar is shown in Figure-1 (Mouza Map) comparing the alignment of the river bank at the time of surveying the Mouza map (unknown) and the sketched alignment of the river bank in March 2015.

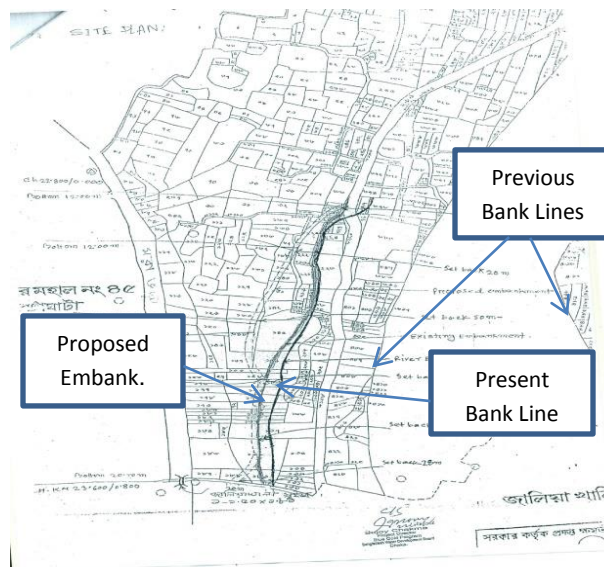


Figure-1: Location of Present River Bank in Mouza Map

**Recent History**

- **Monsoon 2013:**

There were severe erosion in the Chandghar area and the people were really at a loss thinking of their future. They appealed to local UP, UZP, local MP and BWDB for some kind of protective measures. As temporary protection was no more practiced in BWDB design offices, BWDB was trying for some kind of hard (CC Block) protection, but could not manage necessary fund.

- **Dry season 2014:**

During this year erosion was getting worse. Local people appealed to the local MP and Minister for Fisheries & Livestocks, who gave them some hope of concrete block protection. As reported he also assured them that the fund was almost there and the work would be done soon. When Blue Gold Program became operational in April 2014, this issue was of primary importance to Blue Gold Program. Blue Gold had several meetings with WMGs, WMA and UPs regarding probable action that could be taken. Blue Gold proposed that since this program does not have provision for concrete block protection, it can go for a retired embankment at a sufficient setback distance (min. 100m). But the people were not ready to accept embankment retirement as they have already lost huge

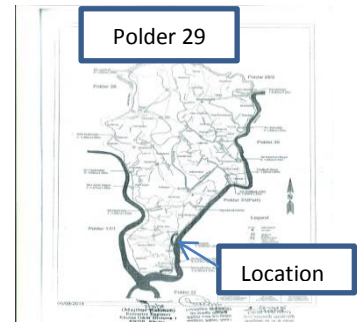


Figure-2: Continued Erosion in 2014

amount land during last decades because of erosion as well as retirement. Moreover, they were somewhat convinced that the MP and Minister of Fisheries would be able to arrange fund for hard protection that, in their opinion, would provide a permanent solution as well as reduce loss of huge land and homesteads. At some stage local people even told that Blue Program is not required in polder 29 if they cannot do hard revetment protection. However, Blue Gold did not stop and continued their effort of convincing the people.

- **Monsoon 2014:**

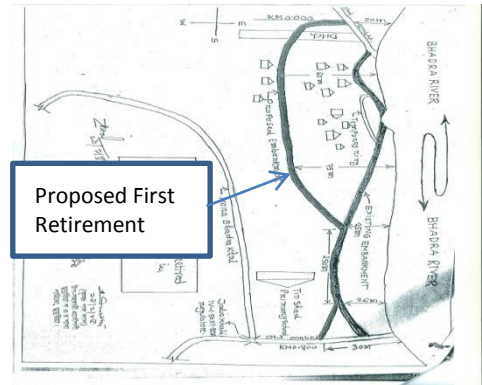
Further erosion of embankment with reaches close to Chandghar now in a critical state, and vulnerable to collapse. Blue Gold Program TA team, PCD, WMA, WMGs, UPs, and Field XEN had several meetings at the erosion site trying to convince the people to allow land for a retired embankment otherwise the situation will become uncontrollable and there will be huge damages. But the people were still hoping for the Minister’s assurance of hard revetment. After several months when they understood Minister’s project might be much delayed or may not even happen and the situation was aggravating, they agreed for a retired embankment at closer distance from the river bank, as Blue Gold Program did not have provision for land acquisition and resettlement compensation. The proposed location of retired embankment is shown in Figure-3.



**Figure-3: Location of Proposed First Retirement**

- **Dry season 2015:**

BWDB/TA recommended alignment of retired embankment some 100m distant from the active river bank. Local community (Chatchatia Sluice WMA - known as “CS WMA” in 2015) objects because no offer for land acquisition or compensation, and many houses and land would be outside the proposed embankment and be at risk.



**Figure-4: Alignment for First Retirement**

WMA accepts an alignment which (in the view of BWDB/TA) is too close to the actively eroding river bank. Although Figure-4 (February 2015) shows a 60/75m set-back, the retired embankment was in fact much closer. The alignment is also shown in the Mouza Map as in Figure-1.

12 April 2015: Construction contract for the retired embankment was awarded to a contractor.

Mid May 2015: Contractor started work but at a very slow pace because of land problem and other social issues. In the true sense the work started in June and that was already the beginning of the rainy season.

In the meantime apprehending probable danger the local UP did some backing of the embankment in several reaches (Figure-5).



**Figure-5: Backing of Embankment-Local Initiative**

In some places they also used porcupines using BWDB designs. Local people also tried with different indigenous methods but nothing worked well. There was almost an imminent breach at one location and apprehending the danger BWDB constructed a ring dike in the countryside of this point (Figure-6).

The contractor was progressing very slowly and in an unplanned manner. He started piecemeal works at different reaches (Figure-7 & 8). Though it was almost end of July, full monsoon, he could not even put a dwarf dike to cover entire the alignment.



**Figure-6: Temporary Ring Dike by BWDB**



**Figure-7: Under-Construction Embankment (not full section)**



**Figure-8: Under- Construction Embankment (Base Layer)**

Some reaches of the embankment were just touched or have not been touched even during the last week of July 2015. Two of such reaches as shown in Figures-9 and 10 triggered the breaches and developed three deep channels, making way for huge floods entering the polder area during the cyclone Komen on 31<sup>st</sup> July 2015.



**Figure-9: Vulnerable Reach Causing Breach & Channel Development**



**Figure-10: Vulnerable Reach Causing Breach & Channel Development**

23 July 2015: Site visit by BWDB/TA identifies physical progress of the ongoing work was approximately 14%, poor quality earthwork too close to river bank (apprx. 20m) – community opposition to BWDB/TA (contrasted with measures provided by CEIP). After that the contractor was repeatedly asked to increase his labor and equipment at least to close Baintola khal and develop a moderate section covering the entire alignment, but there was not much effort on his side. The assessed overall progress on 30 July 2015 was around 18%, still with gaps and vulnerable reaches (Figures-9 & 10).

- **Monsoon 2015:**

During July 2015 the condition of the original embankment along the river bank was deteriorating further, at some points almost on the verge of failure, and increasing threats to the under-construction embankment just several ten meters inside the eroding banks (Figure-11 & 12).



Figure-11: Severe Erosion – on the Verge of Failure



Figure-12: Severe Erosion- with Last Struggle to Save

30-31 July 2015: On 30 July a depression developed in the Bay of Bengal and finally turned in to a cyclone called “Komen”, which crossed the shoreline on 31 July 2015. The original embankment breached at the end point of Baintala khal during high tide compounded by effect of cyclone Komen accompanied with heavy rainfall, resulting in flooding and damage to houses and crops (separate reports). The breach also developed three deep channels across the alignment of the under-construction retired embankment, making continuation of work very very difficult.

Emergency measures taken up by Union Parishad: to protect Chandghar region, Sharappur Union Parishad and local people with the help of WMA and BWDB started constructing a ring dike at the country side of the existing embankment (Figures-13 & 14). Although the local people and the contractor tried their best at that moment to close the breach, their efforts ended in vain due to high velocity of water in the river. Moreover, breaches occurred at two more locations due to the high velocities during high tide. A large portion of Sundarmahal, BCG and Akra Bahir Akra WMG areas were flooded.



**Figure-13: Rows of Bamboo Pins to Make Ring Dike**



**Figure-14: Flooded and Damaged Ring Dike**

According to a preliminary report by Blue Gold TA Team, the flood affected about 11 villages under Dumuria Upazila and 7 villages under Batiaghata Upazila of Khulna District. About 1286 households were more or less affected, 404 houses were totally damaged (mostly mud & thatched houses) and 325 houses were partially damaged. Some 684 fish ghers were destroyed. T.Aman seedlings were damaged in about 30 ha of land and vegetables were damaged in about 20 ha of land. A vast area of land was covered under silt.

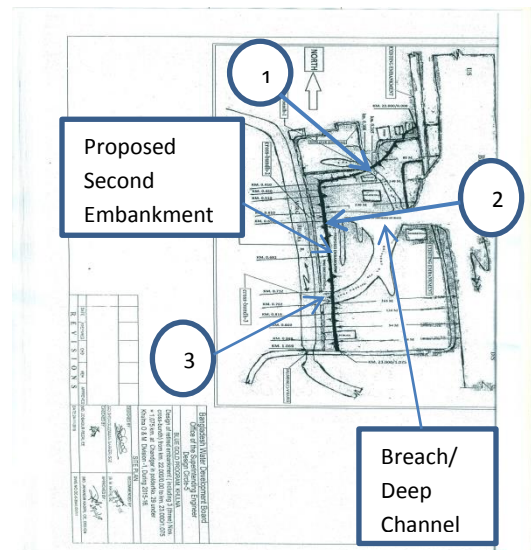
26 November 2015: EKN agrees to contribute partly to emergency works by contractor and Union Parishad.

- **Dry season 2016:**

To close the three breaches (deep channels) formed during monsoon 2015 and to protect Chandghar region, BWDB's Design Circle-5 designed a new embankment with three closures (Figure-15) provided with a minimum set-back distance of 100m. Local people agreed with the understanding that land acquisition provision has been included in the revised DPP and will be processed as soon as the revised DPP is approved. A contractor was appointed under the Blue Gold Program by Khulna O&M Division-1 of BWDB.

14 February 2016: Contract awarded to the contractor.

20 April 2016: Late start of construction of retired embankment by Contractor Biswas. Contractor Biswas claims that delayed start was due to request by MP and Minister, Fisheries and Livestock Services to delay start until outcome of UP elections confirmed since an element of contract (royalty for earth) needs to be managed and monitored by the newly elected UP Chairman. He also claims there was severe labor shortage as most of the laborers were engaged in election campaign and post- election activities.



**Figure-15: Second Embankment with Breach Closing**

There were repeated attempts by contractor to close main channel (cross dam 3 on Figure-15) but failed as the velocity was too high. The last breach was finally closed on 28 June 2016. The main embankment was still very weak but intact. Bamboo pins, Bandalings and sand bags used for closing the main breaches (2 & 3) are shown in Figures-16, 17 & 18. The under-construction embankment is shown in figure-19.



**Figure-16: Closing of Second Breach with Bamboo Pins, Sand Bags and Earth (Cross Dam-2)**



**Figure-17: Wooden Bandaling for the Third Breach (Cross Dam-3)**



**Figure-18: Sand Filled Synthetic Bags for Cross Dam -3**



**Figure-19: Under-construction Embankment**

- **Monsoon 2016:**

Embankment withstood monsoon.

- **Dry season 2017:**

Progress of 2015/16 and 2016/17 contract is around 45%.

**Urgent Actions:**

Although total progress of the retired embankment construction work at the moment is 45%, current progresses of three closures are 20%, 20% and 10% respectively. These three closures with revetments on the slopes along with the entire retired embankment must be completed before monsoon 2017.

**IWM Study:**

IWM was entrusted by Blue Gold on 19th February 2015 for the study of "River Bank Erosion Management in polder 29, Khulna" to identify causes of erosion and develop a comprehensive and innovative adaptive approach for mitigating erosion. The final report was submitted in April 2016 and IWM recommended series of top blocked semi-permeable spurs with sand filled geo-bags in scour hole as erosion protection measure. Design Circle-5 of BWDB supplied the design as per recommendation of the report in October 2016.