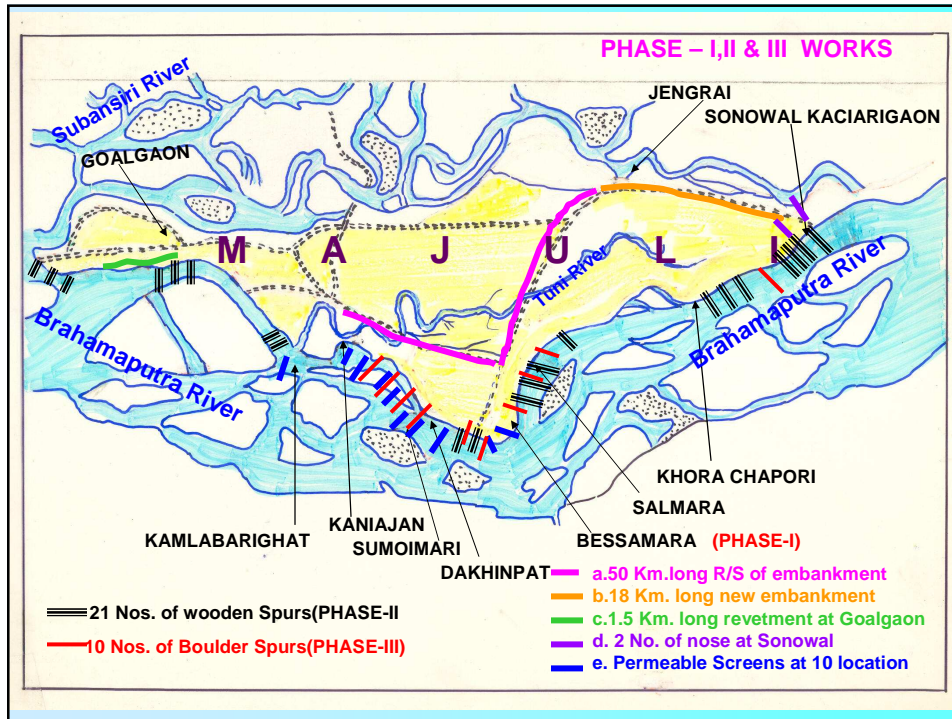


PROTECTION OF MAJULI ISLAND AGAINST FLOOD & EROSION -A CASE STUDY

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Introduction

- The Majuli island is the largest inhabited riverine island in the world
- Located in north of Jorhat town, Assam in the upper reaches of the river Brahmaputra bounded by river Brahmaputra, river Subansiri and river Kherkutia Suti .
- An administrative sub-division of Jorhat district extends for about 80 km along the east west and about 10 -15 km along north south direction..



Problem

- Two major problems -flood inundation and bank erosion.
- River Brahmaputra's bed is reported to have risen and caused large damages in the upper reaches of the island due to water spills over its bank after the great earthquake of 1950.
- Geographical area remains 874.33 sq km (1994) against 1246 sq km (prior to 1950).

Cause

- Bank erosion at Majuli Island is caused by instability of the river behaviour, this is due to deforestation of the forest in the friable hills, occurrence of frequent earthquakes and the faulty land use leading to excessive sediment load into the streams.
- Bank erosion occurs during the receding stage of the floods.
- The Chumaimari spill channel originating from the Brahmaputra River from Bessamora to Dakhinpat and then up to Kamlabari is causing serious bank erosion on the southern side of the Brahmaputra dyke since 1990

Existing works

- Construction of embankment introduced in the island during 1952-53 to contain the floods,.
- Embankments constructed with the available hydrological data and the topographical surveys.
- 155 km of embankments constructed, however, at present only 88 km of embankments exist.
- The embankments constructed earlier were not proper due to insufficient hydrological and survey data and have breached on number of occasions.

Master plan for majuli island prepared by the Brahmaputra board:

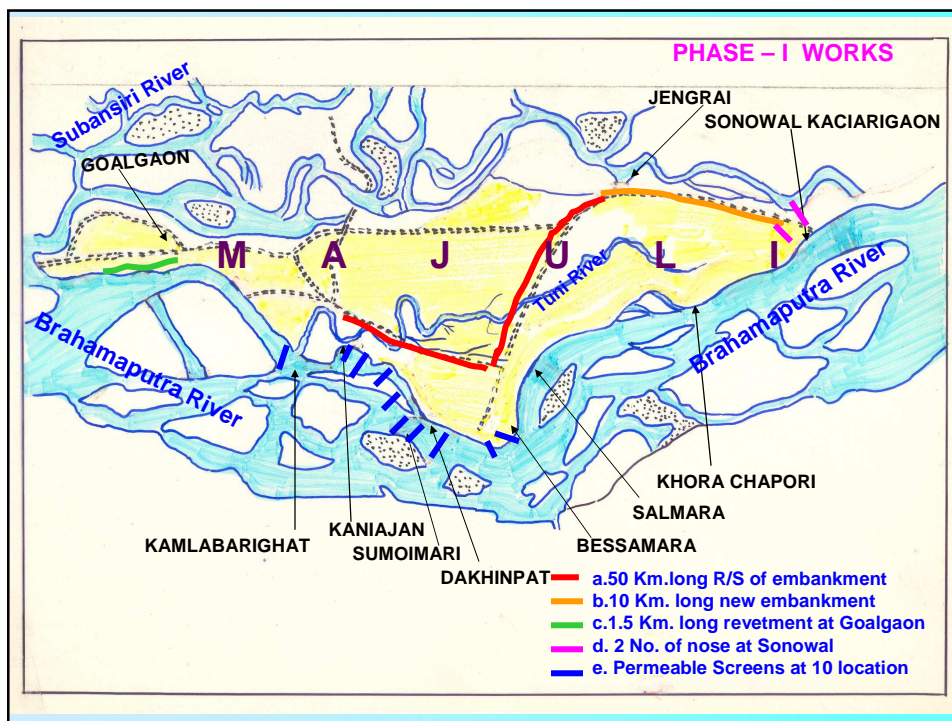
- On the recommendation of the expert team, the Brahmaputra board had prepared a master plan for development of Majuli island.
- The master plan inter-alia included measures for flood control, erosion control & drainage improvement.
- This master plan was approved by the Government of India in Feb 2004.

Proposals/Schemes prepared by the Brahmaputra board

- The scheme titled “ Protection of Majuli island from flood and erosion”, at an estimated cost of Rs.86.56 crore envisaged the following works to be executed in three phases.

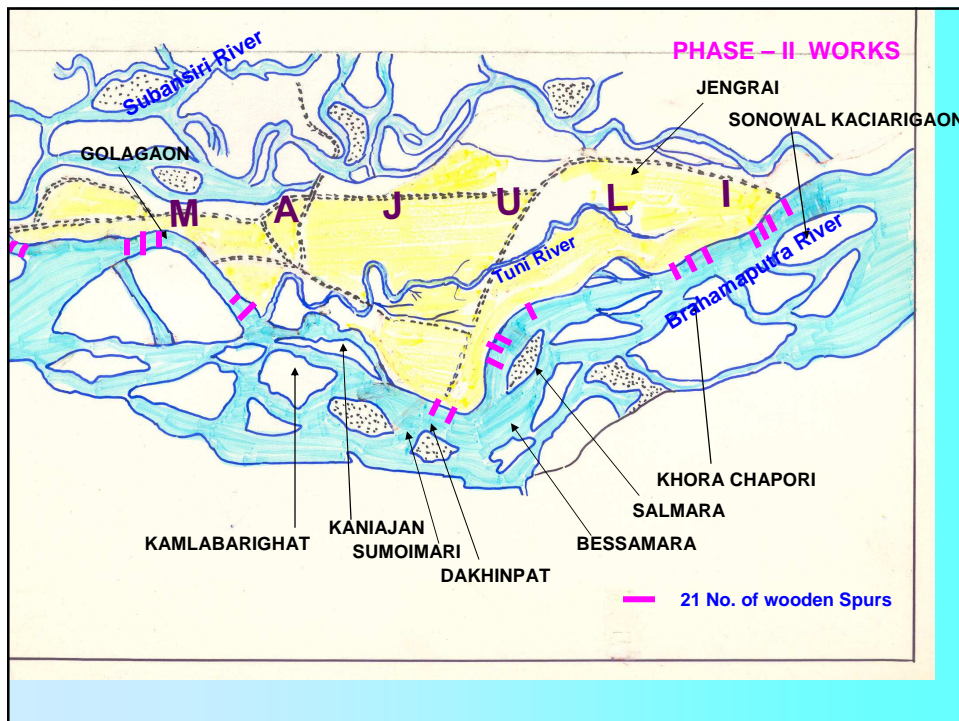
PHASE-I

- Construction of nose of 2 nos of the existing land spurs in the Sonowal Kacharigaon to Kandulimari
- Permeable screens in the form of RCC porcupines (1390 nos.) .
- Improvement of road cum embankment from Matmora-Tekeliphuta-Haldibari to Bessamora-Dakhinpat and Kanijan dyke and also from Jengrai to Kamlabari via Bongaon Rowanpur (50 km).
- Construction of new embankment from Jengrai to Sonowal(18 km)
- Bank revetment work in Goal-gaon(1.5 km).
- Survey and data collection for physical model study and laying of model...



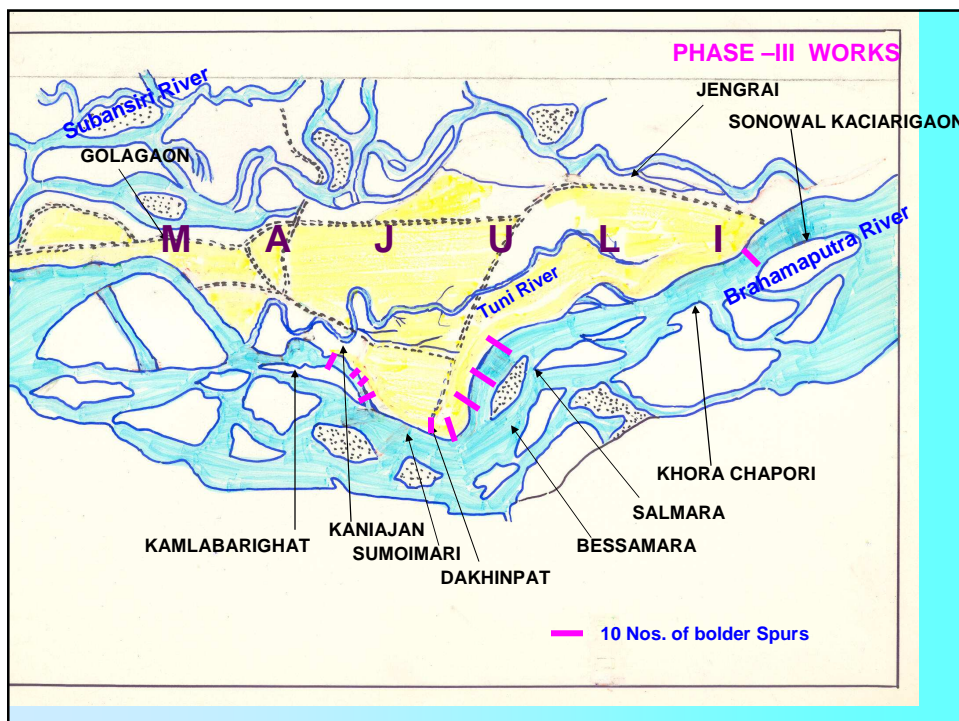
PHASE-II

- 21 nos(420 m total length (20m each)) of permeable spurs are to be constructed in specific locations in the above reaches.
- Model study finalisation.



PHASE-III

- 10 (ten) nos of land spurs in the Sonowal Kacharigaon to Kamlabari reach along with bank revetment in a stretch of about 1.5 km.
- *AT PRESENT THE WORKS OF FIRST PHASE AT AN ESTIMATED COST OF RS. 41.28 CRORES ARE IN PROGRESS.*



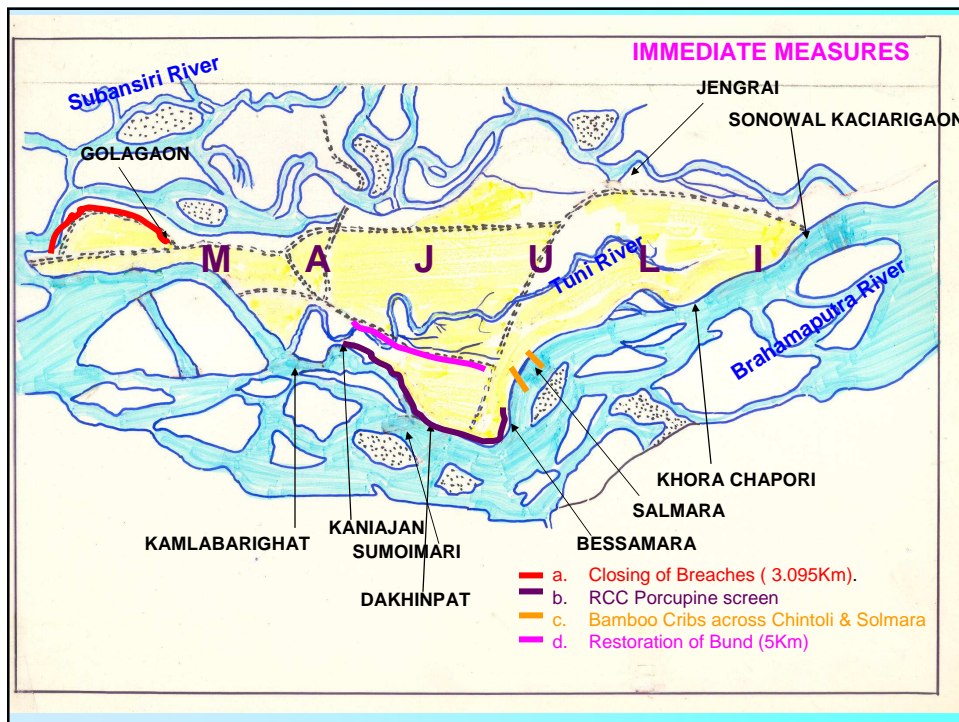
Immediate Measures

- Pending execution of main scheme it was considered appropriate to take immediate measures before the floods of 2003. An expert team visited the site on 17/06/03 and recommended the works at an estimated cost of Rs 6.22 Cr.

Immediate Measures

contd...

- Construction of permeable screens of standard RCC porcupines of length 25 m and at interval of 50 m at 10 locations in a length of 9200 m .
 - Construction of bamboo crib screens across Chintoli and Salmara Suti
 - Construction of RCC porcupine spurs at the outfall of Chinatoli Channel spur
 - Restoration of retirement bund from Kamlabari to PWD road (Bongaon) for a length of about 5000 m.
 - Closing of breaches from Malpindha to Molual and in Pahumara to Haldhibari for a length of 3095 m at 18 locations.
- The above works had been almost completed during 2003-04.



EXPERT TEAM VISITS

- The monitoring committee comprising officers from cwc, Brahmaputra board and state govt of Assam visited the Majuli site on 21st-23rd Aug-05 and 17th-19th Nov, 05 and made certain recommendations taking into account the condition prevailing at site. MOWR constituted an Experts committee under chairmanship of the Member(RM), CWC to study the erosion problems of Majuli island (Assam) in November 2005.
- The committee inspected the Majuli island on 18/04/06 and 19/04/06 and submitted its inspection report.

Recommendations of the team

▪KHORACHAPORI:

- Two screens of 2.5 km each were laid at this point. the screens reduced the flow as desired in the Salmara and Bessamara area.
- Immediately there is need to strengthen the screens in the deepest sections of the channel by laying porcupines in layers for a portion of about 450 m.

▪SALMARA :

- The porcupine spurs laid under immediate measure as well as during 2005 have performed quite well.
- The bank was not graded properly and porcupines at the end were placed on the top of the bank rather than at LWL.
- The screen needs to be extended on the bank by laying three porcupines in three rows.
- It was recommended that the protection works be strengthened by laying one more screen in between existing ones..

Recommendations of the team contd..

▪BESSAMARA:

- The main stream of Brahmaputra hits the bank obliquely and erosion is severe in this reach of about 1 km.
- The bank needs to be protected by strengthening existing works by installing dampeners in between the existing screens.

▪APHALAMUKH BOULDER SPUR:

- As per the public petition received by the committee, necessity of a boulder spur at this location was examined by the committee.
- The committee did not consider technically appropriate to construct a boulder spur at this point.
- It also did not consider necessary to carry out any work in this reach at this stage as the river was observed to be quite stable.

Recommendations of the team contd..

▪ DAKHINPAT:

- The two nos. of screens constructed before 2005 floods needed to be tied to the embankment to avoid outflanking.
- The committee observed that it would be a better proposition if the existing screens were strengthened and extended along the channel which has already developed during 2005 monsoon.

▪ KANIAJAN:

- The team observed that the five nos. of dampeners (porcupines in layers laid to function as permeable bullhead spur) erected by board had protected the bank as envisaged.
- However there is large gap between the 1st dampener laid at Sumoimari check dam and 2nd dampener. the team recommended erection of three more dampeners in this reach of about 1 km.

Recommendations of the team contd..

▪ REACH BETWEEN KANIAJAN AND KAMLABARI:

- Severe erosion was observed in this reach of about 3 km length.
- The scheme under implementation does not envisage any work in this reach.
- The committee felt that the reach needs to be protected by laying of similar dampeners as laid in Kaniajan area at an interval of about 200 m–300 m.

▪ KAMLABARI:

- The wooden spurs and dampeners laid by Bahmaputra board are found to be working satisfactorily.
- The team suggested that the alternative porcupine dampeners be tied with the embankment by laying three rows of porcupines.

Recommendations of the team contd..

- The team recommended that proper documentation of the velocity, depth of flow, bank line before and after floods etc in the various reaches should be kept by the board so that a study can be made later on the performance of these anti-erosion works and standardized their design.
- The recommendations are being implemented by the Brahmaputra Board.

Conclusion

- Siltation measures in the form of RCC porcupines have been found quite effective in reducing intensity of erosion of the river Brahmaputra at Majuli island, Assam.
- The works of Phase-I at an estimated cost of Rs. 41.28 crores of the scheme “protection of Majuli island from flood and erosion” are in progress since 2005 and are yet to be completed substantially.
- However, from the observations made by the Experts Committee during their visit in April, 2006, it can be stated that the works in the form of RCC porcupines which are cheap in cost, easy to construct, sustainable and without significant adverse effects in upstream or downstream or on opposite bank are a proven tool for checking erosion of river banks.

THANK YOU