HAOR FLOOD MANAGEMENT
AND
LIVELIHOOD IMPROVEMENT PROJECT
(BWDB Under Ministry of Water Resource)

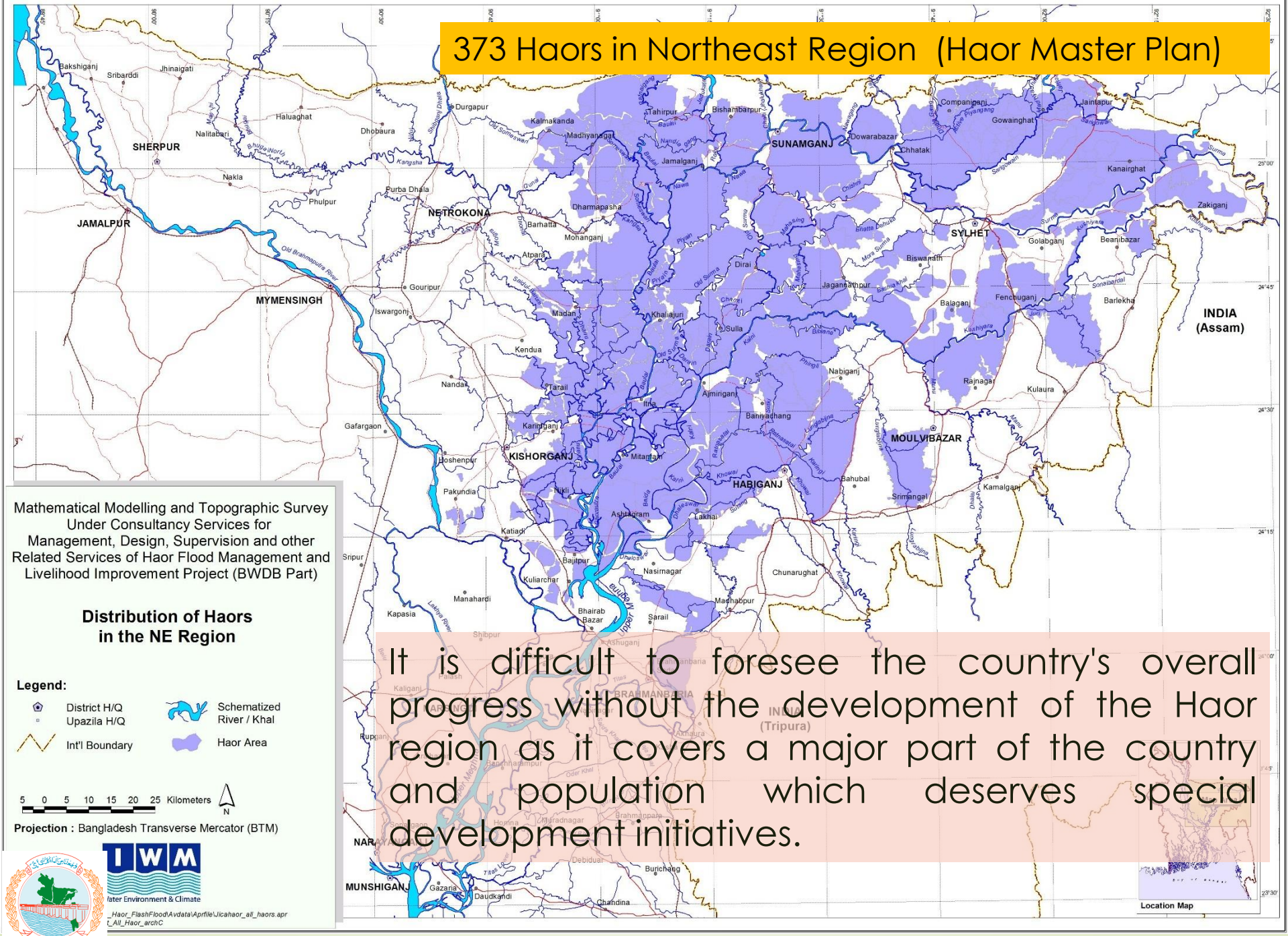
Presented By
Md. Fakhrul Abedin
Addl.Chief Engineer/ Project Director
HFM&LIP, BWDB

Outline of the Presentation

1. Haor area and Background of the project
2. Location of the project.
3. Objective of the project
4. Planning of the project
5. Cost of the project.
6. Progress of the project
   a. Civil Works
   b. Livelihood components
6. Project Activities in photo

Some Flood Damage Photograph of Dharmapasha Rui Beel Haor

373 Haors in Northeast Region (Haor Master Plan)



Mathematical Modelling and Topographic Survey Under Consultancy Services for Management, Design, Supervision and other Related Services of Haor Flood Management and Livelihood Improvement Project (BWDB Part)

Distribution of Haors in the NE Region

Legend:

- District H/Q
- Upazila H/Q
- Int'l Boundary
- Schematized River / Khal
- Haor Area

5 0 5 10 15 20 25 Kilometers

N

Projection : Bangladesh Transverse Mercator (BTM)

IWM Water Environment & Climate

_Haor_FlashFlood\Avdata\Aprfile\Jicahaor_all_haors.apr
t_All_Haor_archC

It is difficult to foresee the country's overall progress without the development of the Haor region as it covers a major part of the country and population which deserves special development initiatives.

Background

- **Sponsoring Ministry:** Ministry of Water Resources
- **Executing Agency:** Bangladesh Water Development Board (BWDB)

Objectives of the project :

The overall objective of the project is to reduce the damages of Boro crops from pre-monsoon flood, improve access to basic infrastructure and increase agriculture and fishery productivity in the hoar areas in the upper Meghna river basin by-

- Rehabilitating and constructing the flood management facilities;
- Rehabilitating and constructing the rural infrastructures; and
- Implementing agriculture and fishery promotion activities,

and thereby contributing to the improvement of living standard and activation of economic activities in the target area.

No. of Haors as per Haor Master Plan

District	Total area in ha	Haor area in ha	No. of Haors
Sunamganj	367,000	268,531	95
Sylhet	349,000	189,909	105
Habiganj	263,700	109,514	14
Maulavibazar	279,900	47,602	3
Netrokona	274,400	79,345	52
Kishoreganj	273,100	133,943	97
Brahmanbaria	192,700	29,616	7
Total	**1,999,800**	**858,460**	**373**

Background

- Bangladesh is a low lying delta of three major rivers Ganges, Brahmaputra & Meghna
- Haor area covers the upper Meghna river basin area around 8600 km^2
- Economic activity of this area is based on agriculture & fisheries only
- Boro is the main crop. The production of Boro is 5.3 MillionTons/Yr which is 16% of total production of country
- Flash Flood caused by severe rainfall in the mountainous area of India in the pre-monsoon period causes severe damages to paddy field just before harvesting
- April to mid-May (Pre-monsoon) is a major concern due to its effect to crop production but that in the Monsoon season (mid May-October) is not considerably important since no crops are planted

Background

- The occurrence of flash flood in the pre-monsoon season damages boro rice (single crop) and others cereals in the area
- The major disasters in the area which affects the primary production sector (e-g. agriculture & Fisheries) and thus threatens the lives and livelihood of the people (mostly farmers)
- If flash flood continue to damage the production of boro rice, people will remain in a stress condition until the next year's harvest

Background

- **JICA** & **BWDB** made Preparatory Survey (Feasibility Study) on the "Upper Meghna River Basin Watershed Management Improvement Project"
- **Three** outcome of this study:
  - Flood Management
  - Rural Infrastructure Development and
  - Agriculture & Fisheries promotion

- **Realization of the study:**
  - Measures for Flood Mitigation
  - Livelihood enhancement for Haor

❖ For this purpose the minutes of discussion signed on 3rd March, 2014 between **JICA** and **BWDB & LGED**

- As per Preparatory Survey Report (Feasibility Study) & Minutes of discussion, a project "**Haor Flood Management and Livelihood Improvement Project**" is taken up.

Project Components

BWDB Part

Component 1:

Construction and rehabilitation of

Flood Management Infrastructure

Component 3-1:

Implementation of livelihood improvement activities through **Agriculture Production Improvement**

LGED Part

Component 2:

Construction and rehabilitation of Rural Development Infrastructure

Component 3-2:

Implementation of livelihood improvement activities through Fishery Production Improvement

Project Components (BWDB part)

Capacity development

1. Training for O&M manual preparation (for BWDB officials)
2. Training for water management organization (WMO) (formation of WMO, management training, O&M technical training for WMO members)

Agriculture Promotion Support Subproject (APSS)

1. Field program (adaptive trial of new varities, field demonstration on improved agricultural practices etc.)
2. Farmer training program (farming skills, farmer's organization strengthening, etc.)
3. Field staff empowerment,
4. Small-scale farmer support
5. Farm machinery support
6. Technology development

Small Scale Income Generation Subproject (SIGS)

1) Small scale income generation (Vegetable, micro-poultry, fruit production ,etc)

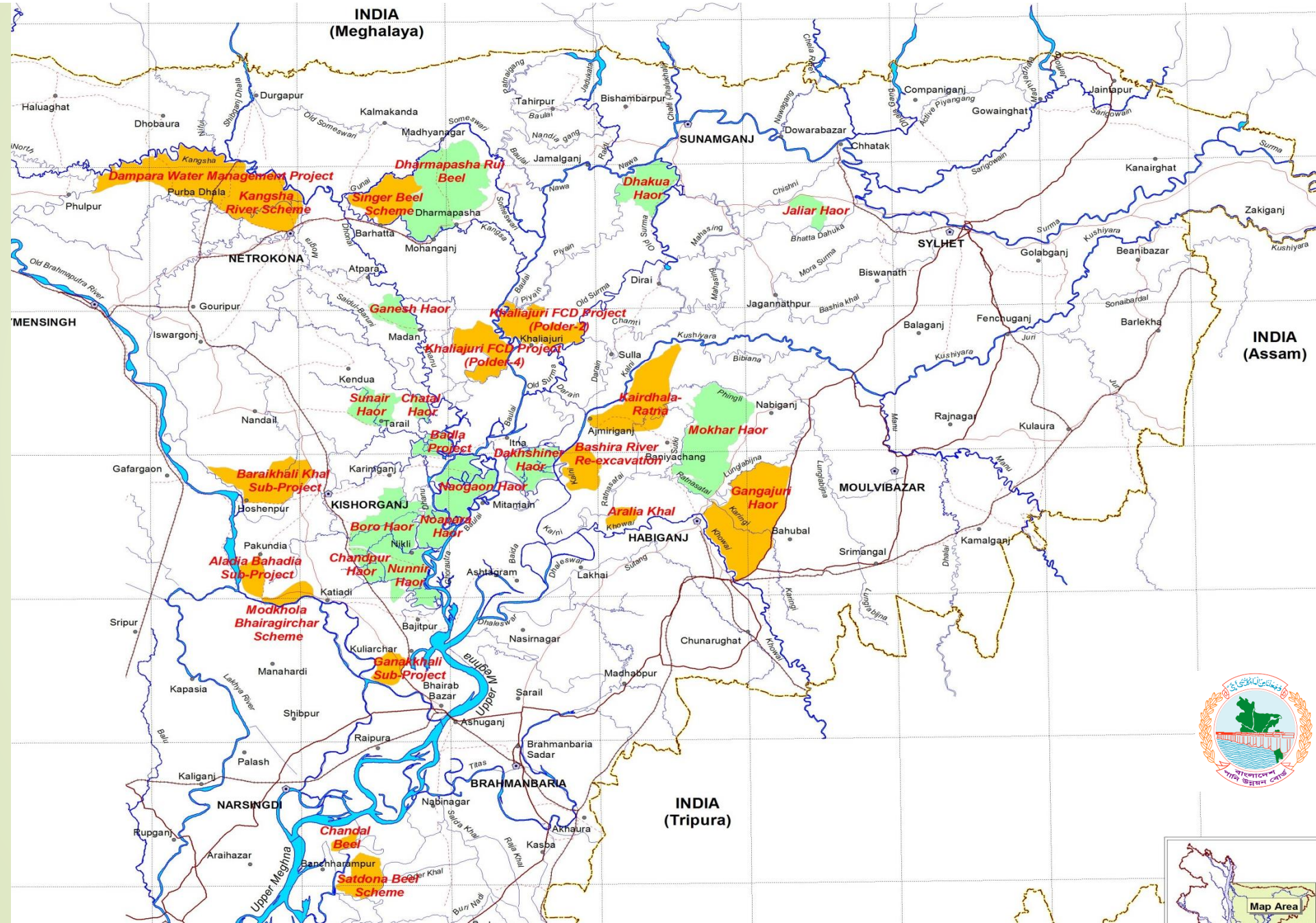
Livelihood (General)

1) Mother and Childs Health Care Support Service
2) Sanitation Support Service Scheme
3) Safe-Drinking Water Support Service Scheme
4) Biogas Scheme for WMG member
5) Duck & Goat Rearing

Project Location

Division	District	Upazila	
Dhaka	Kishoreganj	1. Hosenpur 2. Pakundiya 3. Kuliarchar 4. Kishoreganj Sadar 5. Itna 6. Karimganj	7. Mithamain 8. Austagram 9. Bajitpur 10. Nikli 11. Tarail 12. Austagram
Mymensingh	Mymensingh	1. Nandail	
	Netrakona	1. Purbadhala 2. Netrakona Sadar 3. Kalmakanda 4. Khaliajuri 5. Barhatta	6. Mohanganj 7. Kendua 8. Atpara 9. Madan
Sylhet	Sunamganj	1. Chhatak 2. South Sunamganj, 3. Dharmapasha	4. Jamalganj 5. Sunamganj Sadar
	Hobiganj	1. Ajmiriganj 2. Baniachong	3. Bahubol 4. Hobiganj Sadar
Chittagong	BrahmanBaria	1. Bancharampur	

Locations of 29 sub-projects under HFM&LIP



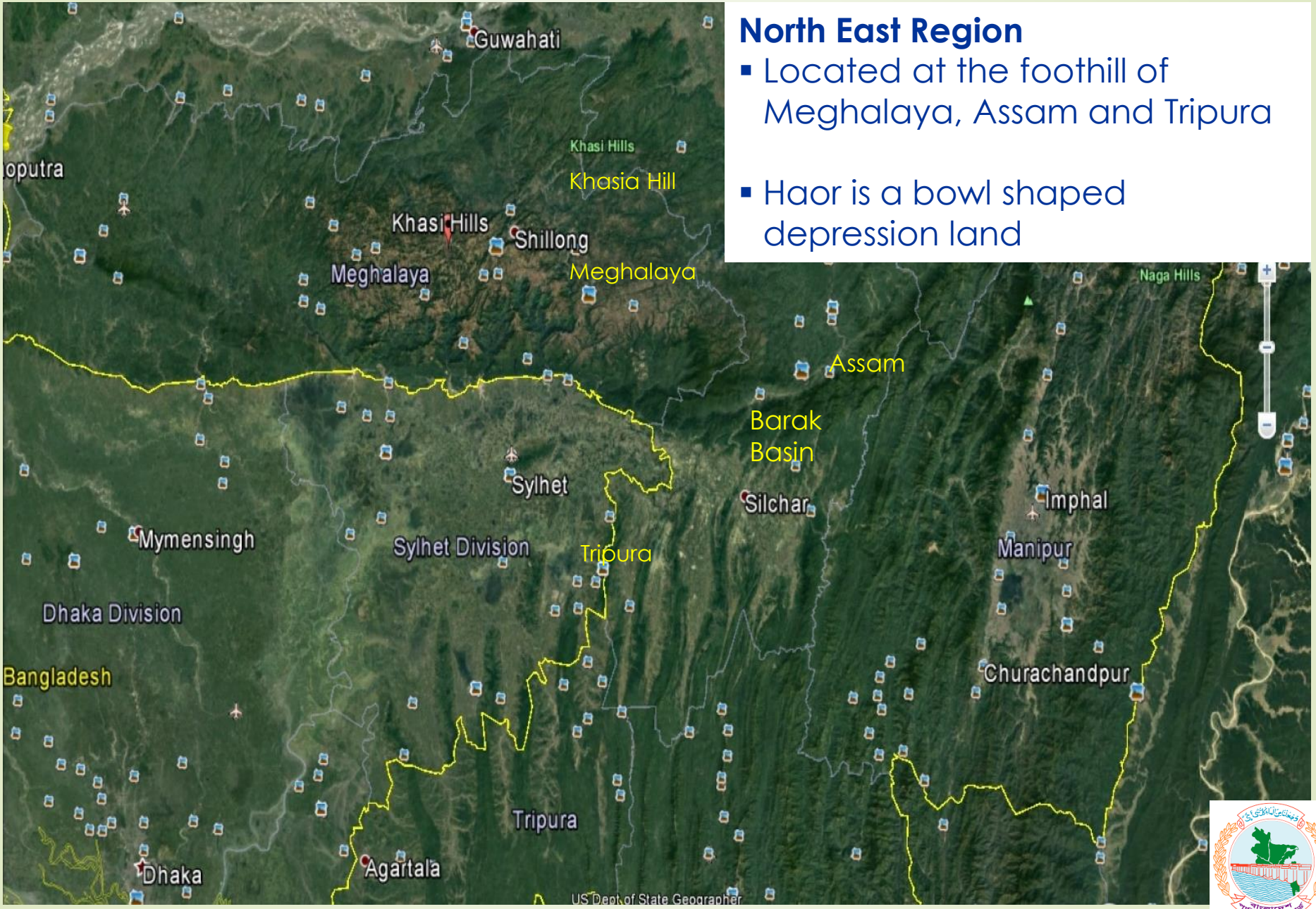
List of New Haor Sub-projects

SI.NO.	HAOR NAME	DISTRICT	AREA (HA)
1	Boro Haor (Nikli) subproject	Kishoreganj	10,672
2	Naogaon Haor subproject	Kishoreganj	7,339
3	Jaliar Haor subproject	Sunamganj	2,048
4	Dharmapasha RuiBeel subproject	Sunamganj & Netrakona	17,855
5	Chandpur Haor subproject	Kishoreganj	2,288
6	Suniar Haor subproject	Kishoreganj & Netrakona	4,428
7	Badla Haor subproject	Kishoreganj	2,087
8	Nunnir Haor subproject	Kishoreganj	5,316
9	Dakhshiner Haor subproject	Kishoreganj	4,854
10	Chatal Haor subproject	Kishoreganj	1,117
11	Ganesh Haor subproject	Netrakona	3,367
12	Dhakua Haor subproject	Sunamganj	6,374
13	Mokhar Haor subproject	Habiganj	16,821
14	Noapara Haor subproject	Kishoreganj	3,141
TOTAL			87,707

List of Rehabilitation Sub-projects

Sl. NO	HAOR NAME	DISTRICT	AREA (HA)
1	Dampara Water Management Scheme	Netrakona & Mymensingh	15,000
2	Kangsa River Scheme	Netrakona	11,337
3	Singer Beel Scheme	Netrakona	7,200
4	Baraikhali Khal Scheme	Mymensingh	8,667
5	Alalia-Bahadia Scheme	Kishoreganj	2,464
6	Modkhola Bhairagirchar subproject Scheme	Kishoreganj	2,060
7	Ganakkhali subproject	Kishoreganj	2,652
8	Kairdhala Ratna Scheme	Habiganj	11,900
9	Bashira River Scheme	Habiganj	4,521
10	Aralia Khal Scheme	Habiganj	1,501
11	Chandal Beel Scheme	Brahmanbaria	1,012
12	Satdona Beel Scheme	Brahmanbaria	5,049
13	Guingajuri FCD Subproject	Habiganj	8,405
14	Khaliajuri Polder 02 Scheme	Netrakona	6,611
15	Khaliajuri Polder 04 Scheme	Netrakona	7,201
Total			95,625

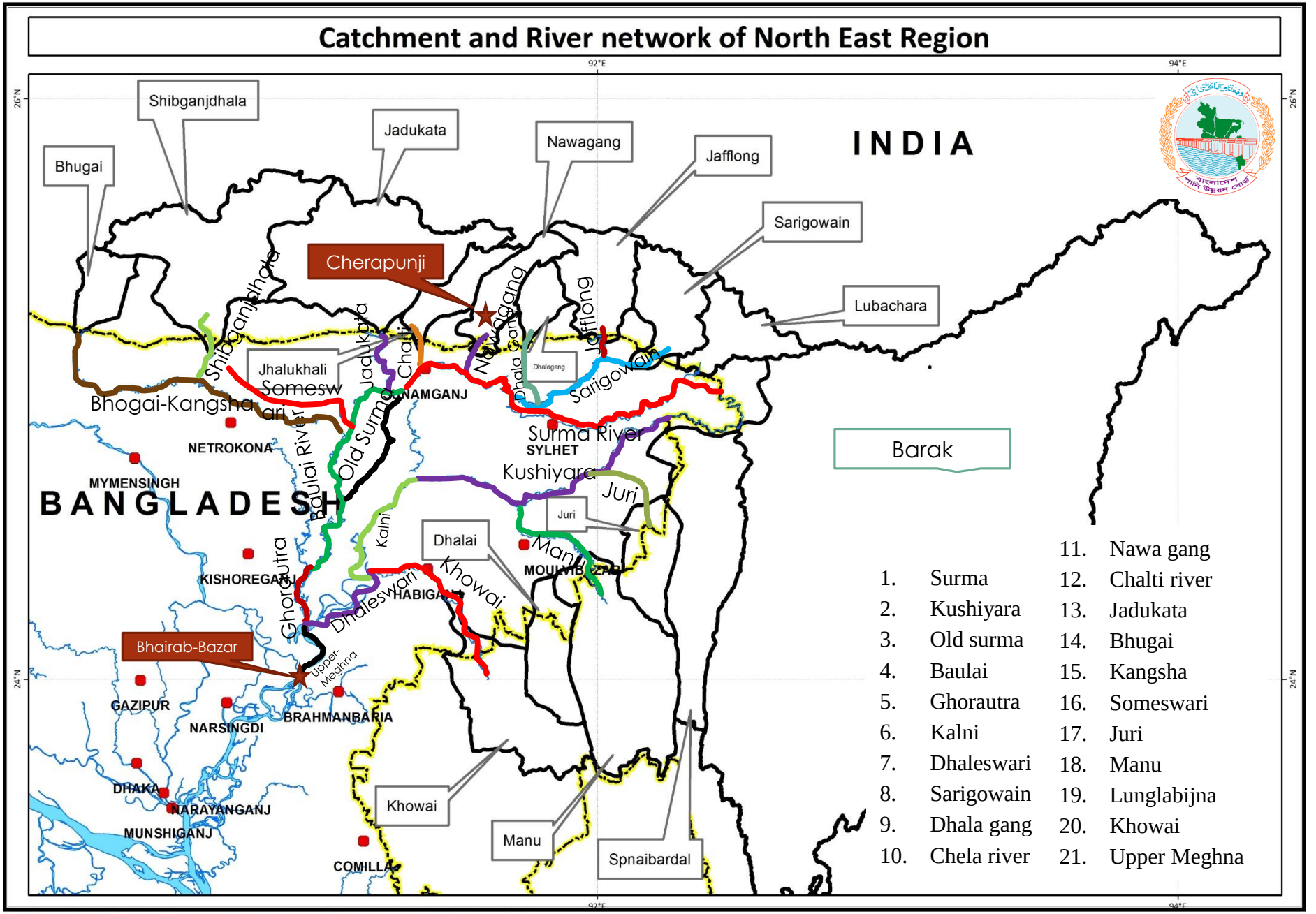
Physical Features of Northeast Region of Bangladesh



North East Region

- Located at the foothill of Meghalaya, Assam and Tripura
- Haor is a bowl shaped depression land

Catchment and River network of North East Region



1. Surma
2. Kushiyara
3. Old surma
4. Baulai
5. Ghorautra
6. Kalni
7. Dhaleswari
8. Sarigowain
9. Dhala gang
10. Chela river
11. Nawa gang
12. Chalti river
13. Jadukata
14. Bhugai
15. Kangsha
16. Someswari
17. Juri
18. Manu
19. Lunglabijna
20. Khowai
21. Upper Meghna

[GIS-77:SVB]D:\P0028\51521_IFAD\GIS_Data\mxds\2_Draft\QPF_Meghna_Map_Template_2.mxd[3:45:03 PM*03/10/2017]

Overview of Planning Activities

Master Plan of Haor Area (April 2012)

Data Collection Survey (Nov'12 to Nov'13)

MOD signed among JICA, BWDB and LGED (July 2013)

Preparatory Survey (February 2014)

The preparatory survey mentioned in the study report that the foregoing hydraulic studies must be updated during the implementation stage in addition to updating of topographic and hydrological information

DPP Approved by ECNEC (14th October, 2014)

Planning Review (October 2017)

Detail Design

Implementation of Intervention

Planning Review Activities

- **Detail planning by BWDB consultants considering the following factors**
  - Flood management for 6 weeks (1st April to 15th May) by constructing submergible embankment
- **Field Survey & Data Collection**
  - Existing features (Road network, Beel, Pond, Homestead etc.) and land level survey of new sub-projects
  - Cross-section survey along the line of proposed new submergible embankment
  - Cross-section survey of existing embankment of existing sub-projects
  - Detail topographic survey for site plan of proposed regulator, causeway, pipe sluice and irrigation inlet
  - Cross-section survey of peripheral rivers and internal khals
  - Installation of Bench Marks in new Haor Sub-projects
  - Mousa map collection from DLRS
  - Water level and Discharge data collection from BWDB/BIWTA
  - Measurement of water level and discharge at selected location
  - Survey of existing structures (regulators, pipe sluice, inlets)
- **Navigation Facilities by constructing causeway instead of regulator**
- **Stakeholder Consultation**
  - Understanding hydrology of sub-project
  - Identify present problems and public demand
  - Locate exact alignment of proposed new embankment
  - Locate exact position of proposed new structures
  - Assessment of rehabilitation of existing structures
  - **Upazilla level: 14 nos. and District level: 4 nos.**
- **Hydrological Analysis**
- **Topographical Assessment**

Planning Review Activities

- **Mathematical Modelling**
  - Regional modelling with significant river/khal system
  - Detail modelling of each sub-project

- **GIS Processing** & **Mapping**
  - Development of land terrain model (DEM) and map
  - Digitization of proposed alignment of new embankment
  - Geo-referencing of Mouza map
  - Superimpose of embankment and proposed structures on mouza map
  - Preparation of sub-project wise details maps showing existing/proposed structures
  - preparation regional level maps for reporting and presentation

- **Updating of Earlier Planning**
  - Estimate length of new embankment
  - Estimate length of existing embankment to be rehabilitated
  - Determine type and quantity of required drainage/flushing structures
  - Identify river/khal to be re-excavated and quantify of re-excavation
  - Estimate rehabilitation of existing structures
  - Introduce proposed structure considering navigation, tide penetration, and LLP irrigation
  - Provide parameters for detail design of proposed intervention

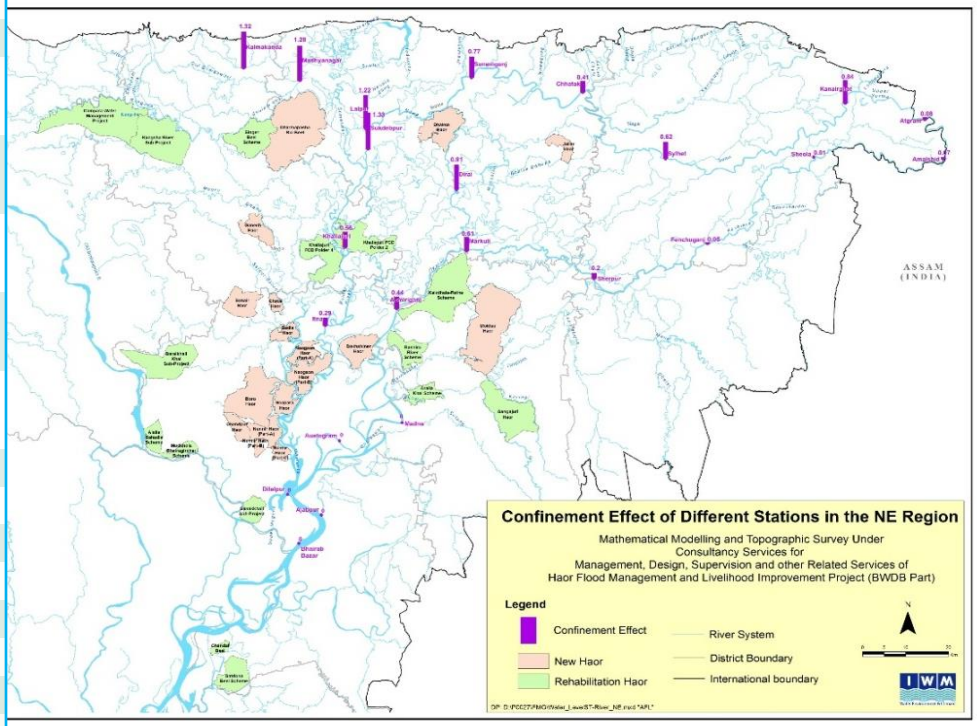
Mathematical Model used as planning tool

- **Regional level modelling (for)–**
  - consider flood flow coming from cross boarder & internal catchments
  - consider flood level in the major rivers
  - downstream flood condition
  - integration of all existing and proposed sub-projects
  - confinement effect
  - hydraulic design parameter of proposed river dredging
- **Local/Sub-project modelling (for) –**
  - Design flood/crest level of proposed/existing embankment
  - optimum opening of proposed drainage/flushing structures
  - check adequacy of existing drainage/flushing structures
  - hydraulic design parameters of proposed structures
  - hydraulic design parameters of proposed khal re-excavation

Confinement Effect

River Name	Station	10-Year Pre-monsoon Flood Level (m PWD)		Confinement Effect (m)
		Base	Project	
KUSHIYARA	Amalshid	17.64	17.71	0.07
KUSHIYARA	Sheola	14.17	14.18	0.01
KUSHIYARA	Fenchuganj	10.33	10.38	0.05
KUSHIYARA	Sherpur	8.61	8.82	0.20
KUSHIYARA	Markuli	7.46	7.97	0.51
KALNI	Ajmiriganj	6.67	7.11	0.44
DHALESWARNE	Madna	4.36	4.26	0
DHALESWARNE	Austagram	3.16	3.11	0
UPPER MEGHNA	Dilalpur	3.13	3.13	0
UPPER MEGHNA	Ajabpur	3.02	3.02	0
UPPER MEGHNA	Bhairab Bazar	2.96	2.96	0
SURMA	Atgram	17.55	17.64	0.08
SURMA	Kanaighat	14.21	15.05	0.84
SURMA	Sylhet	10.63	11.25	0.62
SURMA	Chhatak	8.30	8.71	0.41
SURMA	Sunamganj	7.07	7.84	0.77
BAULAI	Lalpur	5.99	7.21	1.22
BAULAI	Sukdevpur	5.57	6.90	1.33
BAULAI	Khaliajuri	4.94	5.50	0.56
BAULAI	Itna	4.59	4.88	0.29
SOMESWARI	Kalmakanda	5.63	6.95	1.32
SOMESWARI	Madhyanagar	5.63	6.91	1.28
SURMA OLD COURSE	Dirai	6.08	6.98	0.91

Under working condition of 81 Nos. Sub-projects



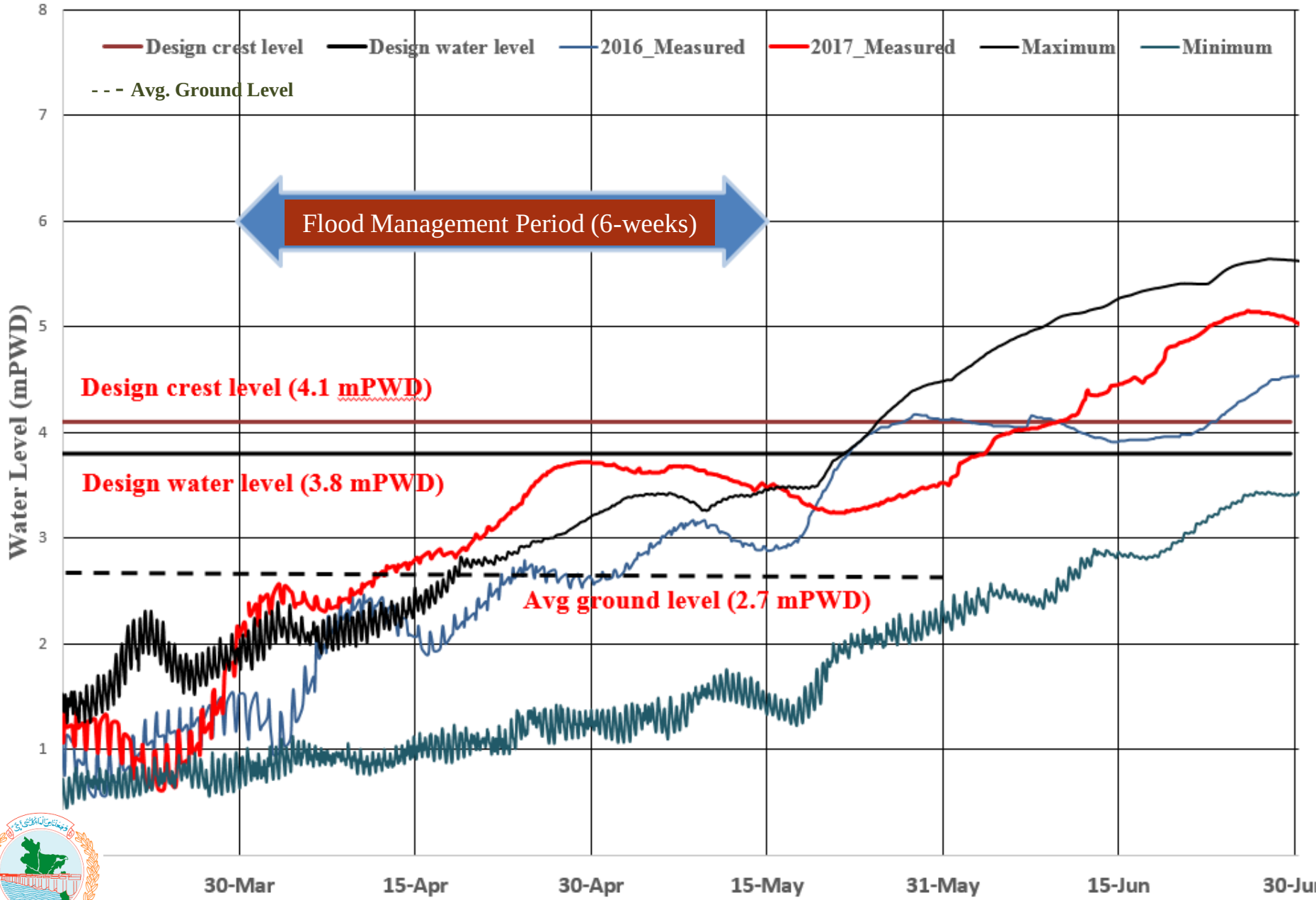
Output of Mathematical Model for Planning and Design

Name of Item/Parameter	Specific Output
Pre-monsoon Flood management benefit	• Flood Inundation map inside the sub-project area prepared under pre-monsoon high flood of l0-year return period for both with and without project condition. • Flood phase areas calculated under different classes of flood depths: F0, F1, F2,F3 and F4. • Maximum water levels (Hydrograph/Tabular value) inside and outside the sub-project under pre-monsoon high flood of 10-year return period
Design Flood Level	• l0-year Pre-monsoon high flood level (Hydrograph/Tabular value) surrounding the sub-project (submersible embankment). • 20-year annual high flood level (Hydrograph/Tabular value surrounding the sub-project (full flood embankment).
Opening size of proposed drainage/flushing structures including invert level	• Identify/verify location of structure. • Optimum No. of vents including size of proposed regulator/causeway. • Invert level of proposed regulator/causeway
Hydraulic design parameters of proposed structures (regulators/causeway)	• Flushing discharge and corresponding upstream and downstream water level . • Drainage discharge and corresponding upstream and downstream water level • 20-year annual high flood level.
Hydraulic design parameters of rivers/khal to be re-excavated	• Maximum drainage discharge along with water levels (Hydrograph/Tabular value) in the khal. • Lowest water level in the outfall river/khal.
Confinement effect	• Rise in flood level due to implementation of projects.
Water availability for LLP irrigation	• Availability of tidal water surrounding the sub-projects

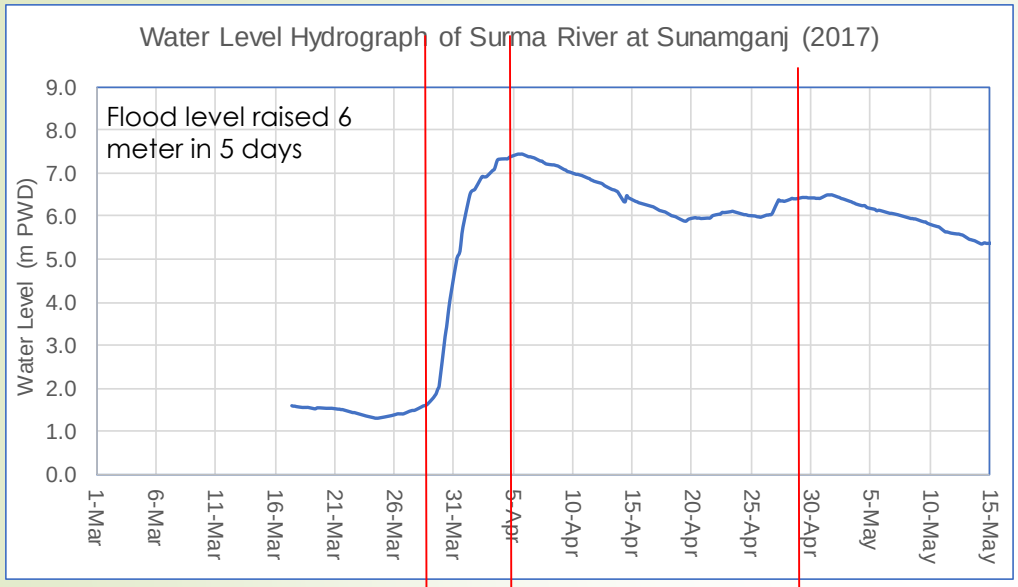
The sub-project models output mentioned above have been used for review of planning of the each new haor & rehabilitation haor sub-project and preparation of detailed design of infrastructure of the sub-projects.

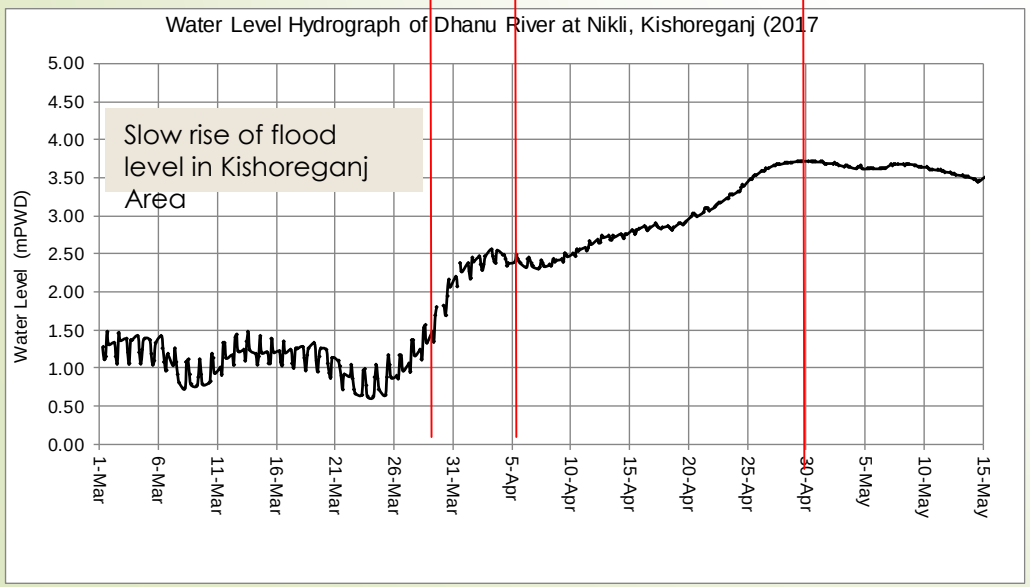
Kamalpur (Nikli) Old Singua River in Kishoreganj District

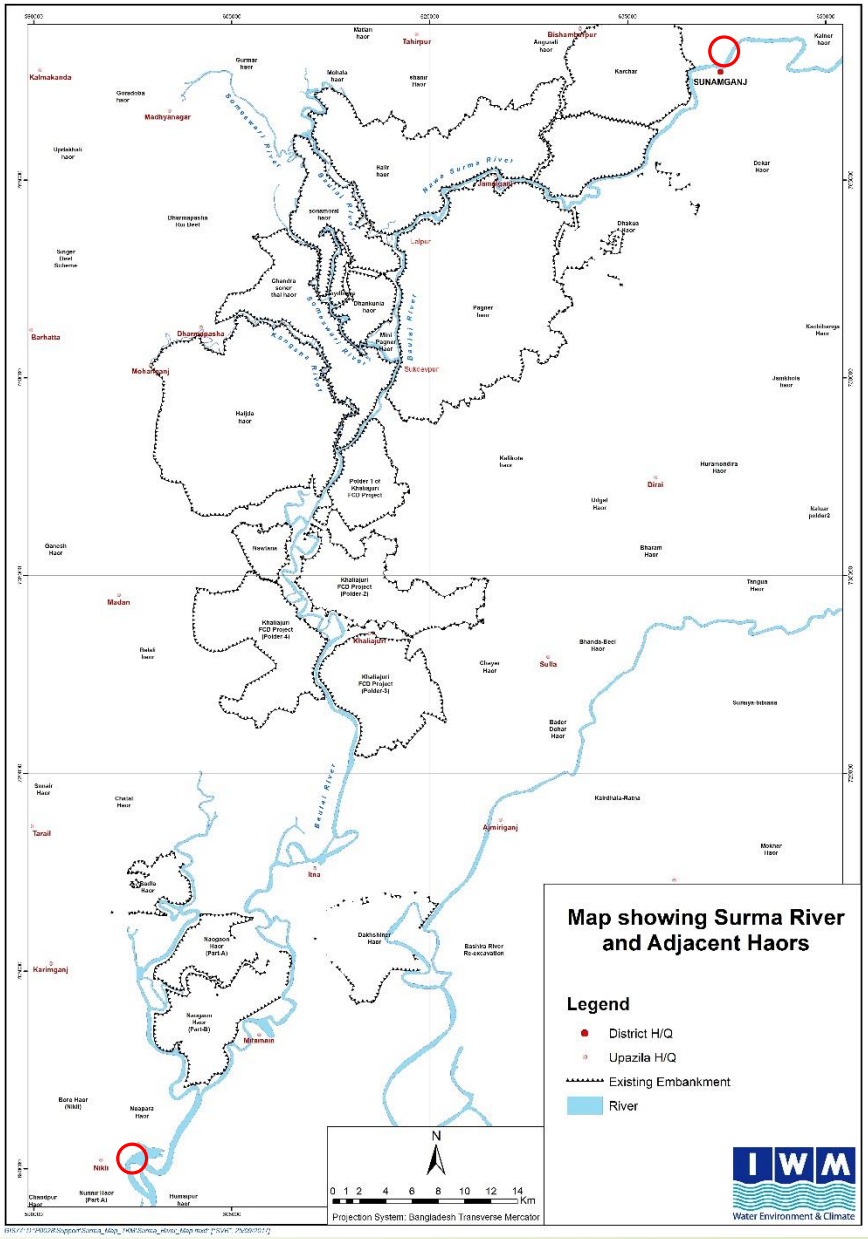
Historical (20yrs) record



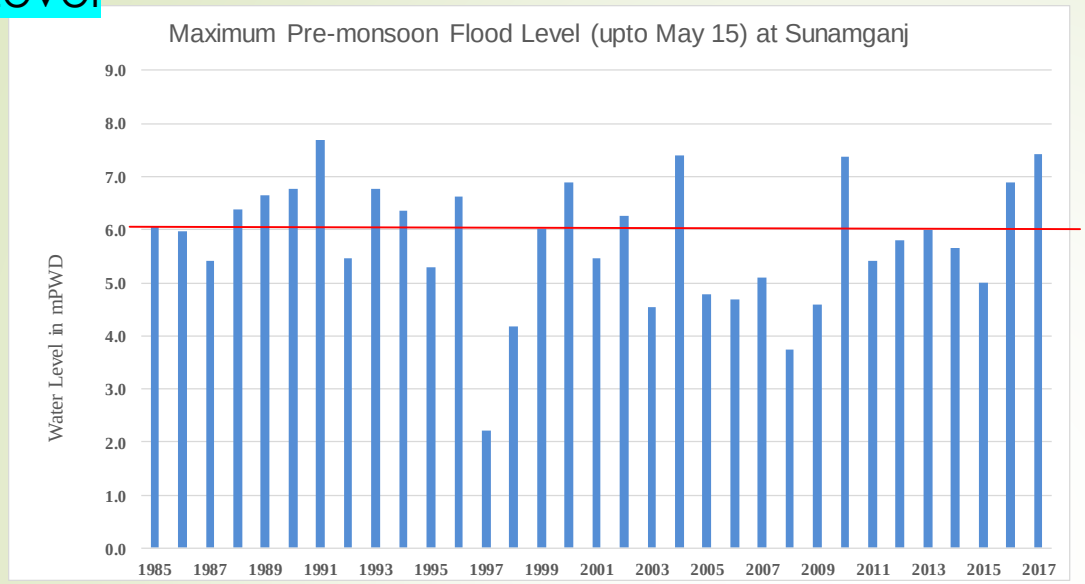
Water level rise Flood 2017





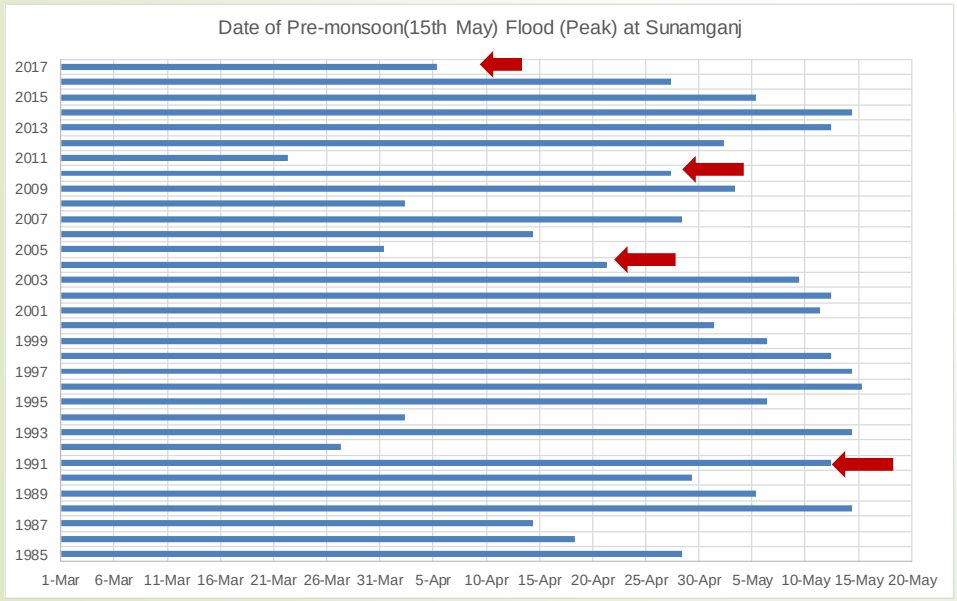


Historical Pre-monsoon (Up to 15th May) Flood Level



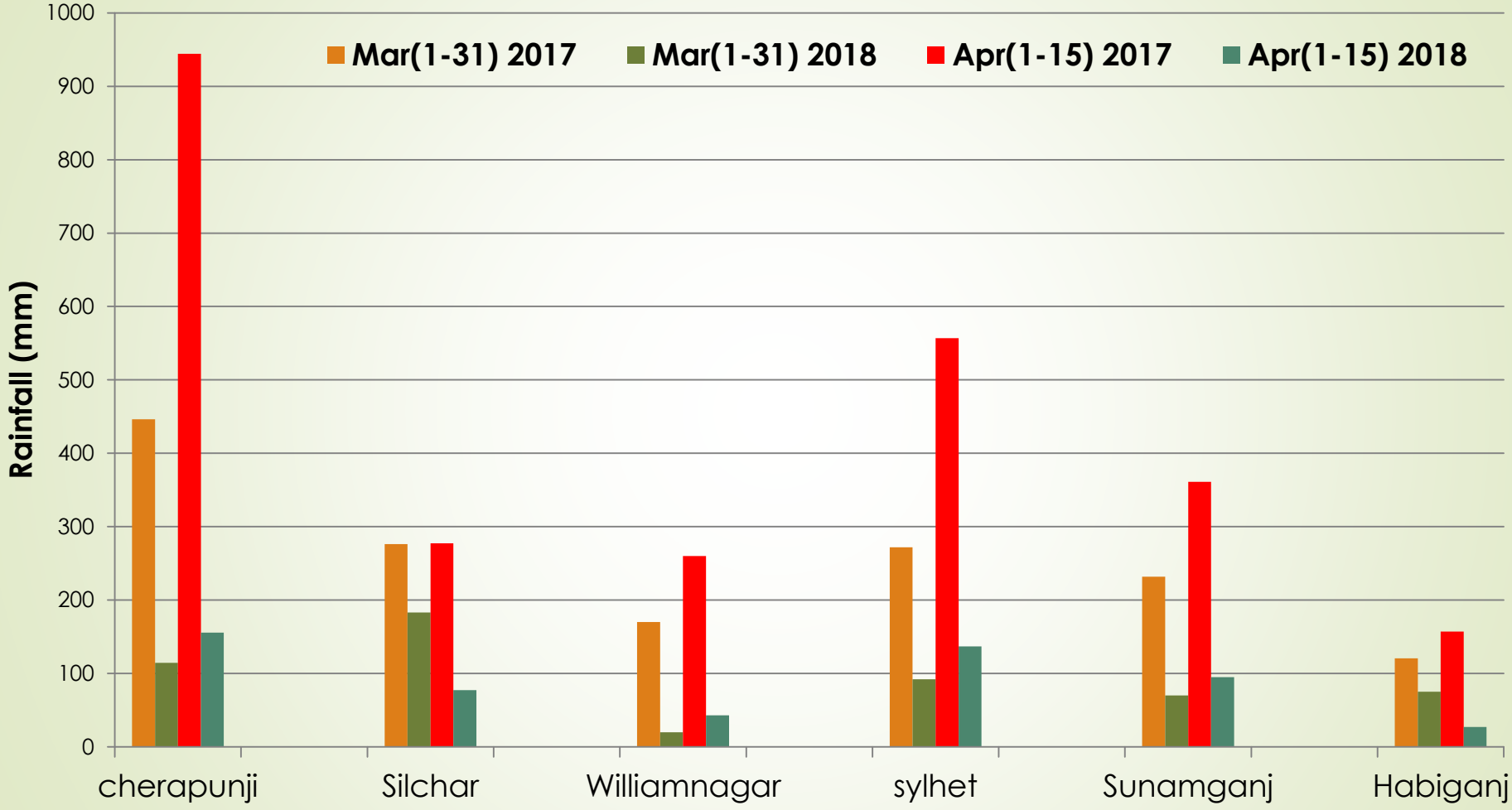
Devastating Flood:
1991, 2004, 2010, 2017

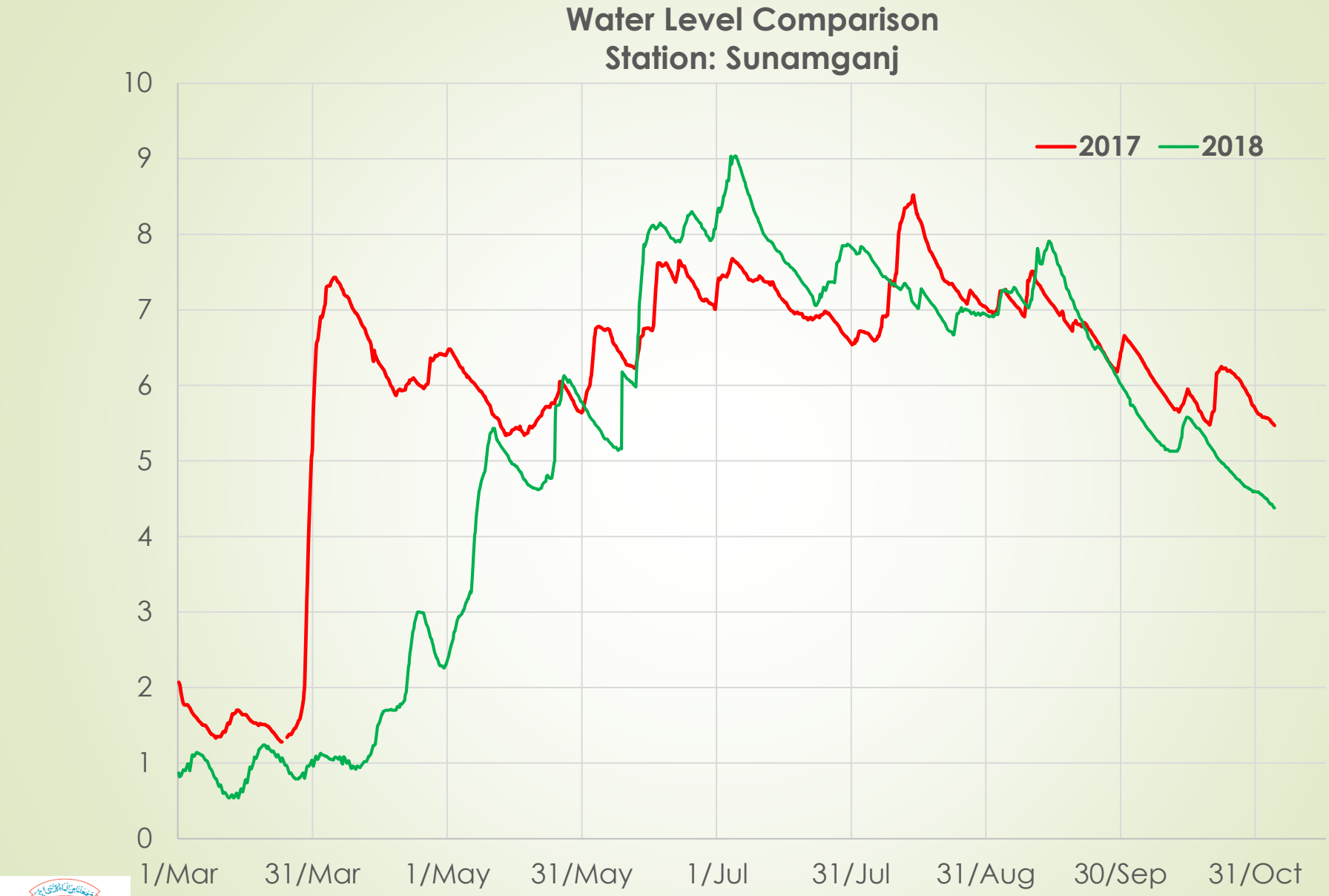
There is an experience that the haors in Sunamganj area start to affect by flood when flood level at Sunamganj exceeds 6.5 m PWD



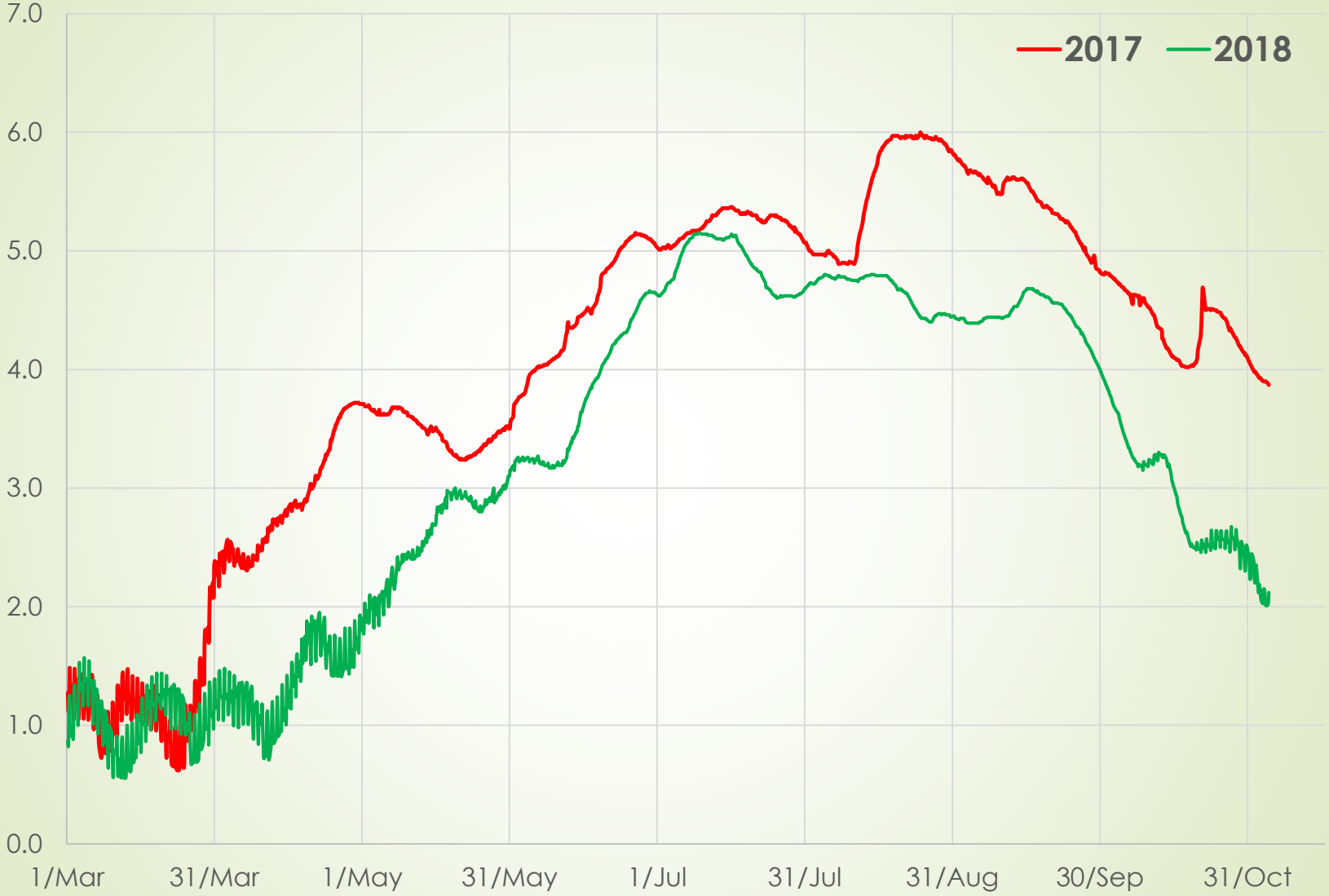
Timing of occurrence of Pre-monsoon flood

Monthly Rainfall comparison for 2017 and 2018




Water Level Comparison
Station: Sunamganj
2017
2018
10
9
8
7
6
5
4
3
2
1
0
1/Mar
31/Mar
1/May
31/May
1/Jul
31/Jul
31/Aug
30/Sep
31/Oct

Water Level Comparison
Station: Kishoreganj



Selection Criteria of 14 nos. New and 15 nos. Rehabilitation sub-projects

14 nos. New Haor sub-projects out of 22 sub-projects were selected on the basis of:

- Feasibility studies
- Expert knowledge and opinions
- Experiences under the Master Plan of the haor area

Priority is relatively determined by comparing the estimated index of economic efficiency of the projects as calculated by the following formula:

$$\textit{Economic Efficiency} = \frac{\textit{Annual damage of Boro rice}}{\textit{Direct Construction Cost}}$$

15 nos. Rehabilitation Haor sub-projects out of 25 sub-projects were selected in due consideration of demand of local people and opinion of BWDB field office on the basis of the following criteria:

- Status of existing submergible embankment
- Status and function of other existing structures
- Siltation in canals
- Connectivity between internal khals and rivers

Intervention summary of the project (BWDB Part)

Component 1: New Haor Sub Projects	
Submersible embankment construction	263.24 km
Regulators	57 nos
Causeway	35 nos
Re-excavation of khal/river	318.20 Km
Box drainage outlet	44 nos
Irrigation inlet	131 nos
Bridge	1 no
Rehab of regulator	8 nos.
WMG office building	60 nos.

Component 1: Rehabilitation Sub Projects	
Full Flood Embankment Rehabilitation	84.31 km
Submergible Embankment Rehabilitation	87.03 km
Regulators- Replacement of gates	104 nos
Regulators- Reinstallation	7 nos
Re-excavation of khal/river	143 km

Total Project Cost of 1st Revised DPP

Total	97865.00 (Lakh BDT)	12546.80 (Million Yen)
GoB	38418.90	4925.51 (Million Yen) 39.26%
PA	59446.10	7621.29 (Million Yen) 60.74%

Cumulative project progress (upto 31 October, 2018)

Physical progress : 38.00%

Financial Progress : 28318.00 Lakh.

Approve Budget for 2018-2019 Financial Year:

27000.00 Lakh BDT. (GoB- 11000.00Lakh BDT; PA- 16000.00 Lakh BDT)

Progress of Civil Work upto October, 2018:

- Submergible embankment construction - 80.20 Km full and 50.00 Km partial,
- Khal/river re-excavation - 100.934 Km full and 50.00 Km partial,
- New Regulator/Causeway/Bridge/Box drainage outlet construction-5 nos. full and 10 nos. partial

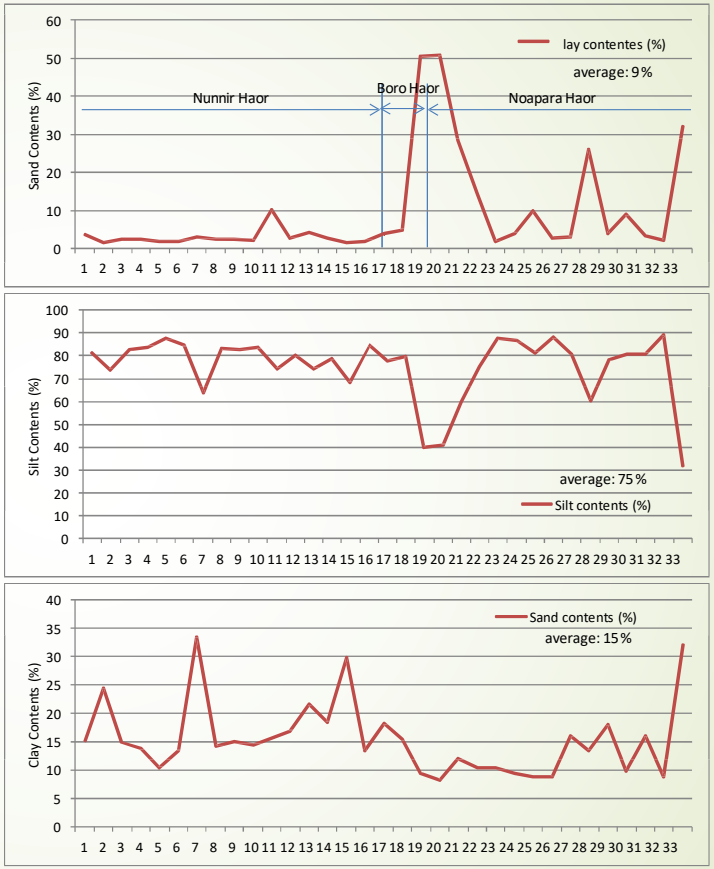
Construction Procedure of Mechanically Compacted Embankment

Available Soil Material in Haor Area

Generally, constraints on obtaining soil material is serious in haor area

Geotechnical investigation has been conducted in some project areas.

As a result, soil material with 10 - 20% content of clay may be practical in haor area.



Required Strength of Embankment

Required strength of compacted embankment depends on the embankment height and strength of foundation. An example of stability analysis results is shown as below.

If height < 2 m, foundation cohesion cu > 15 kN/m², the required cohesion of embankment is cu=10 kN/m² (assuming safety factor > 1.2).

Foundation cohesion cu=15kN/m^2 Embankment cohesion cu=10kN/m^2

Embankment Height (m)	Safety Factor
4	0.792
3	0.975
2.5	1.112
2	1.357

Source: Data Collection Survey on Water Resources Management in Haor Area of Bangladesh, Dec 2013, JICA

Construction Procedure

- Contractor has to provide grain size distribution analysis certificate (Sieve and hydrometer ASTM D-422) of soil to be supplied by him from borrow pit or carried soil from elsewhere.
- The soil gradation shall have to be prior approved by the Supervising Engineer of the consultant and the concerned Executive Engineer of BWDB before placing on embankment body.
- Laboratory compaction test certificate (With Modified proctor test ASTM D- 1557) of the soil to be used shall have to be supplied by the Contractor.
- The specified soil shall be stockpiled nearby location of embankment and moisture content of piled soil shall be checked by the Supervising Engineer of the consultant and the concerned Executive Engineer of BWDB.
- If the moisture content is less than desired moisture for compaction (85% of MDD with modified proctor test, ASTM D-1557), the moisture shall be supplemented by sprinkling and reworking the material at the site of compaction. If the moisture content is more than required moisture content for compaction, the material shall be dried by reworking, mixing with dry materials or other approved means
- The excavating and placing operations shall be such that the materials when compacted will be blended sufficiently to secure the best practicable degree of compaction, impermeability and stability.
- Mechanically compacted Embankments 85 % (Modified). base stripping or ploughing uprooting of trees if any
- Backfill soil shall have acceptable gradation of soil material, as specified
- The compaction operation shall preferably be spread over reaches of around 500m
- When the material has been conditioned and placed it shall be compacted with Sheep foot roller of adequate weight and size or appropriate motorized vibratory compactors approved by the supervising Engineer of the consultant and the concerned Executive Engineer of BWDB

Construction Procedure (Contd.)

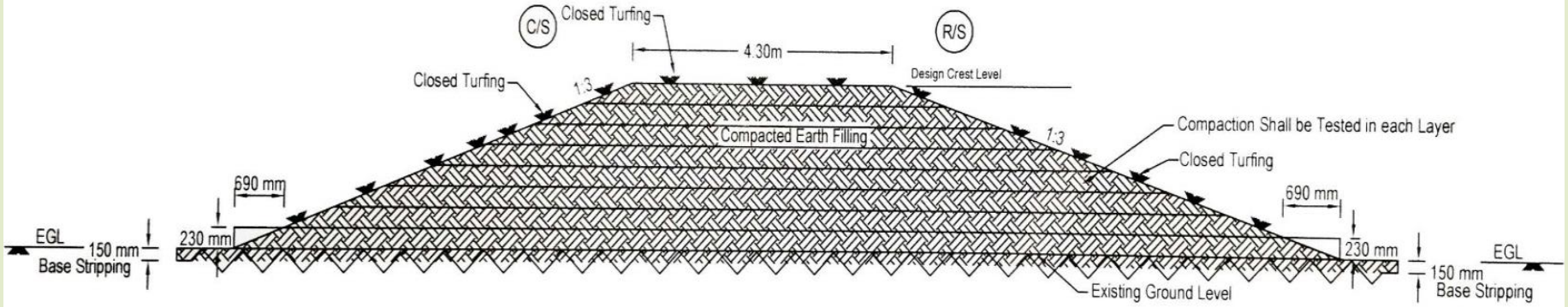
- The compacted soil in each layer shall be tested for specified dry density of about 85% of laboratory Maximum dry density (Modified proctor test ASTM D-1557).
- The Supervising Engineer of the consultant will take samples for each layer of soil being compacted and will perform tests
- Next layers can not be placed before attaining desired compaction of previous layer .
- Test result shall be duly recorded in the tabular form and certified by the Consultant's Supervising Engineer and approved by the Project Director on recommendation by the concerned Executive Engineer of BWDB.
- The GEO reference location of test result site should also be collected by consultant with GPS. Necessary arrangement should be made by
- contractor for conducting compacting test
- The in situ dry density of the compacted fill shall be determined by the sand replacement method described in ASTM D-1556 or similar approved test at locations ordered by the Project Director
- The Contractor shall provide all necessary aid to the Supervising Engineer of the Consultant in obtaining representative samples for testing for which no extra cost will be provided
- All type of cost involved in connection with compaction test will have to be borne by the contractor
- After attaing design level, ***closed turfing*** on ***slope*** of embankment with ***75mm*** thick durba or char kata sods of size of ***200 mmx200 mm***. The sods to be watered regularly until it grows
- ***6 (six) rows*** of ***dhol-kalmi*** on either sides of embankment to be planted ***along the Toe's outward*** for breaking wave energy towards embankment. It may be started ***after alignment fixation*** so that it attained sufficient height & become bushy to function as desired.

Construction Procedure (Contd.)

- Earth excavated from canal or other waterlogged area shall be stockpiled to drain the excess water before placing it for construction of embankment.
- Borrow pits should be at least 20 m away from the toe of the embankment on either sides. Borrow pits on country side should not be made deeper than ***2.0m from the ground level***.
- Location of borrow pits from the toe of embankment are shown in the sketch
- A typical cross section showing layer by layer construction of embankment is attached herewith
- Videos showing sequence of operation of each layer of embankment having date and time (digitally) for future record. No bill will be made without Video Document.
- All instructions and specifications mentioned in the approved drawing should be followed strictly
- Environmental protection of the project areas from any potential adverse impacts, the contractor must take mitigation measures in compliance with the Environmental Management Plan (EMP) - annexed with the tender document.
- Project Director have rights of inclusion of any other points in the methodology if required

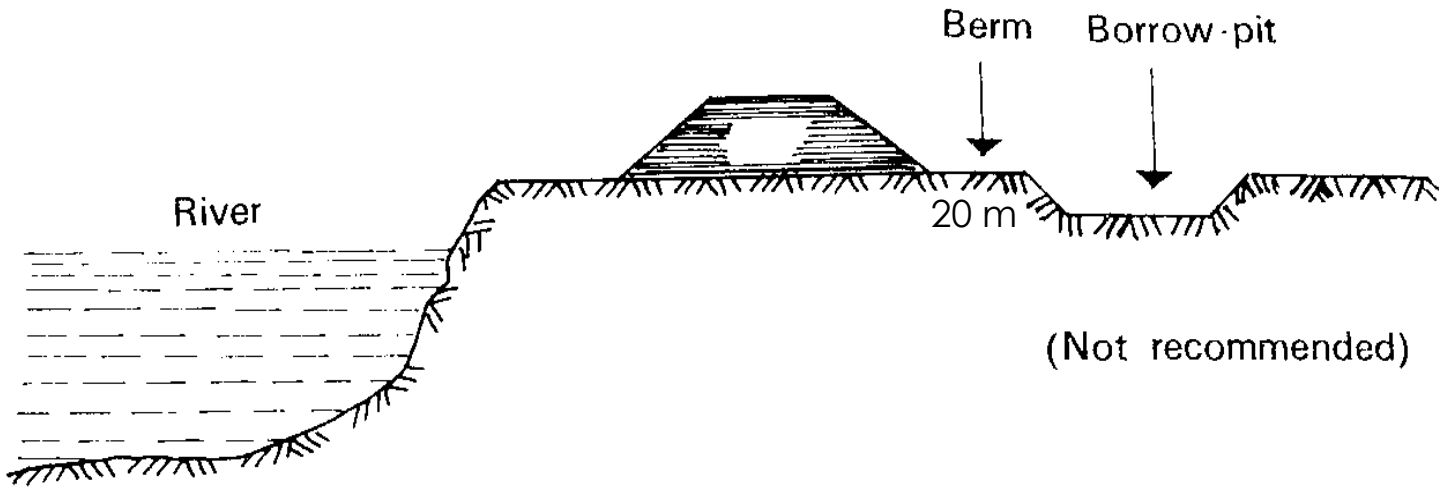
- Videos showing sequence of operation of each layer of embankment having date and time (digitally) for future record. No bill will be made without Video Document.
- All instructions and specifications mentioned in the approved drawing should be followed strictly.
- Environmental protection of the project areas from any potential adverse impacts, the contractor must take mitigation measures in compliance with the Environmental Management Plan (EMP) - annexed with the tender document.
- Project Director have rights of inclusion of any other points in the methodology if required

TYPICAL SECTION SHOWING CONSTRUCTION OF EMBANKMENT LAYER BY LAYER



❑ Location of **Borrow Pits** from The Toe of Embankment

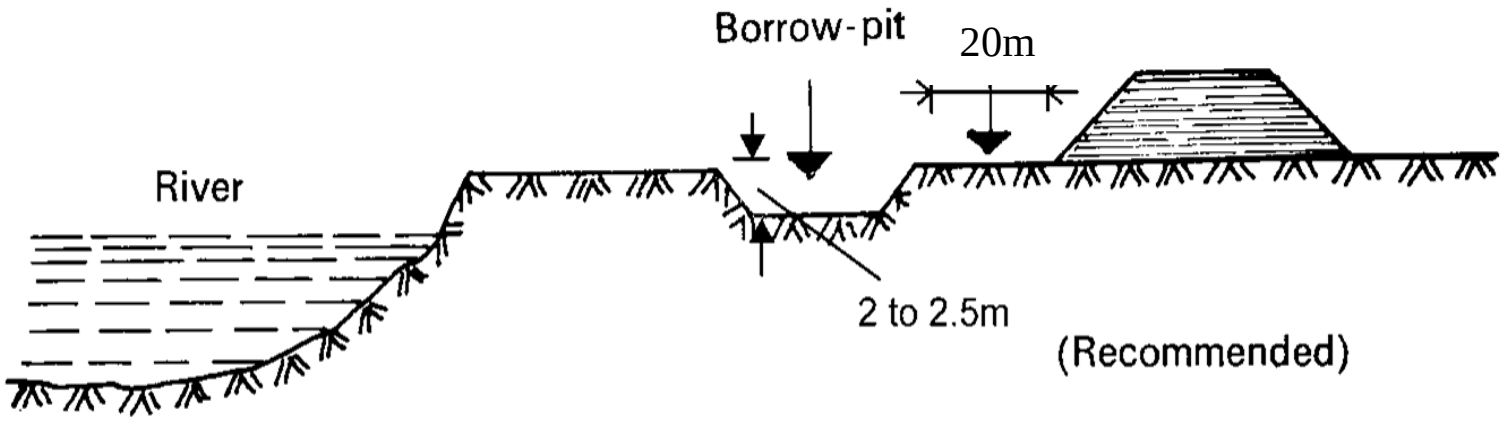
(a) If Earth is Borrowed From The **Country Side**



a) Borrow-pit on the village side.

❑ Location of **Borrow Pits** from The Toe of Embankment

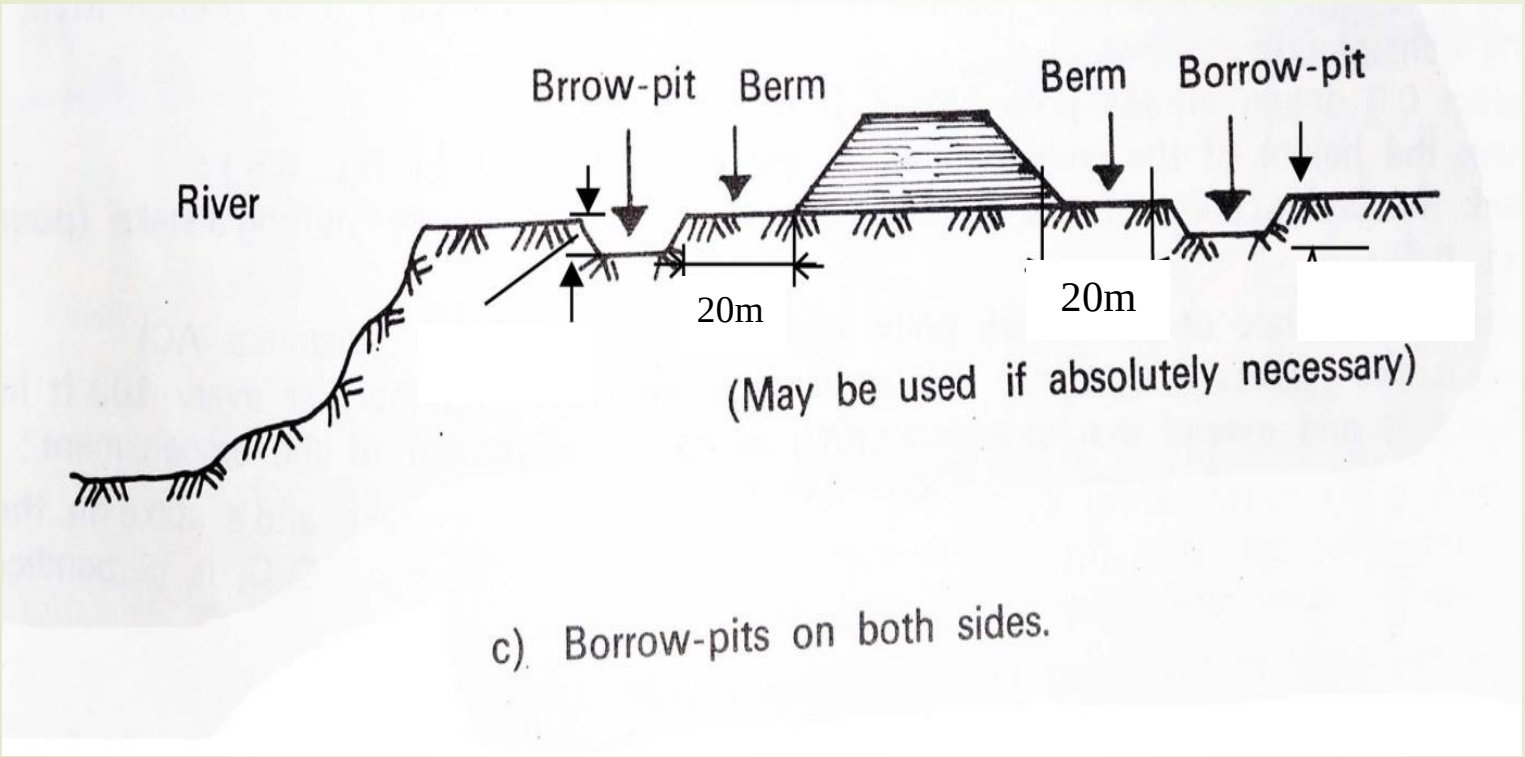
(b) If Earth is Borrowed From The **River Side**



b) Borrow-pit on the river side.

❑ Location of **Borrow Pits** from The Toe of Embankment

(c)If Earth is Borrowed From Both **Side**



Livelihood Improvement through Agricultural Promotional Activities

Progress of Livelihood activities upto October, 2018

Total Training and support service: 98740 persons

➢ Local Training

- Till today total 4,006 numbers of field staff and EC Member of WMG have been trained on formation and strengthening of Water Management group.

➢ Agricultural Promotion Support Sub Project

- Through this program 10,080 farmers have been trained on crop production technology and 1,260 farmers have been trained on livestock and poultry birds rearing.
- Total 360 farmers have been trained on Integrated Farm Management for the establishment of farmer field school.
- 1,440 farmers of 48 Famers Field School's have been trained practically from seed to seed on Boro rice cultivation.
- 1,479 demonstration plots have been established on modern crop production technologies. In addition vegetables seeds have been distributed among 1300 farmers.
- Arrangement has been made to motivate 640 farmers on adoption of modern technologies through visit to BRRI, BARI & BARD.
- Adaptive trial on new rice varieties have been conducted in 3 farmers field.
- 27 Reaper machines have been distributed for harvesting rice to 27 WMGs

Progress of Livelihood activities upto October, 2018

➢ Small Scale Income Generation Sub Project

- Through this program 77,160 ducks have been distributed to 3,858 destitute Women & in the meantime 9,90,492 Number of eggs have received.
- 3070 Goats have been distributed among 1,535 destitute women.
- 390 Sewing Machine along with training have been distributed to 390 destitute women.
- 82 Solar panel & 665 Improved Cooking System have been distributed to 747 families.
- Saplings & seedlings of mango, coconut, lichi, jujube etc. have been distributed among 462 farm families. In addition vegetable seeds have been distributed among 2,989 farm families.
- 255 Water Management Group have been forme, total number of member of the WMG is 1,19,430 (Male : 64,875, Female: 54,555), total savings is 1,97,92,472 Tk.

Local Training

- Till today total 4,006 numbers of field staff and EC Member of WMG have been trained on formation and strengthening of Water Management Group.

Agricultural Promotion Support Sub Project

- Through this program 10,080 farmers have been trained on crop production technology and 1,260 farmers have been trained on livestock and poultry rearing.

- Total 360 farmers have been trained on Integrated Farm Management for the establishment of Farmer Field School (FFS).
- 1,440 farmers of 48 Farmers Field School's have been trained practically from seed to seed on Boro rice cultivation.

- 1,479 demonstration plots have been established on modern crop production technology. In addition vegetables seeds and none rice seeds have been distributed among 1,300 farmers.

- Arrangement has been made to motivate 640 farmers on adoption of modern technologies through visit to BRRI, BARI & BARD.
- Adaptive trial on new rice varieties have been conducted in 3 farmers field.

- 27 Reaper machines have been distributed to 27 WMGs for harvesting of rice.

Small Scale Income Generation Sub Project

- Through this program 77,160 ducks have been distributed to 3,858 destitute Women & in the meantime 9,90,492 number of eggs have received.
- 3070 Goats have been distributed among 1,535 destitute women. Till last October gave birth 297 nos kids.

- 82 Solar panel & 665 Improved Cooking Stoves have been distributed to 747 families.

- Saplings & seedlings of mango, coconut, lichi, jujube etc. have been distributed among 462 farm families. In addition vegetable seeds have been distributed among 2,989 farm families.
- 255 Water Management Group have been formed. Total number of member of WMG is 1,19,430 (Male : 64,875, Female: 54,555) and total savings is Tk. 1,97,93,724.

- 390 Sewing Machine along with training have been distributed to 390 destitute women.

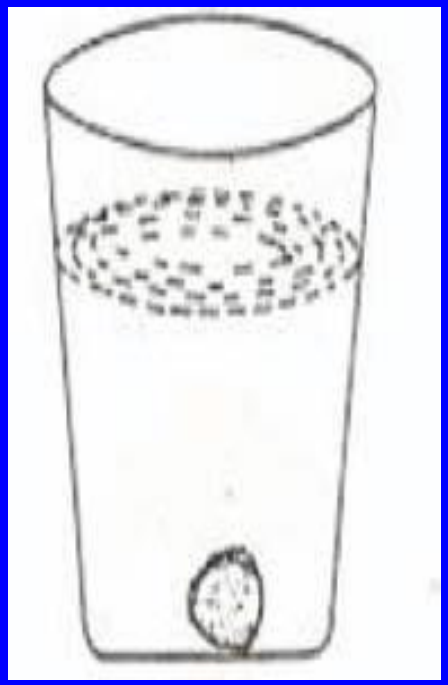
8 TECHNICS TO REDUCE YIELD GAP

1) Improved varieties;
2) Strong or healthy seedling;
3) Intensive cultivation;
4) Proper plant population;
5) Balanced fertilizer application;
6) Rational irrigation;
7) Control of pest and disease;
8) Growing of rice through cultivation of green manuring crops;

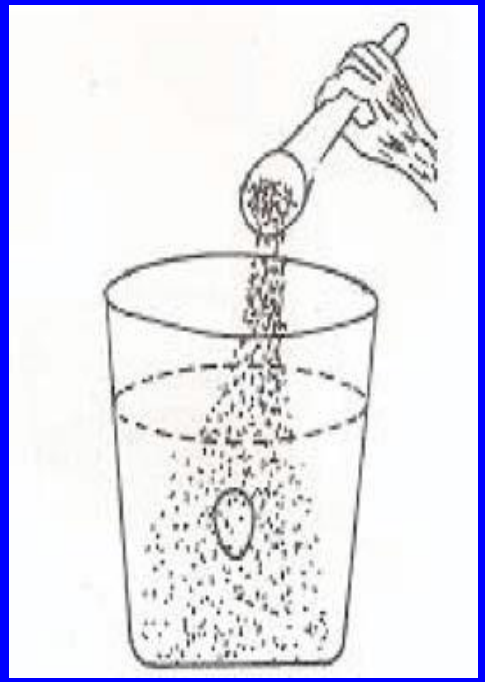
Strong and Healthy Seedling Raising

SEED SORTING

FOR SEEDING, STRONG AND HEALTHY SEED SHOULD BE ENSURED. BECAUSE, HEALTHY SEED MEANS HEALTHY SEEDLING. SO FOR SEED SORTING, FOLLOWING PROCEDURE SHOULD BE FOLLOWED. 375 GM UREA TO BE DISSOLVED IN 10 LITTER OF WATER. THEN 10 KG SEED NEED TO BE SOAKED IN IT. HEALTHY SEED WILL SUBMERGE AND UNFILLED GRAIN WILL FLOAT AND FLOATED NEED TO BE REMOVED. FILLED GRAIN NEED BE WASHED 3-4 TIMES WITH CLEAN WATER AND AGAIN SOAKED IN WATER.



Drops Egg in Water



Adding Salt Increases density of Water and Egg Rises up

Egg Riches top of the Salt Solution

Raised Seed Bed

Seed Sowing

An Ideal Seed Bed

CARE OF SEED BED DURING EXTREME COLD

DURING THE COLD SPELL SEED BED TO BE KEPT COVERED WITH TRANSPARENT POLYTHENE SHEET FROM 10 AM TO 5 PM. WATER OF THE SEED BED TO BE DRAINED OUT AT THE MORNING AND AGAIN NEW WATER TO BE IRRIGATED. DEWS DEPOSITED ON THE LEAVES NEED TO BE REMOVED EVERYDAY MORNING . DOING THIS PRACTICES SEEDLINGS COULD BE PROTECTED AND NORMAL GROWTH TO BE ENSURED.

UPROOTING SEEDLINGS

WATERING THE SEED BED BEFORE UPROOTING THE SEEDLINGS. UPROOTING SEEDLING SHOULD BE DONE CAREFULLY SO THAT THE BASE OF THE SEEDLINGS ARE NOT BROKEN OR DAMAGED. DRY STRAW OF RICE SHOULD BE USE TO TIE THE BUNDLE OF SEEDLINGS,

Carrying of Seedlings

To avoid leaf damage, seedlings to be carried in bamboo busket instead of gunny bag.

Main field preparation

Based on soil types, land need to be ploughed 3-4 times followed by laddering

Balanced fertilizer

Agro-ecological zone (AEZ)- 8, 9, 19, 21, 22

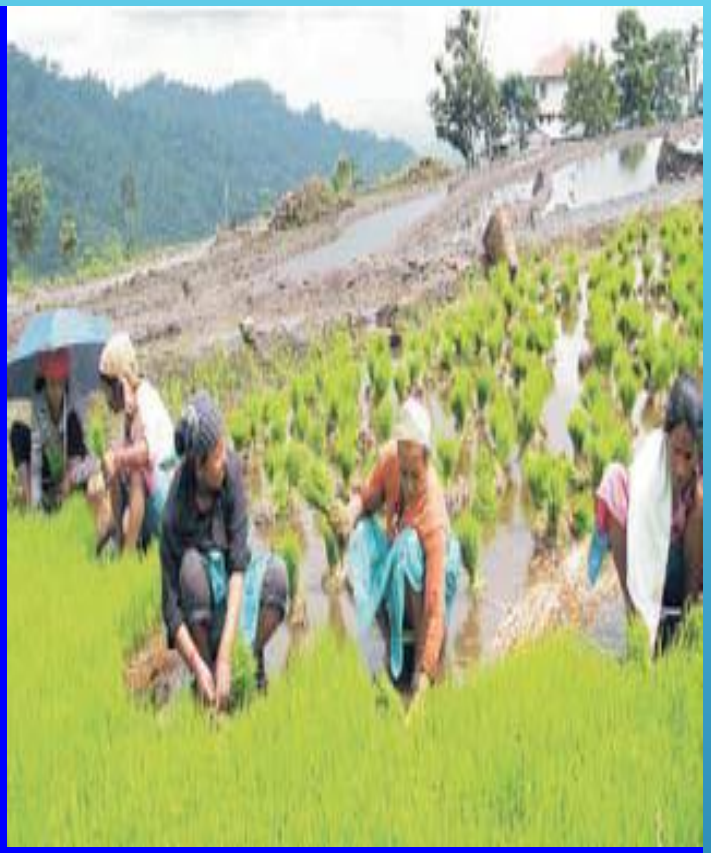
AEZ	Urea	TSP	MOP	Gypsum	Zink
8	Very Low-Low	Low	Medium	Low	Low-Medium
9	Very Low-Low	Low-Medium	low	Low-Medium	Low-Medium
19	Very Low-Low	Low-Medium	Medium-Optimum	Low-Medium	Low-Medium
21	Low	Low-Medium	Medium-Optimum	Medium-Optimum	Medium-Optimum
22	Very Low-Low	low	Low	low	medium

FERTILIZER DOSE FOR RICE CULTIVATION

AEZ	Fertilizer dose per desimale				
	Urea	TSP	MOP	Gypsum	Zink
Boro					
Very low	1230	410	485	330	40
Low	1050	310	320	220	20
Medium	880	205	240	115	20
Transplanted Aman					
Very low	880	310	485	220	40
Low	700	205	320	180	20
Medium	530	205	240	135	20
Broadcast Aus					
Very low	530	205	320	135	20
Low	440	165	240	90	20
Medium	350	123	160	--	--

1/3 of urea and all others fertilizer are to be applied during the last plowing , 1/3 of of urea to be applied at the time of 3-4 tillers and the rest amount of urea to be applied before 7 days of panicle initiation

A Male Farmer Uprooting The Seedlings



Women Farmers on The Jobs

Tillers produced at the base of the seedlings

Result of deep transplanting

Number of tillers per hill

	Seedling stage	Tillering stage	Panicle stage	Ripening Stage	Total Life Cycle
BIRI 28	30	50	30	30	140
BIRI 29	40	60	30	30	160

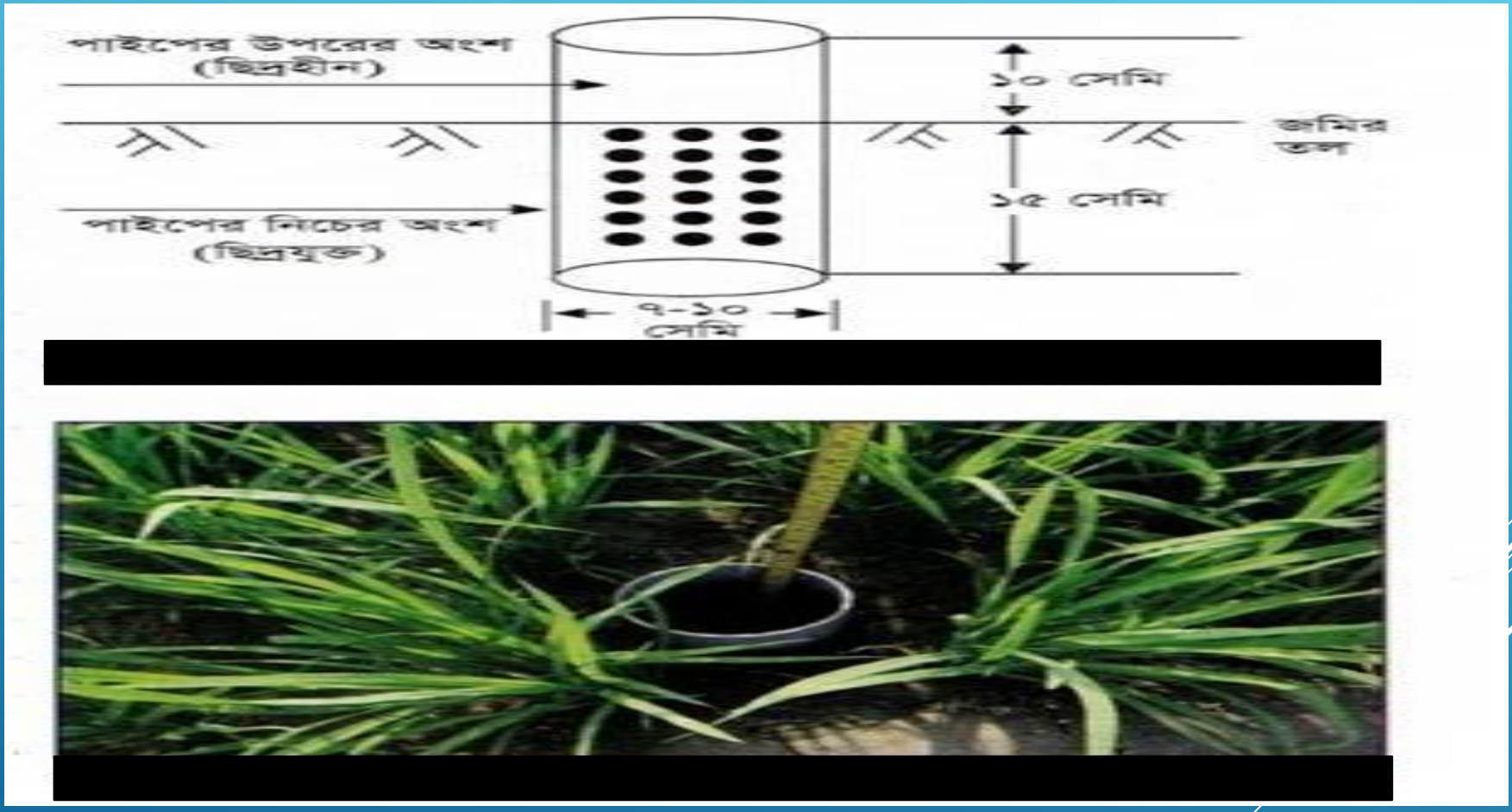
Uprooted Seedlings

Ideal Seed bed

Traditional Transplanting

Row Transplanting

Wetting and drying Method of irrigation



Off Types

Roguing

Storing of processed seed

Photo gallery

Field Visit & Stakeholder Consultation

Identification of alignment of existing embankment

Site selection of proposed regulator

by Consultants, PD office for decision about
r cum causeway over Diga Nadi, Boro Haor Nikli.

Stakeholder consultation workshop

Opinion Sharing of Local Representatives with Honorable Minister MOWR

Kishoreganj 22 December 2016

Embankment Constructed by Road Roller

Embankment Constructed by Road Roller

Khal Re-excavation work

Regulator Construction

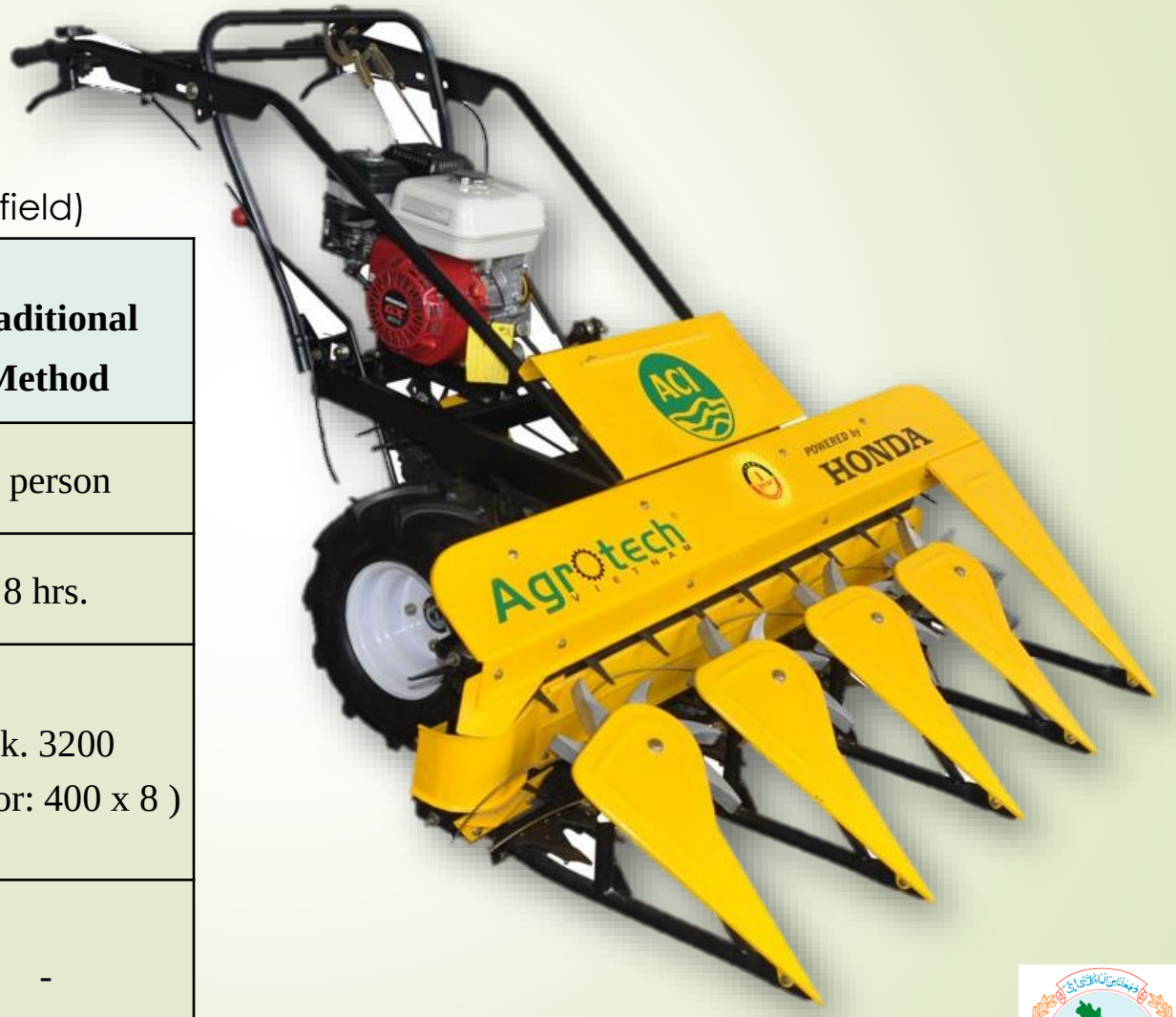
Regulator Construction

Regulator Construction

1V- Southern Depression Regulator (Nunnir Haor Part-B)

3V- Pangairdair Regulator (Noagaon Haor part A)

Automatic Rice Reaper Machine



Cost Comparison

(for 1 acre/100 decimal crop field)

	Reaper Machine	Traditional Method
Labor required	1 person	8 person
Time required	1 hour 30 min	8 hrs.
Cost	Tk. 365 (Labor:150/- + Patrol: 150/- + Depreciation: 65/-)	Tk. 3200 (Labor: 400 x 8)
Benefit	Saves Cost : 80% Saves Time: 50% Saves Labor: 87%	-

Photographs Demonstration of Rice, Potato, Maize

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

Photographs of Livelihood Improvement Activities

THANK YOU !