

The potential of Tidal River Management for flood alleviation in South Western Bangladesh

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Supplementary tables

Table S1| Major dataset used in this research

Data	Description	Sources
Digital elevation model (DEM)	The Advanced Land Observing Satellite (ALOS) DEM of 30m spatial resolution	(JAXA, 2015)
Land use	Land use and land cover data for 2013	(http://www.espadelta.net/) (Mukhopadhyay et al., 2018)
Population	Gridded population data of 90m spatial resolution	(WorldPop, 2017)
Precipitation data	Gridded (5km grid points) precipitation data of 10-day temporal resolution from 1965-2012	Bangladesh Meteorological Department (www.bmd.gov.bd/)
Soil texture data	Topsoil texture data with attributes of texture types, such as ‘silt loam’, ‘clay’, ‘silty clay’, etc.	Bangladesh Agricultural Research Council (http://www.barc.gov.bd/)
Soil permeability	Soil permeability level (‘very low’ to ‘very high’)	Bangladesh Agricultural Research Council (http://www.barc.gov.bd/)
Spatial data	Geographic Information System (GIS) data on polder boundary, polder number, river lines etc.	The Water Resources Planning Organization (WARPO) (www.warpo.gov.bd/)

Table S2| Flood observation data used to develop and validate the flood susceptibility model

Dataset	Flood points	Non-flood points	Total
Training dataset	426	274	700
Test dataset	160	140	300
Total	586	414	1000

Table S3| Multicollinearity diagnosis of selected flood conditioning factors

Selected variables	Variance inflation factor (VIF)	Mean VIF
Aspect	1.049	
Elevation	2.445	
Slope	1.274	
Curvature	1.469	
Land subsidence	1.179	
Precipitation	1.544	
SPI	1.734	1.397
Land use	1.392	
Soil texture	1.204	
Soil permeability	1.315	
Distance from drainage channels	1.058	
Distance from rivers	1.098	

Table S4| Population and land uses in flood susceptible areas of varying degrees

Exposure	Categories of flood probability				
	0 – 0.2	0.2 – 0.4	0.4 – 0.6	0.6 – 0.8	0.8 – 1
Population (%)	38	9	8.5	13.5	31
Land use (% of area)					
Shrimp culture	9.4	5.0	6.5	16.8	62.2
Rice field	21.5	6.5	7.0	13.8	51.2
Mixed rice field, shrimp, and other fish culture	0.7	1.8	2.9	4.4	90.2
Mangrove	34.7	9.7	18.7	21.5	15.3
Shrimp and other fish culture	2.0	3.7	3.9	4.1	86.2
Other crop agriculture land	25.6	8.0	8.0	18.1	40.3
Freshwater fish culture	13.5	5.7	6.2	10.8	63.9
Settlement with Homestead	48.0	10.4	9.8	14.6	17.3
Vegetation (Rural)					
Settlement with Homestead	71.4	8.1	6.8	6.7	7.0
Vegetation (Urban)					
Others	0.2	0.2	0.5	11.7	87.4

Supplementary figures

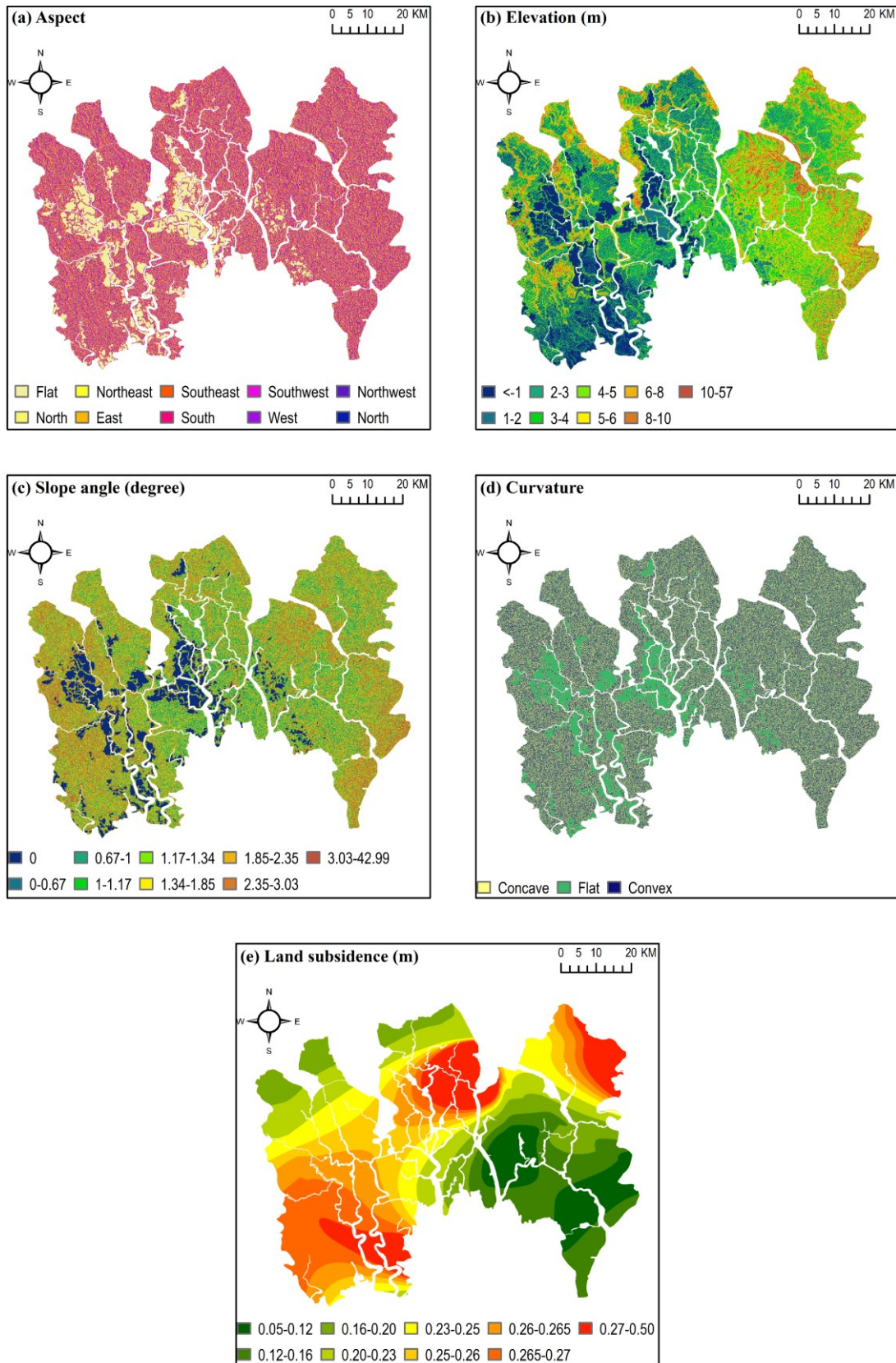


Fig. S1. Topographic factors contribute to flood

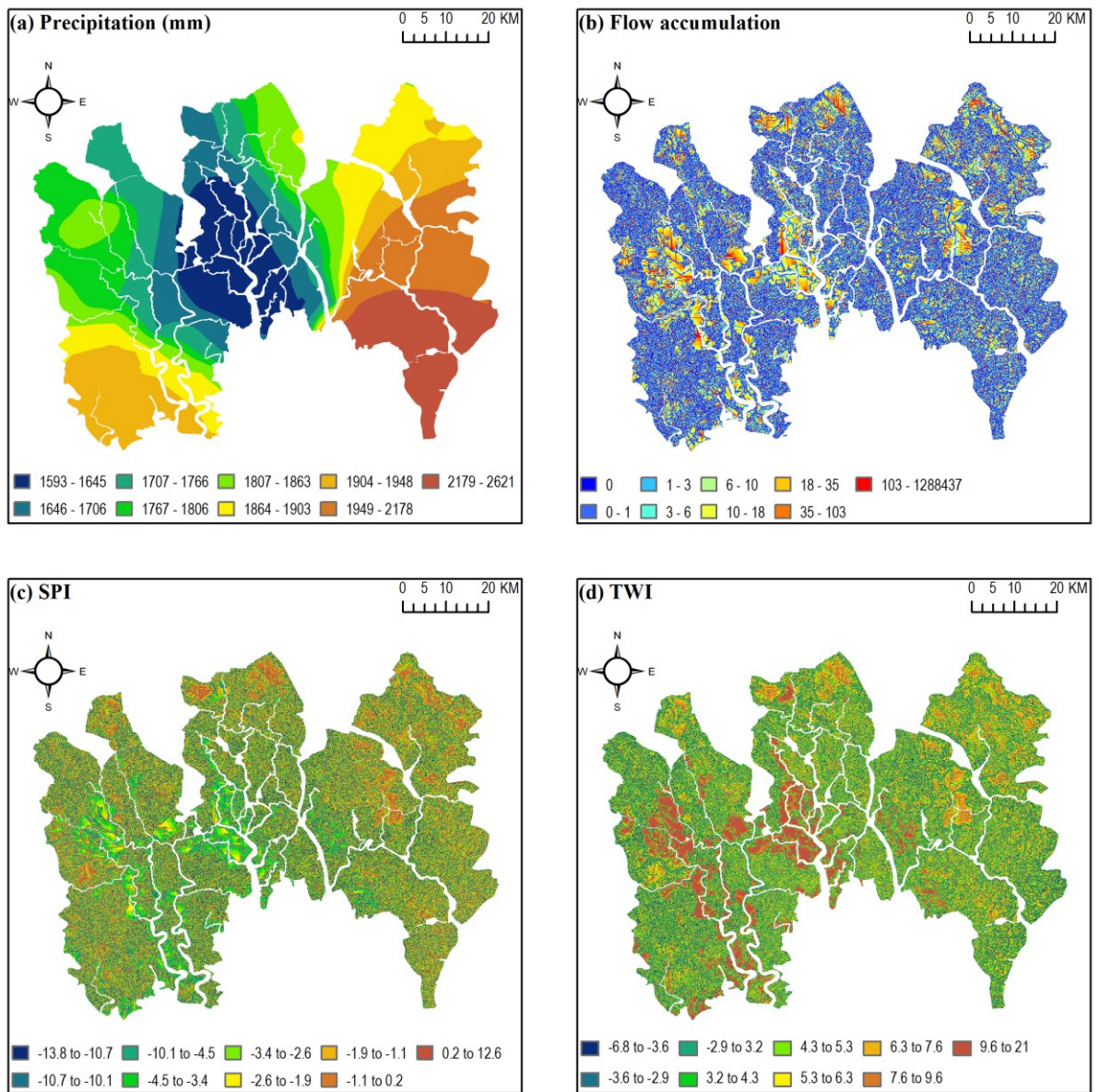


Fig. S2. Hydrological factors influence flood

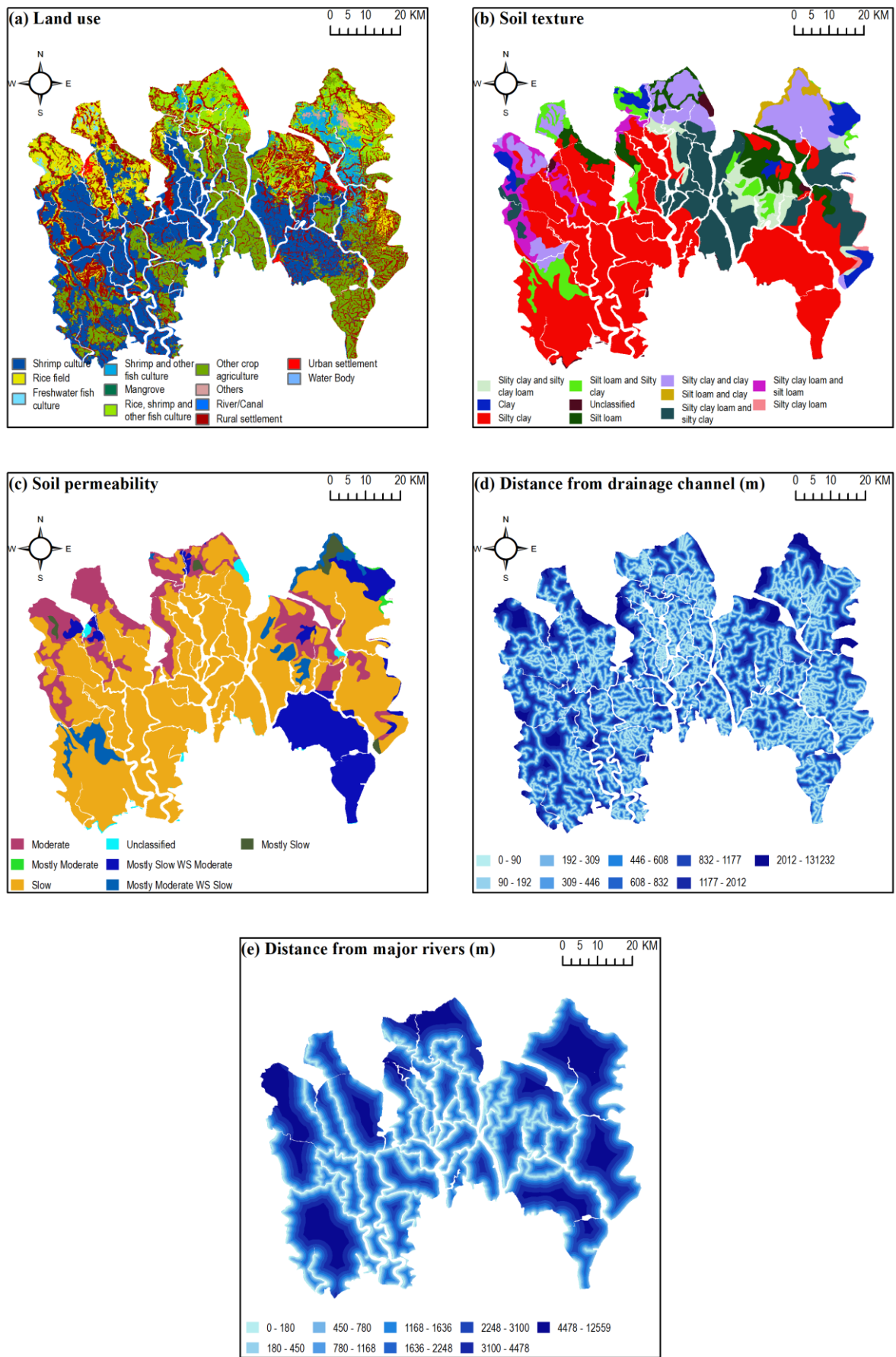


Fig. S3. Anthropogenic, geological, and locational factors influencing flood

Experimental study for sediment transport modelling

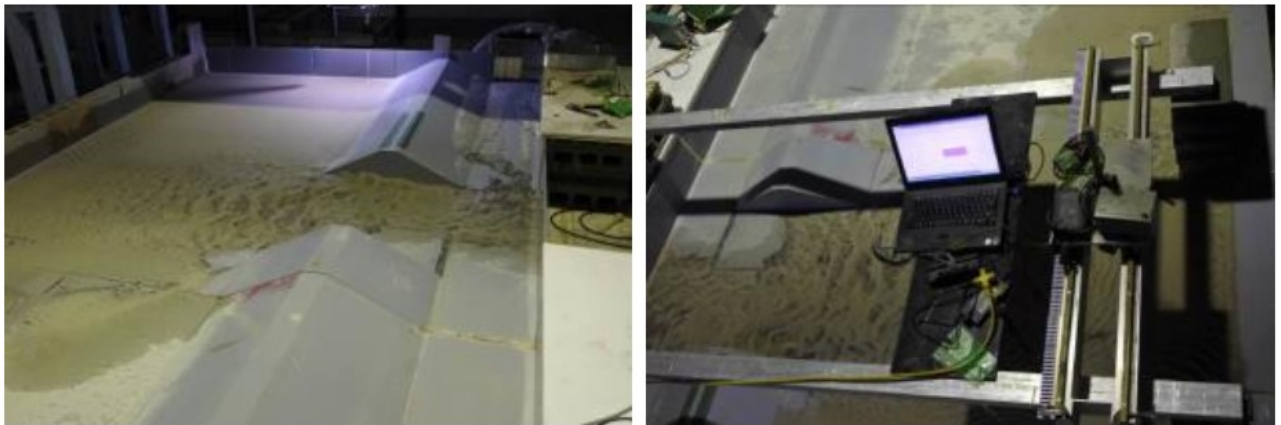


Fig. S4. Experimental facility: photos of bed level (left) and bed level measurement using laser displacement sensor (right) case II

Source:(Talchabhadel et al., 2017a)

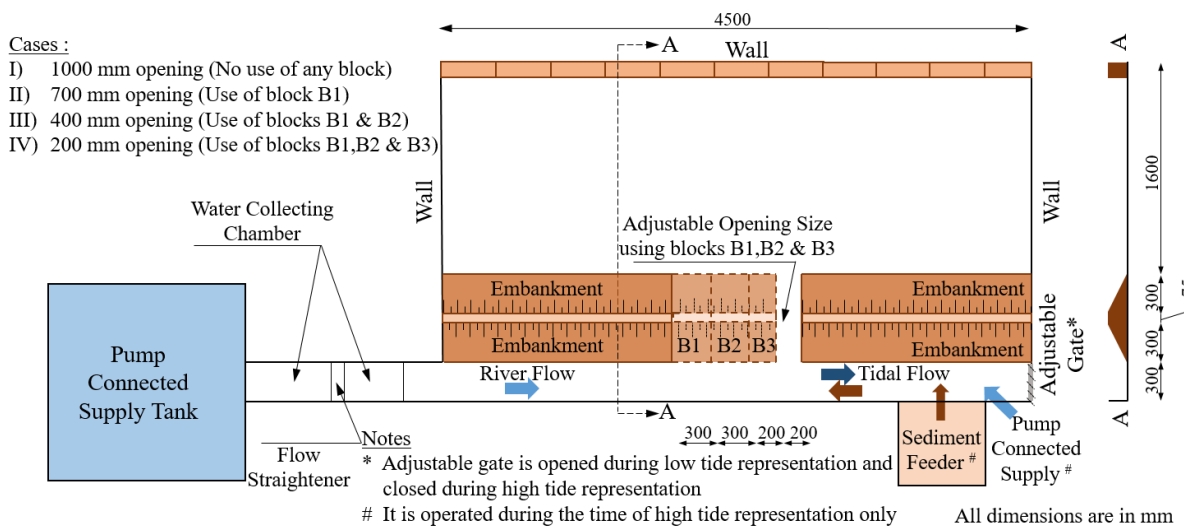


Fig. S5. Schematic view of the experimental setup

Source: (Talchabhadel et al., 2016; Talchabhadel et al., 2018)

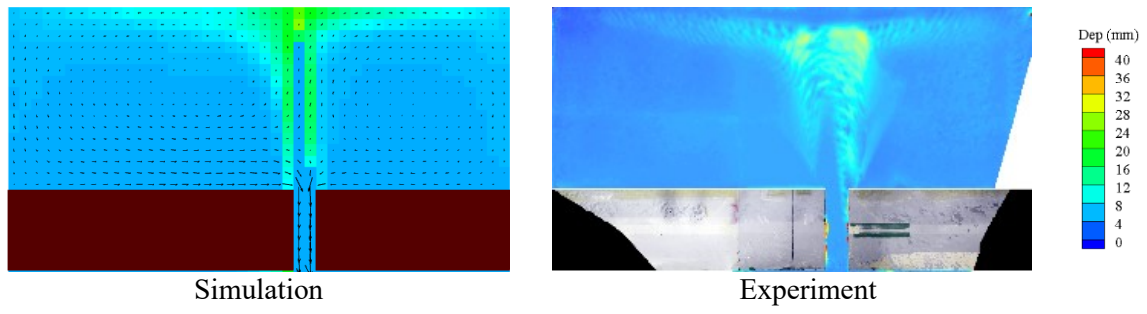


Fig. S6. Sample comparison of simulated and experimental results of deposited sediment after repetitive tidal movement

Source:(Talchabhadel et al., 2017a; Talchabhadel et al., 2017b)

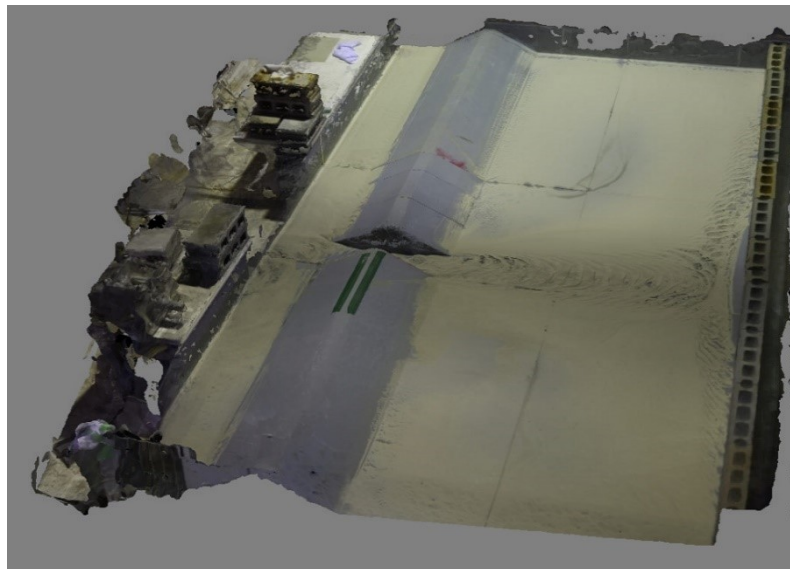


Fig. S7. Perspective view (3D spatial data from digital images)

Source: (Talchabhadel et al., 2017b)

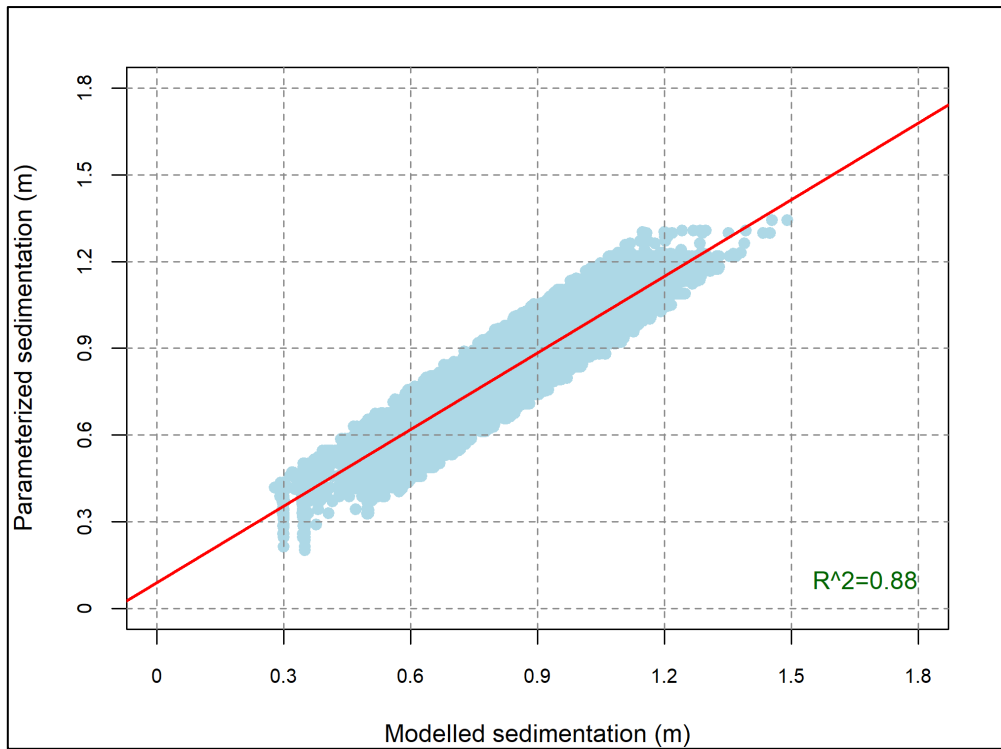


Fig. S8. Validation of suitability model to select candidate TRM sites

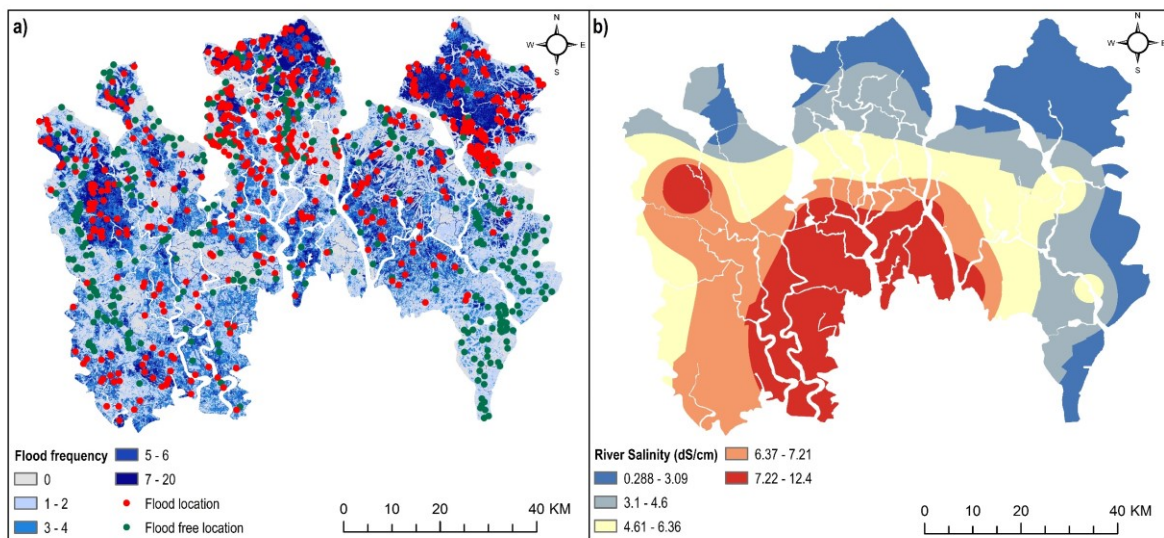


Fig. S9. a) Flood inventory map; b) River salinity map

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