SEA of SW Bangladesh and Sundarbans

Using Real Intelligence

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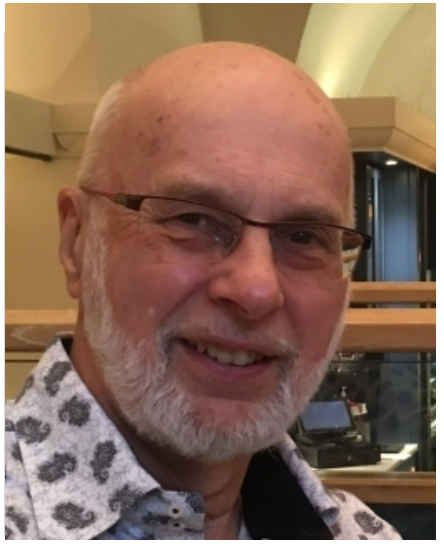

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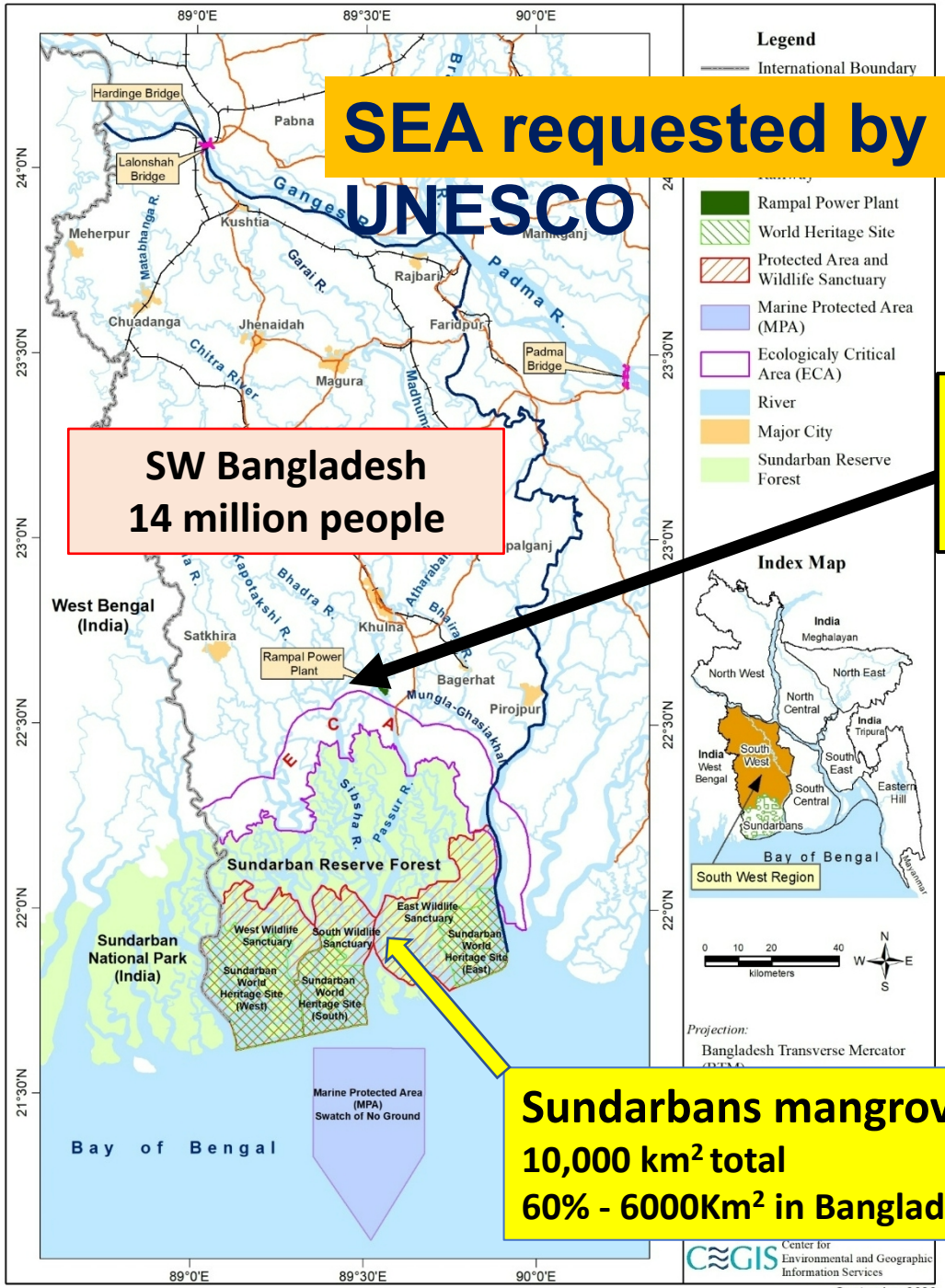
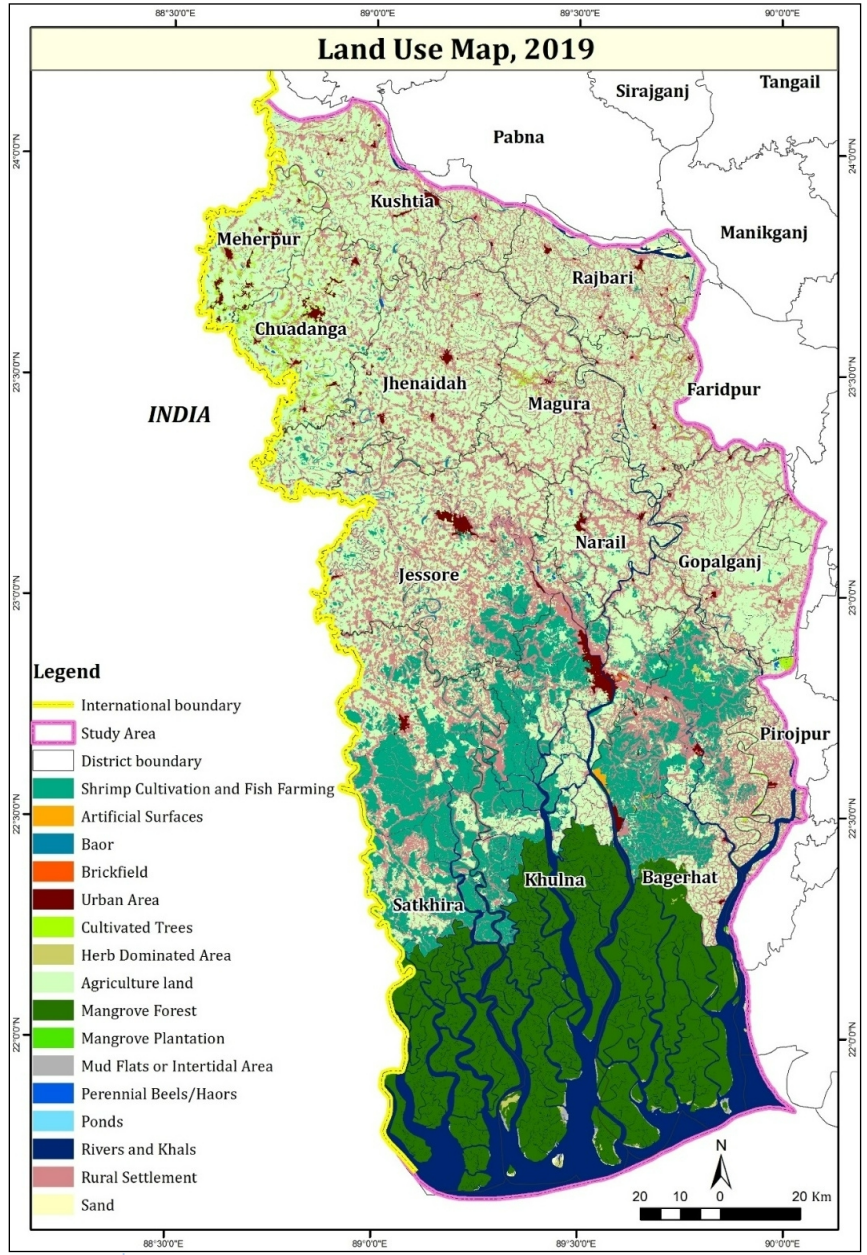
SEA requested by UNESCO

SW Bangladesh
14 million people

Rampal coal-fired power plant

Sundarbans mangroves
10,000 km² total
60% - 6000Km² in Bangladesh





Complex - sectors and theme areas

9 Major Sectors

- Forestry
- Fisheries
- Water resources
- Power & energy
- Tourism
- Urbanisation
- Industry
- Transport & communications
- Shipping

89 PPPs assessed

Other Sectors and Thematic Areas

- Environment, biodiversity & climate
- Sundarbans
- Agriculture
- Cultural affairs
- Defence
- Disasters
- Economy
- Education
- Food
- Health & family welfare
- Labour, employment & livelihoods
- Land
- Local government, rural development & cooperatives
- Mining
- Planning
- Population
- Information
- Science & technology
- Waste management
- Women, children & vulnerable groups

+ National and cross-sector plans

Artificial v Real Intelligence – 2 key issues

- Young professionals may lack ‘real world’ experience and may be seduced into accepting what AI (as new technology) throws out with realizing it needs **ground truthing** and possibly needs challenging
    - Satellite images (available in 1970s) v airphotos – still needed ground truthing. Got better over time with better resolution and ground correlation
- EA needs **stakeholder engagement**. This identifies issues that are local and particular that AI not likely to pick up (not documented)

SEA Process

Affected by COVID

THEMATIC BASELINE STUDIES:

1. Climate & climate change
2. Pollution & waste
3. Delta dynamics
4. Land resources
5. Sundarbans & wildlife
6. Tourism
7. Fisheries & agriculture
8. Infrastructure
9. Power & energy
10. Urbanisation
11. Economic & industrial development
12. Social issues
13. Institutional governance

Inception

SCREENING of PPPs per sector (89)

SCOPING
(baseline studies, key issues, growth scenarios

INITIAL ASSESSMENT of Alternative Growth Scenarios:
(low, medium, high)

DEEPER ASSESSMENT of High Growth Scenario
(Pollution modelling)

SEA REPORT & SEMP

STAKEHOLDER PARTICIPATION

- National
- SW Region
- Districts
- Local (Upazila)
- Resource Use groups
- Emails to stakeholders
- SEA Website

Many local issues raised

Key Environmental Issues

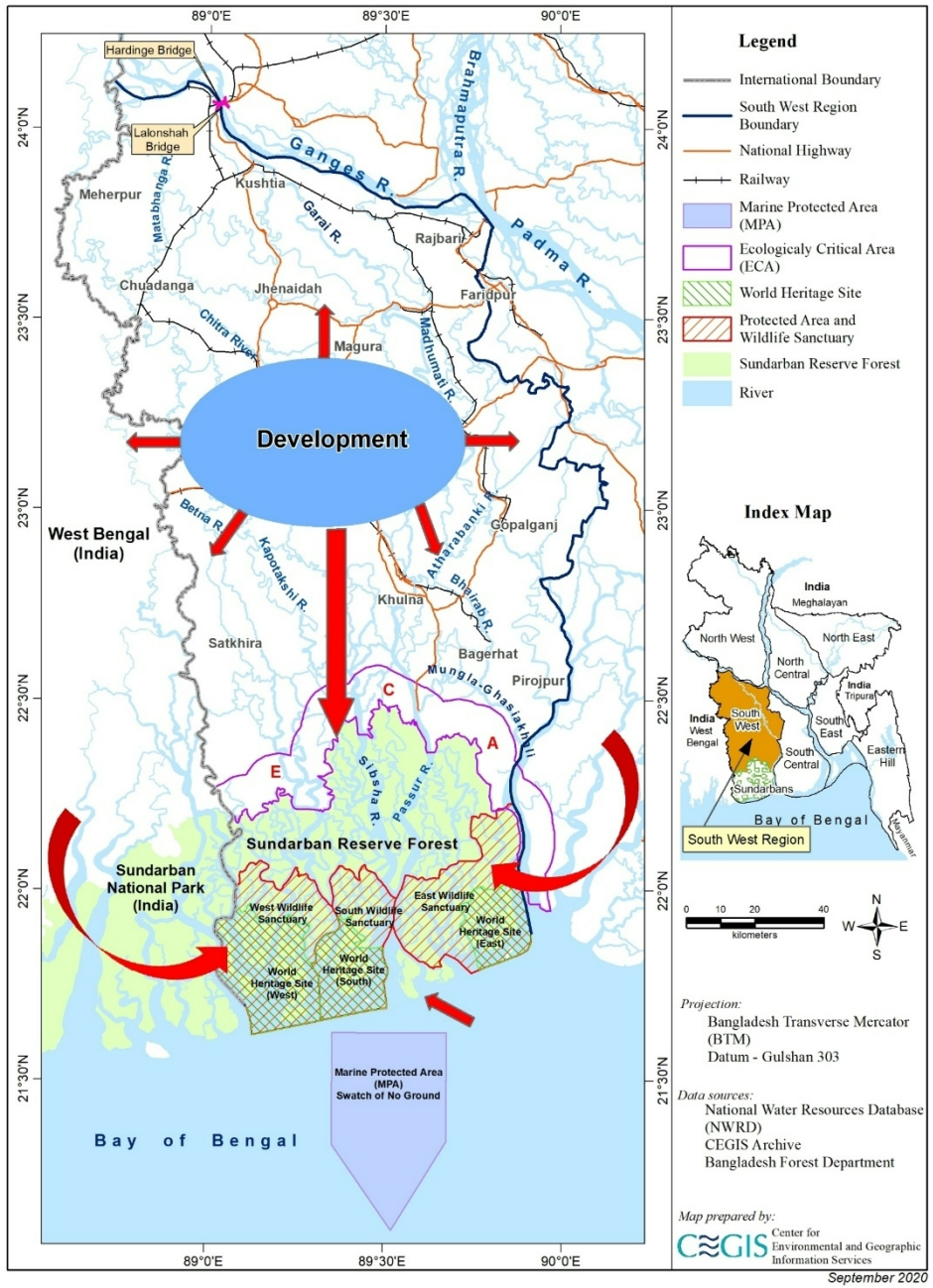
- Pollution and waste (solid, liquid, air, soil)
- Water management & flow dynamics in rivers
- Sedimentation and siltation (fluvial and tidal)
- Salinity (soil & groundwater)
- Noise (including sub-aqua)
- Habitat isolation
- Loss of biodiversity & ecosystem services
- Invasive alien species
- Induced river bank erosion
- Climate change
- Floods and cyclones
- Impacts of industries and infrastructure
- Urbanisation
- Land use changes (fisheries, agriculture, etc.)
- Impacts on sensitive areas

Objectives set to address each issue

Issues

- Livelihoods
- Rural-urban migration
- Health & sanitation
- Gender-related issues, and children
- Education
- Loss of traditional knowledge
- Loss of cultural heritage
- Security
- Seasonal tourism
- Illegal activities (poaching, fishing. Timber)
- Institutional issues
- Transportation & communication
- Product marketing & value chain
- Transboundary issues
- Post Covid-19 issues

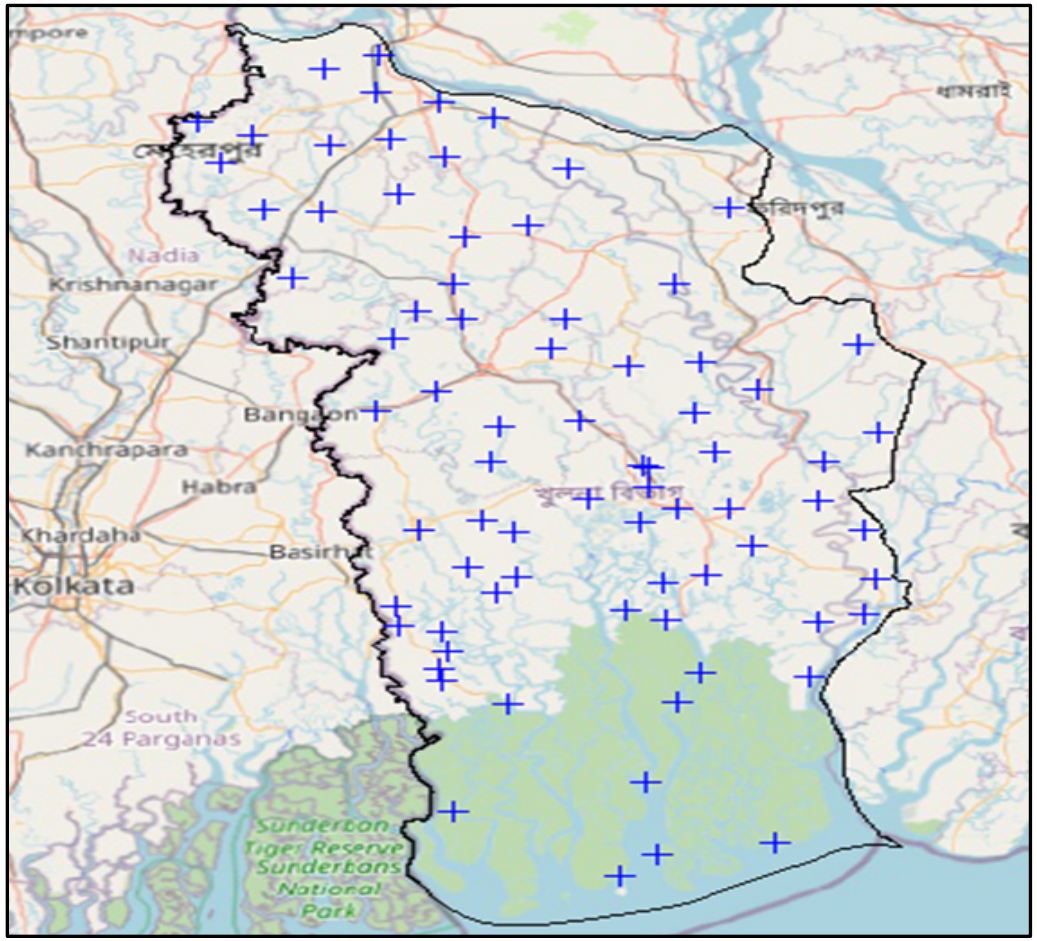
Objectives set to address each issue



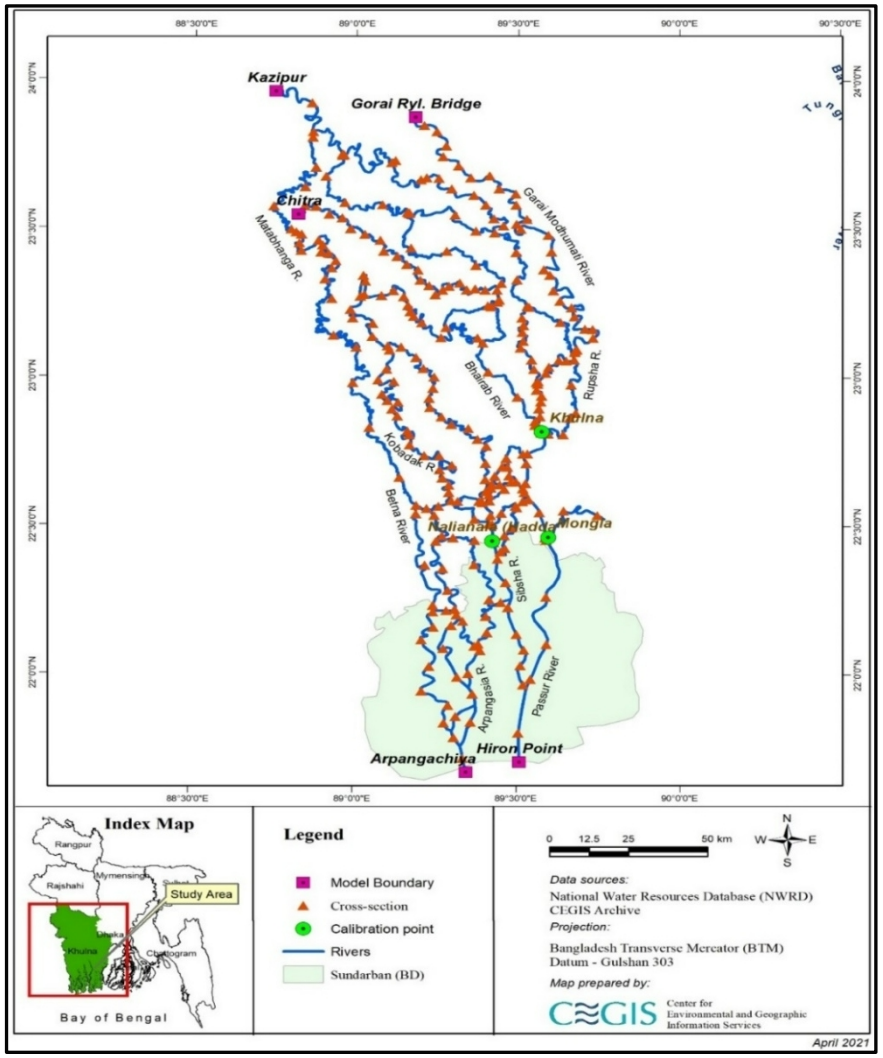
Transboundary impacts

- **Water Sharing (Ganges)**
- **Upstream dam/barrage and irrigation in the Ganges basin, and**
- **Power plants and industries in neighbouring West Bengal, India**

Pollution modelling

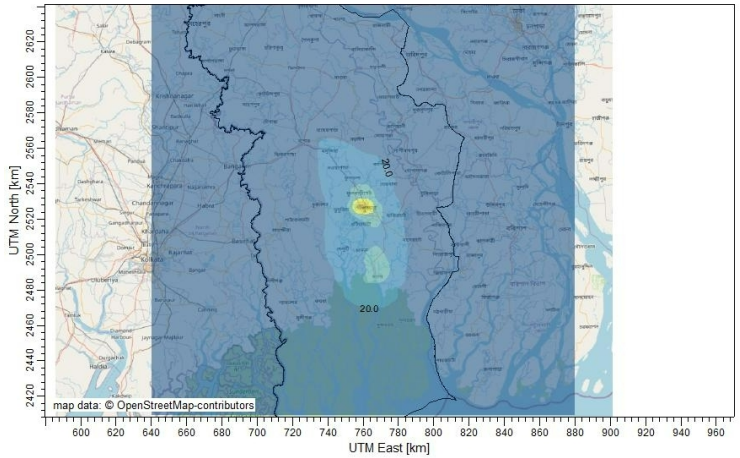


Air – key receptor sites

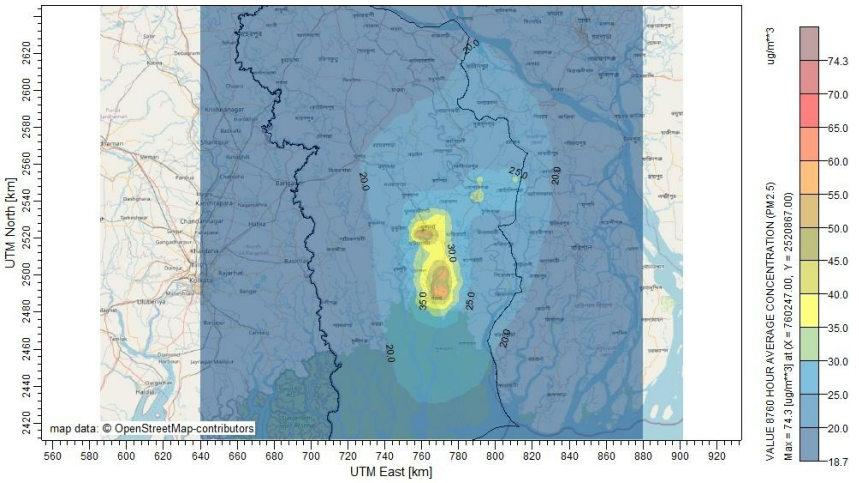


Water – data set sites

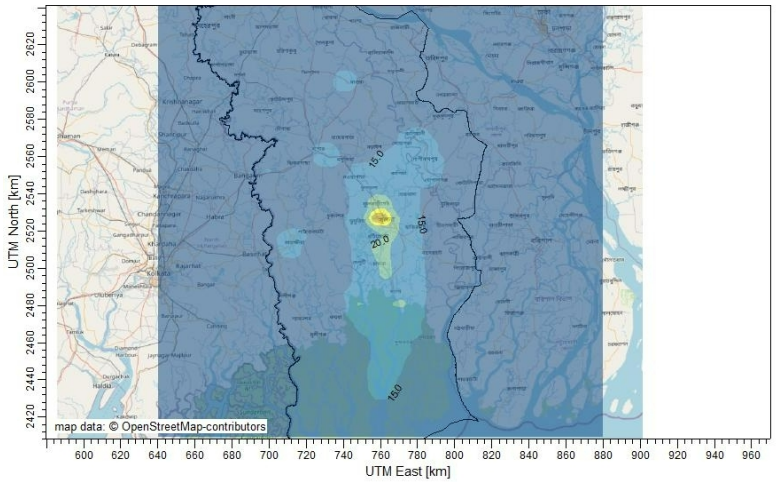
PM 2.5 (2019)



PM 2.5 (2041)



NOx (2019)



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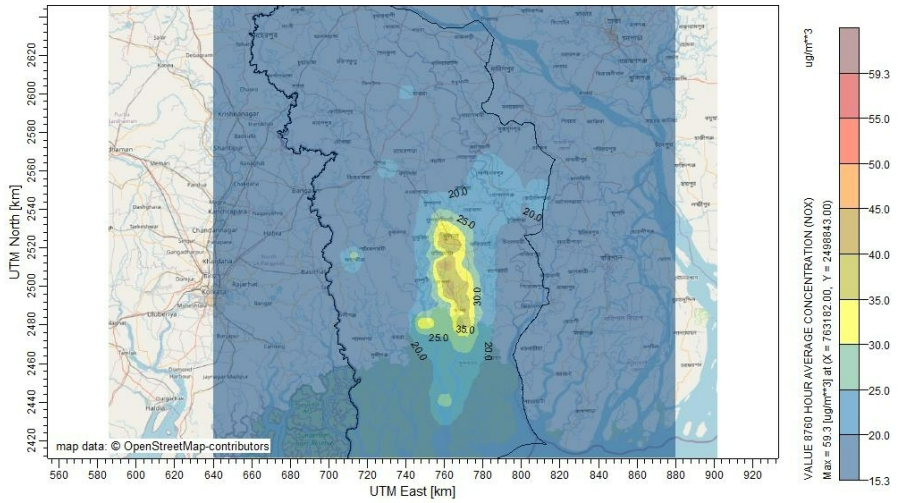


PM high risk to human health, may also affect fauna & flora

PM & NOx highest around Mongla – need emission reductions

Mongla concentration field (35 x 65 km) – higher levels in northern Sundarbans – risk for vegetation

Phosphate concentrations at different locations (with flow augmentation)

Location	Phosphate during dry season (mg/l)			Phosphate during wet season (mg/l)			Inland Surface Water Quality Standard (ECR'1997 and Draft ECR'2017)
	Base	Y_2031	Y_2041	Base	Y_2031	Y_2041	
Khulna	0.26	0.18	0.19	0.58	0.36	0.36	0.5 mg/L
Dacope	0.23	0.18	0.19	0.59	0.38	0.39	
Mongla	0.22	0.18	0.19	0.58	0.41	0.41	
Harbaria	0.21	0.18	0.18	0.58	0.41	0.41	
Akram Point	0.17	0.16	0.17	0.48	0.28	0.28	
Hiron Point	0.15	0.15	0.15	0.21	0.17	0.17	
Paikgacha	0.19	0.18	0.18	0.56	0.46	0.46	
Assasuni	0.21	0.05	0.06	0.48	0.41	0.40	
Koyra	0.19	0.19	0.19	0.46	0.29	0.29	
Arpangachiya	0.16	0.16	0.16	0.30	0.22	0.22	

- **Somewhat elevated phosphate concentrations in wet season**
- **US standard 0.1mg/L (USEPA)**
- **Due to agricultural run-off, municipal & industrial discharges.**
- **Needs reducing/treatment immediately.**

Growth Scenarios

High Growth

Achieve High Income Country (HIC) status by 2041 (govt policy in Second Perspectives Plan - requires added stimulus (investment, innovation, etc.)

Medium Growth

Equivalent to current growth path aimed at achieving upper Middle Income Country (MIC) status by 2031 (lower MIC achieved in 2015);

Low Growth

Reduction of economic growth that could be triggered by external factors – over which Bangladesh is little or no control

Detailed narratives describing each scenario

Scenarios compared

ISSUES	LOW GROWTH	MEDIUM GROWTH	HIGH GROWTH
ENVIRONMENTAL			
Biodiversity and ecosystems	0	+2	+4
Illegal activities in protected areas	0	+2	+4
Invasive Alien Species	0	+2	+4
Waste	0	+2	+4
Pollution	+1	+3	+4
Greenhouse gases	0	+2	+1
Climate change and natural disasters	+1	+2	+4
Dry season freshwater flow	0	+2	+4
Monsoon peak river flows	0	0	+2
Land degradation	0	+2	+3
Conversion of agricultural land	0	0	0
SOCIO-ECONOMIC			
Economic development and diversification	+1	+3	+4
Employment and livelihoods	0	+2	+3
Health	0	+2	+3
Water supply & sanitation	0	+2	+4
Education	0	+2	+4
Migration	+1	+2	+4
Gender equality and empowerment	+1	+2	+4
Inclusion of landless and marginals	+1	+2	+3
Conflicts over use of land	0	+2	+2
Heritage sites	0	+1	+3
Food security	0	+3	+4
Agricultural and fish production	+1	+2	+4
Renewable energy	0	+2	+3
Energy production & consumption	+1	+3	+4
Affordable energy	+1	+3	+4
Tourism	0	+1	+3
Connection	+1	+2	+3
Footprint of transport services	+1	+2	+4

Mitigated scores

ISSUES	LOW GROWTH	MEDIUM GROWTH	HIGH GROWTH
ENVIRONMENTAL			
Biodiversity and ecosystems	-3	-2	-4
Illegal activities in protected areas	-3	-2	-3
Invasive Alien Species	-3	-2	-3
Waste	-4	-2	-3
Pollution	-4	-2	-3
Greenhouse gases	-3	-3	-3
Climate change and natural disasters	-4	-3	-4
Dry season freshwater flow	-3	-2	-3
Monsoon peak river flows	0	0	-2
Land degradation	-3	-2	-3
Conversion of agricultural land	-2	-3	-3
SOCIO-ECONOMIC			
Economic development and diversification	-2	-2	-3
Employment and livelihoods	-2	-2	-3
Health	-2	-1	-1
Water supply & sanitation	-2	-3	-3
Education	-2	-1	-1
Migration	-2	-2	-2
Gender equality and empowerment	-1	0	0
Inclusion of landless and marginals	-3	-2	-2
Conflicts over use of land	-3	-2	-3
Heritage sites	-3	-1	-2
Food security	-2	0	0
Agricultural and fish production	-1	0	0
Renewable energy	-2	-1	-1
Energy production & consumption	-2	0	0
Affordable energy	-1	0	0
Tourism	-2	-1	-1
Connection	-2	-1	-1
Footprint of transport services	-2	-1	-1

Mitigated scores

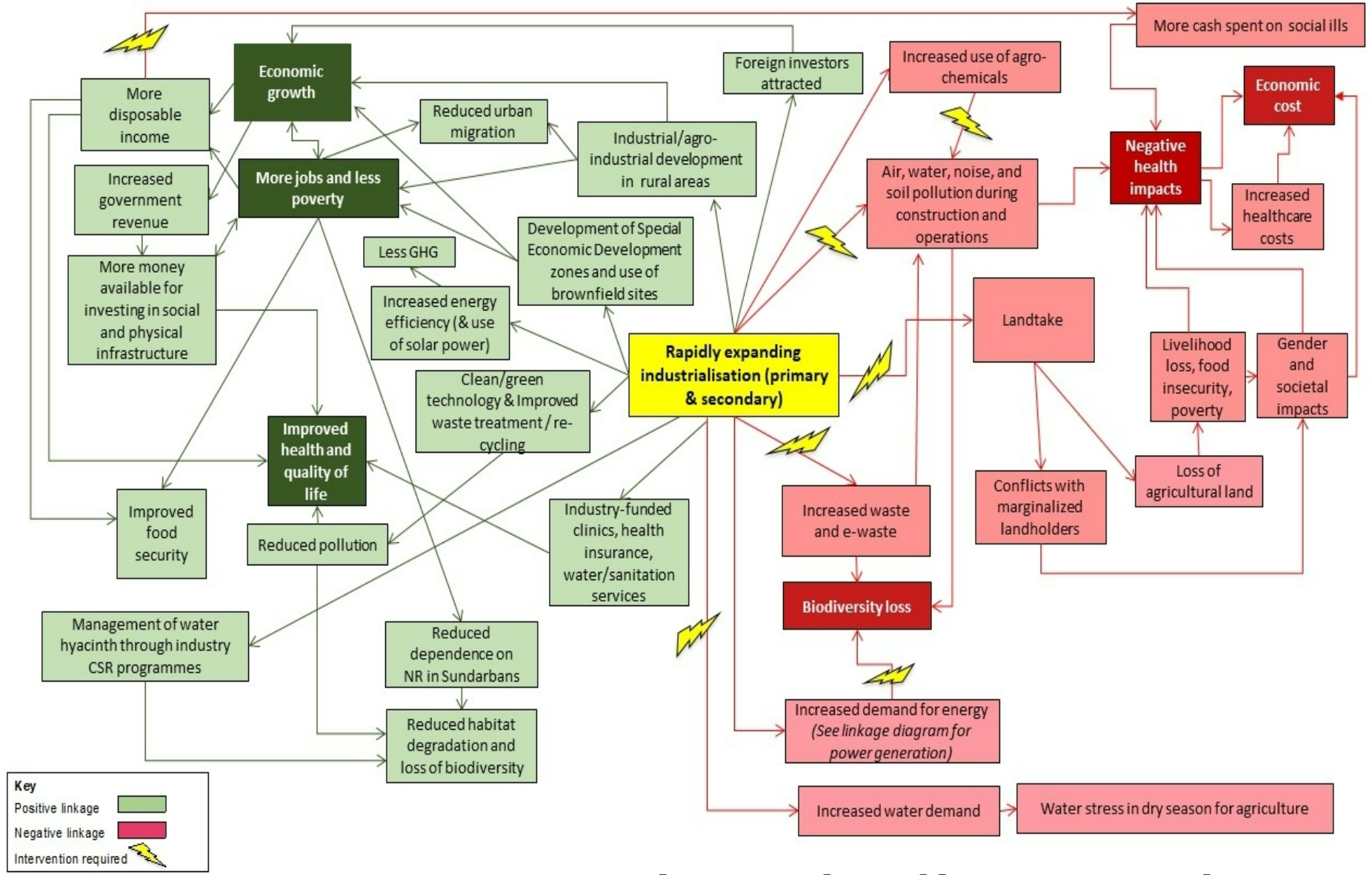
Deeper assessment

By sector

ISSUES	Industry	Transport	Urban	Power/Energy	Forestry	Fisheries	Water	Tourism	Agriculture	TOTAL
ENVIRONMENTAL										
Biodiversity and ecosystems	-3	-2	-1	-3	-3	-3	-3	-2	0	-20
Illegal activities in protected areas	0	0	0	0	-3	-3	0	0	0	-6
Invasive Alien Species	0	0	0	0	0	-3	0	0	-3	-6
Waste	-3	-3	-3	-3	0	-2	0	0	0	-14
Pollution	-3	-3	-3	-3	0	-1	0	0	-1	-14
Greenhouse gases	-2	-2	-1	-3	-3	0	0	0	-1	-12
Climate change and natural disasters	0	-2	-1	0	-2	0	-3	0	0	-8
Dry season freshwater flow	0	0	0	-1	-1	0	-4	0	0	-6
Monsoon peak river flows	0	0	0	0	-1	0	-3	0	0	-4
Land degradation	0	-1	0	0	-1	-3	-3	0	0	-8
Conversion of agricultural land	-1	0	0	0	-1	-4	0	0	0	-6
SOCIO-ECONOMIC										
Economic development and diversification	-2	-3	-3	-2	-1	-4	-4	-2	-2	-23
Employment and livelihoods	-1	0	-1	-1	-1	-1	-4	-1	-1	-11
Health	-1	-1	0	0	-3	0	-3	-2	0	-10
Water supply & sanitation	-1	-1	-1	0	0	0	-3	0	0	-6
Education	0	-1	-1	0	0	0	0	-1	0	-3
Migration	-2	0	-1	0	0	0	0	0	0	-3
Gender equality and empowerment	-1	0	0	0	-1	0	0	-1	0	-3
Inclusion of landless and marginals	0	0	0	0	-2	0	0	0	0	-2
Conflicts over use of land	-2	0	0	-2	0	-3	0	0	0	-7
Heritage sites	-1	0	0	-1	-3	0	-2	-2	0	-9
Food security	-1	-1	0	-1	-1	-2	-4	0	-2	-12
Agricultural and fish production	-1	-1	0	-1	-1	_1	-4	0	-2	-11
Renewable energy	0	0	-1	-1	0	0	0	0	0	-2
Energy production & consumption	0	0	0	0	-1	0	0	0	0	-1
Affordable energy	0	0	0	0	-1	0	0	0	0	-1
Tourism	0	-1	0	0	-2	0	0	-2	0	-5
Connection	0	-2	0	-1	0	0	0	0	0	-3
Footprint of transport services	0	-2	-1	-2	0	0	-2	0	0	-7

Risk Scores

Importance of SEMP !



***Positive*: Economic growth; more jobs and less poverty; and improved health and quality of life;**
***Negative*: Economic costs; negative health impacts; loss of biodiversity.**

Key findings

- Emotive claims that Sundarbans under threat – many don't take account of facts/science
- Risks much greater for rest of SW region (settled areas, large population) – particularly for health & livelihoods
- Modelling shows elevated PM and NOx around Mongla (but below Bangladesh standards)
- Pollution affects adjacent (northern) part of Sundarbans only (risks need research)
- OUV of World Heritage Sites (near coast) not affected
- But if safeguards not enforced & full/effective mitigation not implemented – risk of cumulative impacts - exploitation and degradation of habitats, loss of biodiversity and ecosystem(s) integrity and services [low-moderate impact on OUV)

Thank You

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Let’s continue the conversation!

Message me your questions or comments in the IAIA25 app.

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