



ENGAGE4Sundarbans

Regional Workshop & Exhibition

2nd - 6th September, 2024

Kolkata & Kumirmari



Solution-oriented
Research for Development
Programme



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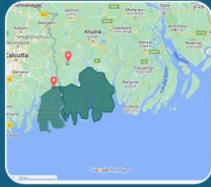




ENGAGE4 Sundarbans

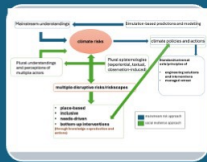
Eliciting Needs-based Grassroots Action through Cross-Group Engagement (ENGAGE)

The inhabitants of the tidally active lower deltaic plain of the Ganges-Brahmaputra-Meghna basin adjacent to the Sundarbans Mangrove Forest in India and Bangladesh are highly exposed to multiple risks, including cyclones, salinization, pandemics, and socioeconomic marginalization.



Aim of the project

Eliciting Needs-based Grassroots Actions through Cross-Group Engagement and transboundary knowledge coproduction to build resilience in the Sundarbans



Conceptual framework

- Framing of Sundarbans' 'riskscape'
- Support situated adaptive practices that enhance social resilience through experiments in inland fishing and integrated farming based on transdisciplinary engagement across the political boundaries of the Sundarbans.



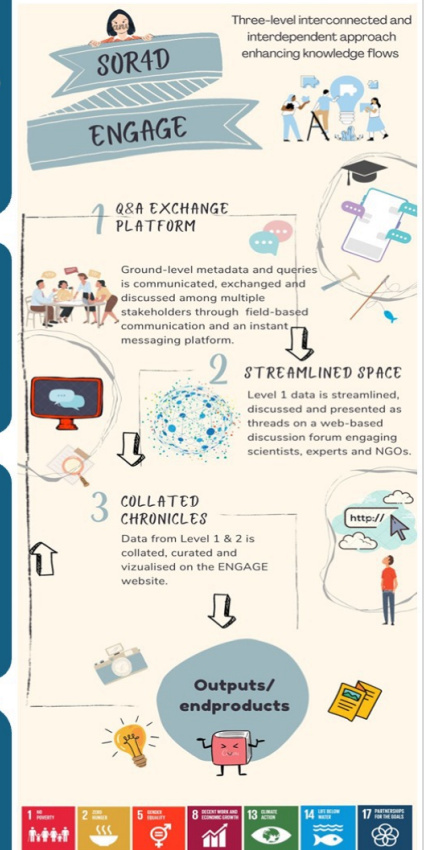
Practical Objectives

- Map climate risks and disaster impacts
- Stimulate situated adaptive agro-ecological mechanisms
- Enhance trans-disciplinary engagement
- Cross-learning from bilateral exchanges across transboundary Sundarbans

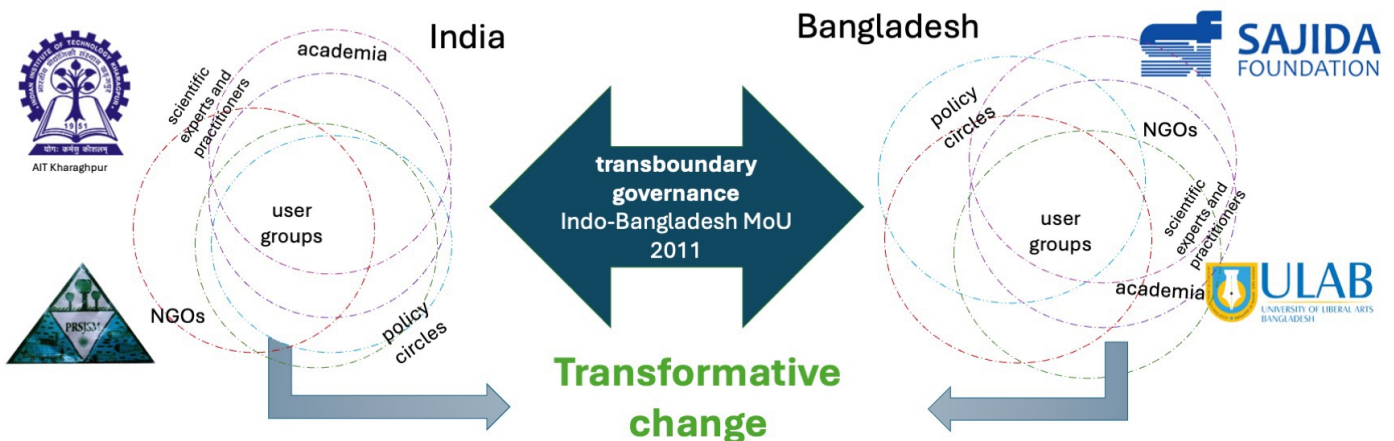
Practical approach: the A2EKC



- Archival research
- Experimentations of agro-ecological practices in the fields: integrated farming and inland fisheries
- Ethnographic observations and Involvement of community members in the surveys
- Knowledge co-production based on co-curation shared analysis between academia, NGOs, business, farmers and user groups, policymakers, communities
- Collective actions



Building resilience through transboundary knowledge coproduction



Funders:





Kolkata Programme Schedule (2nd – 3rd September, 2024)

September 2 (Monday)

9:30 – 10:00	Registration
10:00 – 11:00	Project Overview and Rationale
11:00 – 11:30	Project Reporting and Workshop Route Map
11:30 – 11:45	Tea Break
11:45 – 12:30	Looking Back to Look Forward
12:30 – 12:45	Exhibition/Knowledge Product Presentation on Archive
12:40 – 1:15	Q+A; Critical Feedback and Review
1:15 – 2:15	Lunch
2:15 – 4:00	AQUAMUSE Panel (including Q+A)
4:00 – 4:30	Special Presentation on ‘Seeing’ like a visual artist
4:30 – 5:00	Tea Break

September 3 (Tuesday)

9:30 – 10:00	Recap and Overview
10:00 – 10:30	Mapping the Land Use Transformations in the Sundarbans
10:30 – 11:00	Ethnography: Ground(ed) Narratives
11:00 – 11:30	Q+A; Critical Feedback and Review
11:30 – 11:45	Tea Break
11:45 – 12:00	Co-ENGAGEment Design – Overview and Rationale
12:00 – 1:45	Activities and Exercises
1:45 – 2:45	Lunch
2:45 – 3:30	Reflections
3:30 – 4:00	Exhibition/Knowledge Product Presentations
4:00 – 4:15	Tea Break
4:15 – 6:30	Cultural Evening



Kumirmari Programme Schedule (4th – 6th September, 2024)

September 4 (Wednesday)

- Visit to the Kumirmari Island (from Kolkata)
- Exposure to the SJSM K2A Premise
- *Adda* and Food

September 5 (Thursday)

9:30– 10:00	Debriefing by Project Team Members
10:00 – 10:15	Q+A from Local Participants
10:15 – 10:30	Presenting the Experimentation Component of ENGAGE
10:30 – 11:00	Tea Break
11: 00 – 11:45	Mapping of 26 Canals – Process and Findings
11:45 – 13:00	Profile Assessment and Selection of the Experimentation Site
13:15 – 14:15	Lunch
14:30 – 16:30	Group Activities Using SWOT on Experimentation Viability

September 6 (Friday)

10:30 – 12:30	Group Discussions on Implementation Logistics and Design
13:00 – 14:00	Lunch
14:30	Departure



Summaries and Abstracts (SOR4D ENGAGE)

Background

The project follows the A2E (archival-ethnographic-experimentation) methodology in exploring and activating social resilience in the delta. Our systemic approach includes a two-step methodology of:

1. historical ethno-graphic explorations, and
2. pilot experimentations (inland fish farming and integrated farming) in the translocal project sites (Kumirmari, India and Assasuni, Bangladesh), co-engaging and eliciting multiagency with sustained implications for transboundary Sundarbans

While the first two components (archival and ethnographic research) have been conducted during the first year of the project (July 2023 – August 2024), in the second year (January – December 2025), inland fishing in the selected canal of Kumirmari and integrated farming experimentation in Assasuni will be executed.

This regional workshop aims to present archival, GIS and ethnographic explorations using conventional presentation formats, followed by critical feedback from invited delegates. The knowledge products capture processes, techniques, and storylines that unfolded during the execution of the project during Year 1.



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(Re)shaping a 'risky' delta: Archival insights on the colonial origin and impact on the resilience legacy of the Sundarbans

The Sundarbans, the world's largest transboundary mangrove delta, is a "risky" and "treacherous" muddyscape. Prone to severe tropical climatic occurrences and cohabited by humans and tigers (and many other forms of flora and fauna), this region synonymizes thrill and danger, emitting an aura of mystery that has spanned numerous (non)fiction literatures and urban legends. Subject to fluvial risks, the Sundarbans faces recurring cyclones and floods whose mitigation strategies are rooted in historicized policies and local complexities. Contrary to popular narratives, this risk-resilience dynamics have been legitimized through colonial statecraft, permeating linear non/human contestations ranging from "reclamation" to "desiccation," that continue to influence the region's vulnerable socio-ecological legacy. Using archival research as a tool, we explore the historical tenets of mapping, tracking and managing of the plural risks associated with the Sundarbans and the careful manipulation of its social ecology to induce imperial adaptive strategies. Consulting primary colonial records, Indigenous narratives and secondary accounts, we present the Colonial Resilience Framework (CRF) and its role in the shifting, sorting and shaping of Sundarbans climate resilience discourse that constantly attempts to control the habituated risks in the delta. This altered perception of environmental vulnerabilities still continues to overwhelm the naturality of the space, vocalizing the need for contemporary quick fixes such as managed retreat strategies in the Sundarbans. The application of the archival method provides a comprehensive overview of Sundarbans' climate legacy against this "fixing" approach that once discarded its inherent socionature dynamics and facilitates towards an integrative passage in understanding and adapting to the riskscape rather than controlling it, through traditionally rooted place-based solutions.

Mapping the land use transformations in the Sundarbans

The coastal areas of the Sundarbans in India and Bangladesh are frequently disrupted by natural disasters such as cyclones, storm surges, floods and saltwater intrusion, which disrupt the daily lives of communities and cause losses and damages. Observing and analysing satellite images can support our understanding of environmental changes that have taken place over time. To document these transformations, we selected a series of satellite images (Landsat, SPOT and other) to compare spatio-temporal land use transformations in Assasuni and Kumirmari Upazila since 1973. We focused on the changes that occurred after the passage of a severe cyclone. For this, we used remote sensing and mapping softwares. The results show that breaches in the dikes allow salt water to pass through, thus contributing to the salinisation of the soil. By opportunity or constraint, in these affected areas, aquaculture has replaced rice and other crops. In addition, we have observed how soil erosion has forced communities to move their villages, sometimes to refugee camps set up by the government. These observations are further verified in the field with the agenda of coming up with sustained solution strategies to tackle the challenges.

The 3Rs: Exploring risks, responses, and recovery practices in Kumirmari

The current study seeks to explore the complex intersectionality among the 3Rs – Risks, Responses, and Recovery strategies in informing conceptual paradigms of socio-ecological resilience and regional/local policies and actions. Findings have been gathered from 400 household surveys in Kumirmari, Gosaba using a tool that was formulated following knowledge coproduction principles in transdisciplinary research. The three key sections of the tool included: socio-demographic profile, riskscapes, and locally-led adaptation practices. The findings suggest that cyclones, riverbank erosion, and floods are the top three risk factors affecting the life and livelihood of the inhabitants. In response to such risk scenarios, the top three pressing infrastructural needs are repairing and (re)constructing the river embankments followed by setting up of flood shelters and health centres. Agro-ecological experimentations conducted as individual and collective ventures have noteworthy potential as situated adaptive strategies and tactics. The results will be further analyzed to identify more-than-linear interactions between risks, responses, and recovery mechanisms determining (social) resilience of the study area. We argue that the investigation is significant not only in terms of informing risk-resilience approaches in socio-ecological research but also formulating local policies and action pathways.

Ideating living lab: A social resilience experimentation in climate vulnerable coastal region in Bangladesh

People living in Bangladesh coastal regions are facing the dual impacts of both climate and development activities. The nature of these dual impacts is complex and intertwined with social ecological and socio politico economic systems. These complex challenges that are spatial as well as temporal in nature requires cross sectoral, innovative and whole of a society approach to understand and response requires collaboration of multiple actors. Living lab, as a new approach, prefers experimentation, flexibility, and collaboration over rigid, 'from top' and 'expert decision'. Living lab refers a shift from 'for community' to 'with community' and from 'planning' to 'cocreation'. Our project in Protapnagar is using 'living lab' as the guiding approach to enhance social resilience among climate vulnerable farming community. This approach is using multimodal methods including participatory research, co-creation of intervention, forming alliance with local stakeholders and ensuring social and 'ecological justice'. We spent 6 months in Protapnagar exploring and documenting situated adaptive practices that inform social resilience through ethnographic research. Using tools such as participant observation, group discussion, informal interviews this research documented people's adaptation practice and related social and cultural norms that informed those practices. Some of our key findings include better understanding of the socio-political situation and nuanced coping and adaptation strategies that the community has undertaken. Followed by devastating flood in 2020, the local government has banned saline water shrimp cultivation in arable land and this received significant backing from local farming community and administration. The banning of salt water in arable land and reconstruction of embankment has led to widespread agricultural activities ranging from homestead vegetable gardening to commercial crop productions. There is a strong pro agriculture sentiment among the communities as well as local power brokers (local governing body, local administration, and local elites). One of the core principles of the living lab is forming sustainable and long-lasting alliance with community and local stakeholders and by doing so, we are now moving to the next level of pilot experimentation with cluster of farmer groups, including both farmers with land and landless members of the community.



AQUAMUSE Panel: Arts-based Pedagogies in Curating Fluidscapes

Project AQUAMUSE is a decolonizing museum-making initiative using arts-based pedagogies to capture and curate extreme events across the world's three river basins and deltas – the Nile, the Volta, and the Ganga. The Indian Sundarbans has been shaped by rich and complex hydrosocial histories constituting floods, cyclones, rising sea levels, and state and community responses to nature in the form of hard infrastructural interventions (such as the construction of embankments) and situated adaptive practices (including place-based agro-ecological experimentations). How do communities cope in this precarious, uncertain, and unstable fluid terrain? Does remembering (preceding) floods make communities more resilient to future floods, complicating the (more accepted) inversely proportional relationship between vulnerability and resilience, and demonstrating these categories as mutually co-existent? Using arts as a creative-innovative methodological tool, and combining ethnography with visualization techniques, AQUAMUSE aims to curate plural accounts and experiences of floods experiences, in creating an oral history archive of critical transitions from vulnerability to viability in the fluid terrain of the Sundarbans. The project team members with diverse backgrounds will reflect on the significance of immersive ethno-graphies in eliciting human emotions and actions in advancing socio-environmental/water justice in fluidscapes.

Panellists and Topic Titles

- Sara Ahmed, Project AQUAMUSE: Overview and Challenges
- Priyadarshi Patnaik, Role of Visual Arts in Conveying Flood Narratives
- Radhika Mulay, Congregating Ethnography and (Performative) Arts
- Sukrit Sen, Rhythms and Rhymes in Advocating Climate Action
- Jenia Mukherjee, 5Is of Ethno-graphic Research



A Special Presentation on: 'Seeing' like a visual artist

Drawing is a way of putting down, in arrangements of lines and marks, the thoughts that we are not yet ready or able to put into words. It is a way of constructing ideas and observations as much as it is a means of expressing them. While the end product is images, something much more easily produced through modern technologies of photography and videography, both of which are trusted methods used for visual ethnography, drawing has the power to capture intangible nuances of space-time owing to the role of the artist as both observer and participant.

This presentation explores how artistic methods can serve as a bridge between the hard facts of climate change and the organic community engagement required to live with/adapt to this change. My artistic practice is rooted in on-field sketches and a deep engagement with the visual culture of the people/place of interest, in this case Kumirmari as a microcosm of the Sundarbans. Every culture has its associated visual dialect and I opine that showcasing this visual dialect to a larger audience as artists and curators familiarizes the outsider to the story of the community. This approach offers a unique means to document and interpret the lived experiences of local communities. Multimodal methods of inquiry, especially art-based ones, can be crucial to solving the problem of inaccessibility of information from academics to community and vice versa.

As a transdisciplinary artist and student, my role extends beyond that of a mere observer. I attempt to become an active participant in the community's journey of resilience, using my art to amplify voices that are often marginalized in traditional discourse. By intertwining the scientific with the artistic, and employing drawing as a method, I provide an alternative lens through which to view the climate crisis.



Pratyasha Nath is a visual artist and a fifth year student of Biotechnology at IIT Kharagpur. Her transdisciplinary artistic practice and research interests are rooted in the life sciences and shaped by a concern for the future of the planet. She is working on developing visually enriched knowledge outputs for the Swissnex-funded K2A Project as an intern with Jenia Mukherjee.

Exhibition

The exhibition showcases knowledge products (KPs) encompassing creative interpretation of research findings and their dissemination in accessible formats for larger audience. The KPs have been designed adhering to inclusive principles of transformative-transdisciplinary research. The exhibits succinctly capture our journey so far, exposing the audience through the processes collectively navigated by our SOR4D ENGAGE Team.

Exhibit 1: Archiving the Delta

It highlights the milestone years on extreme events and colonial responses to them.

ARCHIVING the Delta

-  Damages and deaths
-  Relief work
-  Meteorological sciences
-  Hard infrastructures
-  Scientific experimentations; other adaptive measures

Selected Records WBSA | June 1898: Revenue Agriculture, 10-18, 18-21. Report on cyclone and adoption of relief measures. WBSA | May 1899: Revenue Agriculture, 6-8. Chittagong damages to the Kutiabdea embankments by the tidal waves of 1897. WBSA | O'Malley, L. S. S. (1914). *Bengal District Gazetteers 24 Parganas*. Calcutta: The Bengal Secretariat Book Depot.

- 7000-10000 human deaths, 90 out of 3000 cattle survived
- Damage of rice crops
- River bridges destroyed

- Public Works Departments prioritizing embankments and taking over their rebuilding in different islands
- Funds disbursed (often misused by local contractors) for construction of roads, digging of *khas* and increasing tank capacities
- Repairing works for damaged embankments
- Recommendations from Mr. Basu (native officer) on using dams or embankments for purposes other than irrigation, such as preventing erosion by drainage, silt deposition to fertilize soil

- Famine Relief Committee initially sanctioned 10000 INR and an additional 25000 INR subsequently
- 45000 INR sanctioned for *bhadrolcks* by the Commissioner

- Enquiries on a seasonal crop disease affecting betel nut trees and coconut, caused due to overcrowded plantations, insufficient manure and scant rainfall
- Suggestions to burn the plants

1737

1864

1867-1869

1876

1897-1898

1942

- 300,000 casualties
- 24 out of 32 Company buildings beyond repair
- 200 residences destroyed
- 20000 ships cast away
- Cattles, tigers, rhinoceros, crocodiles, birds died
- Post cyclone loss of soil fertility causing famine

- Investigated as a rare combination of cyclone and earthquake induced tsunami

- Colonial Officers discuss the efficacy of 'riparian proprietorship' on Matla and other navigable channels in the Sundarbans.
- Fishermen's rights to practice fishing in the tidal waters considered as corporeal, allowing all leases on the tidal river as null and void, and revenues to be returned with interest.

- Proposed improvement of meteorological department organisation for public information and underground telegraph lines from Calcutta to Saugar islands
- Proposal for making an 'observatory'
- Meteorological questionnaire developed

- Loss of public property in Diamond Harbour with 60000 INR costs approx.
- 2/3rd population died
- Dead cattle carcasses contaminated water
- Possibilities of plague outbreaks

- Debates between colonial officials and local *zamindars* on embankment construction (projected 45000 – 80000 INR costs approx.)
- Discussions with engineers regarding embankments on Sagor islands and its possible impact on Calcutta's safety and security

- Colonial documenting of tidal fluctuations
- Theoretical predictions on the wind direction in the Bay of Bengal

- Severe loss of lives in the Hatya islands and Dawlatkhan
- Non-systematic cleaning of tanks causing cholera outbreaks
- Loss of property, damage to houses, public buildings, crops, cattle
- Native administrator Mr. Dutta (sub div. officer, South Shabazpore) discusses the stagnancy of contaminated water causing crop damage and disease
- Loss of naval vessels

- Reports on negligence from officers regarding embankment repairs on Matla
- Proposal from Lieutenant Gov. to amend the Embankment Act for improved situation
- Protective measures established by lowering high terraced tanks at short intervals, also serving as refuge for the local inhabitants

- Problems arising from prioritizing the groups in urgent need for funds
- Queen's enquiry on the post cyclone status with Departments of Revenue, Agriculture, and Commerce

- Routledge's suggestion of an experimental bamboo plantations in the region
- Officials discuss the efficacy of local adaptive measures of using rotten rice as subsistence during calamities and people temporarily shifting homes during storms

- Detailed meteorological readings cyclones
- Calculation of wind speed and direction
- Assessment of tidal fluctuations
- Measurement of downpour

- Tidal wave rising 20ft high
- 11000 casualties, 3000 homes destroyed.
- Destruction more devastating than air raids during the World War II

Selected Records July 1867: Revenue Agriculture, 210-211: Cyclone of 1864. Public works department to ascertain whether the city of Calcutta would be endangered by a cyclone wave like that of 1864 if Saugar island were protected by embankments. WBSA | December 1873: Revenue Agriculture; 19-21: Embankments in attention of commissioners and district officer of embankment ACT VI of 1873, with a view to provide relief works during famine. WBSA | July-1876: Land Revenue, 35-36,40-41: Suggestions of an experimental bamboo plantations in the region.

Exhibit 2: Ethnographic Explorations

It is a journey down the memory lane: of exposure, explorations, and engagement in Kumirmari since January 2021.

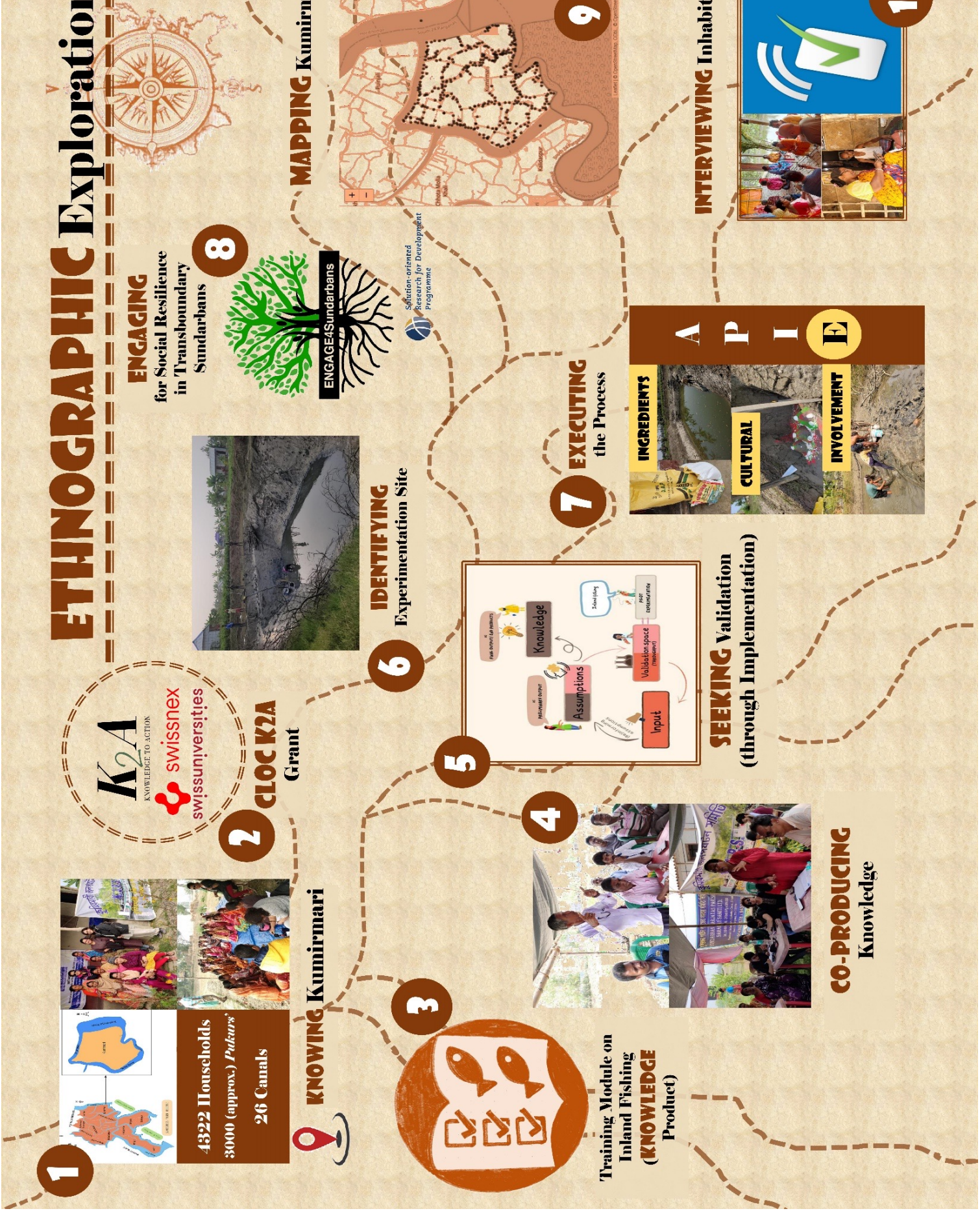
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Exhibit 3: Best Practices of Inland Fishing

An inclusive and accessible knowledge product disseminating best practices of inland fishing.

K₂A
KNOWLEDGE TO ACTION



swissuniversities

Benefits of Inland Fishing

1. Safer and sustainable alternative to forest fishing
2. Additional source of income for the household
3. Self-reliance and empowerment for women

Adopt scientific method of fish farming

DAP

Practice scientific fish farming in your pond in three easy steps:

1. Pond preparations by clearing surroundings of shrubs and bushes.
2. Release of fishlings and monthly maintenance using lime, common salt, cow dung, and DAP
3. Disease prevention using indigenous and scientifically tested chemo-prophylactics like turmeric and potassium permanganate.

For further information consult the K2A Inland Fishing Training Manual and visit our website:

<https://engage4sundarbans.org/>

Academic posters

Knowledge of inland fisheries in the coastal areas of the Sundarbans (India and Bangladesh)



Small-scale fishing practices including forest and inland fishing are found to be one of the dominant livelihood practices in the Sundarbans, exposed to various socio-ecological and political challenges and rapidly increasing climate change-induced risks and hazards.

Introduction



- Fishing in the protected mangrove forest entails risks of encountering tigers, forest guards, bandits, etc.
- Fishing in the main tidal river provides a lot of fish varieties but with cost involved by boat and fuel
- Alternatively, coastal fishing communities adopt inland fishing to secure their harvest
- However, current inland fishing practice is found to be vulnerable as it fails to tap the local natural-ecological, socio-economic, and cultural knowledge base, technical know-how, and supportive interventions

Research questions



Which fishing practices are the most sustainable for the communities of the Sundarbans coastal area?

Methods



- Coproduction of knowledge involving multiple actors to address vulnerabilities
- Practice-based inland fishing design, harnessing bottom-up agro-ecological knowledge
- Transdisciplinary engagement of different stakeholders
- Action-oriented inland fishing design by tapping the nodes of challenges and opportunities

Results

Types of water bodies	Resources	Income	Tool	Sustainability			Comments
				Ecological	Economical	Social	
Tidal rivers (brackish water)	Fish, crab, shrimp, Post Larvae (PL)	\$\$\$	Net, boat, angler, hook	+++	++	++	Tidal rivers host a large diversity of fish but they are hard to catch.
Aquaculture Pond/ Gher (Brackish water) used for intensive farming	No wild species: only targeted shrimp or white fish	\$\$\$\$\$	Net		++	+	Ponds are more productive, easy to harvest and give higher incomes but they employ fewer people and have a low biodiversity.
Pond (Fresh water) used for extensive farming	Some culture fish/ fry from adjacent canal when inundated	\$\$\$\$	Cast net	++	+	++	Fresh water ponds can host a large biodiversity and provide good harvest for households.
Canal within locality (Brackish)	Small fish from nearest rivers, fry and fingerlings	\$	Cast net, fine mesh net	+		+	Canals are used to drain waters and some fish can be harvested, but the quantity is limited due to poor ecological conditions.

Case study Kumirmari, a remote island from the Indian Sundarbans

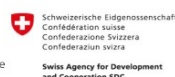


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SCAN ME



Is Integrated Farming a Nature-based Solution? A Case Study from Southwestern Bangladesh

Md Faisal Imran
Haseeb Md Irfanullah
Samiya A Selim
Sawda Yeasmin

Center for Sustainable Development,
University of Liberal Arts Bangladesh



Nature-based solutions (NbS) offer a more holistic approach to societal challenges, by working with and enhancing the natural, human and social capital that underpins long-term human wellbeing. NbS, either alone or combined with other approaches, contributes to cost-effective options for addressing climate change, natural hazards, and development challenges while also reversing biodiversity loss.

Introduction



- As an agrarian nation, Bangladesh faces severe hardships in local communities due to disaster-related disruptions
- On average, tropical cyclones impose an annual economic burden of approximately US\$ 1 billion, significantly impacting Bangladesh's GDP.
- Nature-based Solutions (NbS) serve as an ecosystem-based adaptation strategy that bolsters long-term human, natural, and social capital.
- Consequently, innovation in agriculture is imperative, with the Integrated Farming System (IFS) being recognized as an effective approach.
- A local NGO, Sajida Foundation, is actively implementing IFS in coastal communities to enhance their resilience against disasters.

Research questions



- What are the criteria need to be addressed if we want to call in NbS?
- How to mainstream NbS as a concepts of resilience?
- What approach can upscale pilots by identifying gaps?
- How to verify past projects and future proposals?

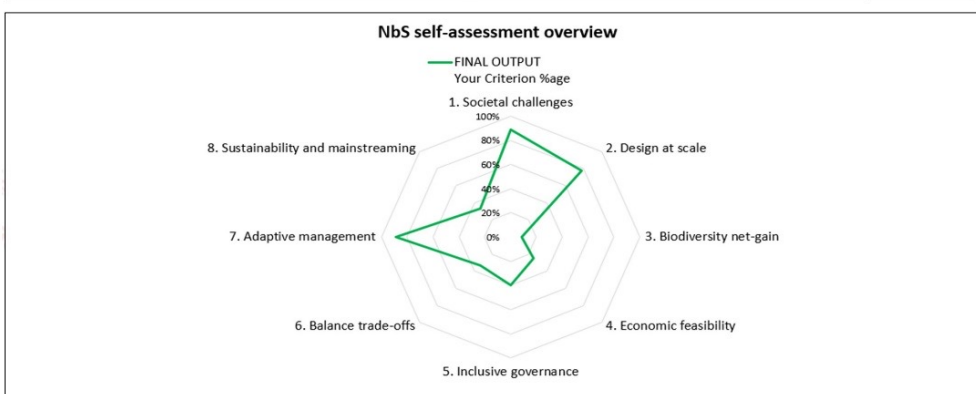
Methods



- Primary data was collected through Key informant Interviews by Climate Change Program (CCP) staff
- FGDs were conducted with male & female groups
- Diverse reports under CCP were analyzed
- Methods and Data Validation exercises were conducted in consultation with NbS experts

Results

Criterion	Overview of the CCP project through self-assessment tool			FINAL OUTPUT Your Criterion %age
	Your Criterion Score	Maximum Criterion Score	Normalised criterion	
1. Societal challenges	8	9	0.89	89%
2. Design at scale	7	9	0.78	78%
3. Biodiversity net-gain	1	12	0.08	8%
4. Economic feasibility	3	12	0.25	25%
5. Inclusive governance	6	15	0.40	40%
6. Balance trade-offs	3	9	0.33	33%
7. Adaptive management	8	9	0.89	89%
8. Sustainability and mainstreaming	3	9	0.33	33%
Total Percentage match				49%



Key	Output
Strong	Intervention adheres to the IUCN Global Standard for NbS
Adequate	
Partial	
Insufficient	Intervention does not adhere to the IUCN Global Standard for NbS

Conclusion

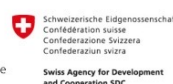
- Stimulating NbS as a situated adaptive mechanisms to harness social resilience in and of the delta
- NbS to craft high impact pathways across (post) development interventions at the ground level
- NbS as a disaster risk reduction need to co-design and co-implement wide spectrum of situated adaptive practices evolved across time and space



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ENGAGE4Sundarbans workshop-cum-exhibition
scheduled between September 2 and 6, 2024, India

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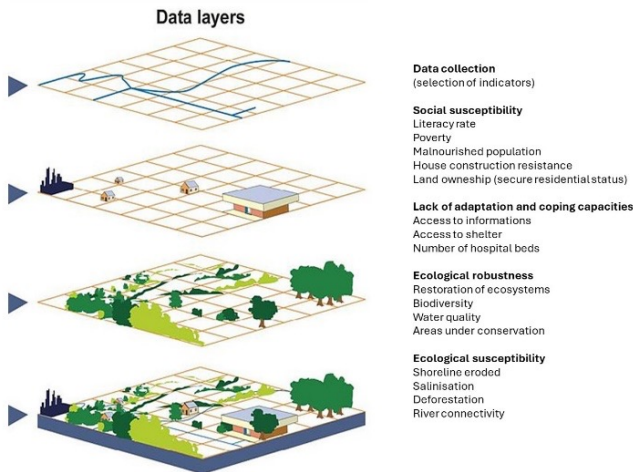


Spatial analysis of environmental risk in river delta's coastal social-ecological systems

Emilie, UNIL and Habbiba, ULAB

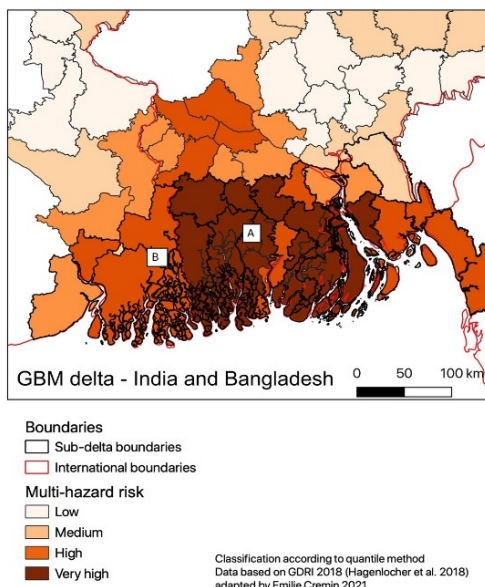
- River deltas in coastal areas are highly exposed to natural hazards such as floods, coastal and riverbank erosion, salinisation and storms.
- Living Deltas hub has developed a Geographical Information System (GIS) to analyse the risk in the GBM coastal area.
- ENGAGE4Sundarbans focuses on the case of Assasuni Union in Bangladesh and Kumirmari GP in India.

1. Geocomputation



The geocomputation process involves the collection and processing of geospatial data to inform the indicators selected through the consultation process.

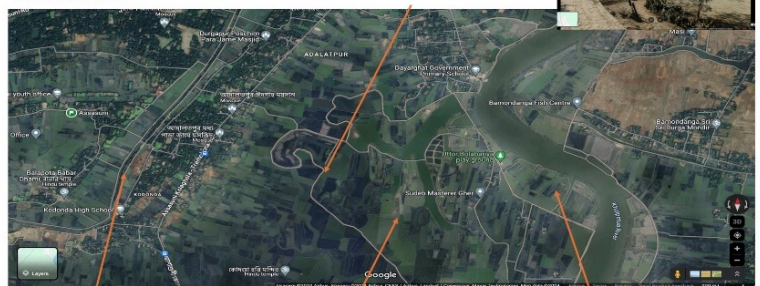
3. GBM delta risk Map



The Global Delta Risk Index (GDRI) offers an Indicator Library that captures the multiple vulnerability components for both social and ecological systems. This allows capturing cumulative impacts, and risk cascades and understanding risks posed to sustainable livelihoods in coastal social-ecological systems.

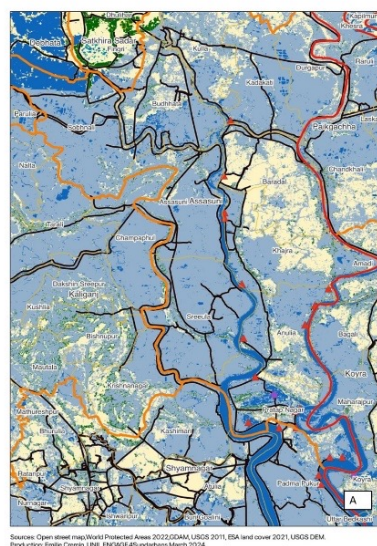
2. Field and aerial observations

Data extracted with remote sensing and verified on the ground, in the field with the research team and communities



Shrimp ponds (ghers) and embankments

4. Detailed Risk Map of Assasuni Bangladesh and Kumirmari, West Bengal



Spatial analysis shows that a small area remains dedicated to rice cropping compared to Kumirmari. In Assasuni aquaculture has become the dominant land cover. Conclusion: The mapping of the results highlights the areas where efforts and investments must be made to build resilience and sustain coastal socio-ecological systems.

Acknowledgements

The SNF SOR4D ENGAGE4Sundarbans project and the UKRI GCRF Living Deltas Hub (Grant Reference NE/S008926/1) are international projects that aim to safeguard delta futures in South and SE Asia through more sustainable development and support delta community resilience, coping and adaptation strategies to the existential threats they face. The poster presents the approach used by the GIS and Risk Assessment Working Group.

Ideating living lab: A social resilience experimentation in a climate-vulnerable coastal area of Bangladesh

Samiya A Selim¹, Nurul Islam², Gazi Inzamam Bruny²

1. Professor, University of Liberal Arts, Bangladesh

2. Researcher, SAJIDA Foundation, Bangladesh

Background

- People living in Bangladesh's coastal regions are facing the dual impacts of both climate and development activities.
- The nature of these dual impacts is complex and intertwined with social-ecological and socio-political-economic systems.
- These complex challenges that are spatial and temporal in nature require a cross-sectoral, innovative and whole-of-society approach to understand and needs response from a collaboration of multiple actors.

Context

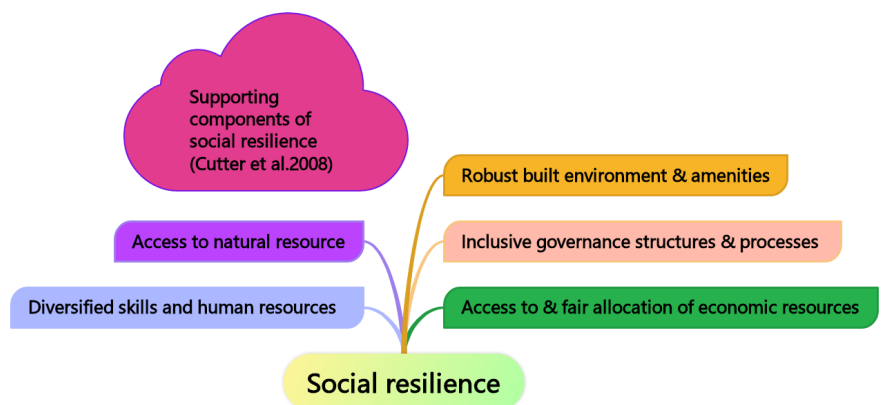
- Protapnagar Union, located in Ashassuni Upazila near the Sundarbans, is one of the most climate-vulnerable regions in Bangladesh. The area frequently faces extreme weather events such as cyclones, sea level rise, and salinity intrusion.
- The expansion of shrimp farming in the region has further increased the vulnerability of this traditionally agricultural community.
- After a devastating flood in 2020, the community decided to ban shrimp farming to revive agriculture and freshwater aquaculture.
- ENGAGE4Sundarbans is supporting the community by promoting agroecology-based livelihoods that ensure sustainable income and contribute to ecosystem restoration.

Project goal

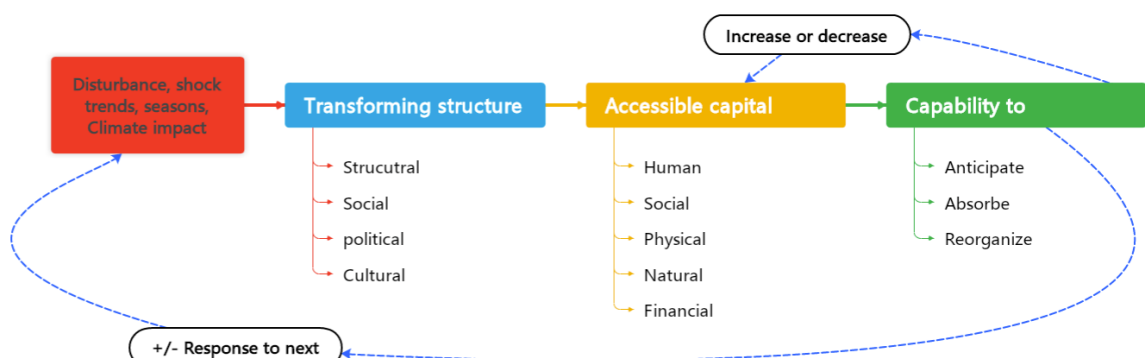
ENGAGE4Sundarbans in Assasuni aims to stimulate 'situated' adaptive practices to enhance social resilience among communities facing multiple disaster risks.

Methodology

- Living lab concept as the guiding approach focusing on experimentation, flexibility, collaboration and co-creation
- Multimodal methods including participatory research, co-creation of intervention, forming alliance with local stakeholders and ensuring social and 'ecological justice'
- Exploring and documenting situated adaptive practices that inform social resilience through ethno-survey research.



Social resilience framework based on the Sustainable Livelihoods Framework (UK DFID 1999)



Chief Guest



Indraneel Ghose works at the Embassy of Switzerland in India as the Senior Thematic Advisor for Education, Research and Innovation, where his responsibilities include the promotion of science and technology cooperation between Switzerland and India. He has a doctorate in Marine Geosciences from the University of Paris and has carried out post-doctoral research at the National Institute of Oceanography in Goa.

Invited Delegates



Abhijit Mukherjee is a Full Professor in the Department of Geology and Geophysics and the School of Environmental Science and Engineering at the Indian Institute of Technology Kharagpur. His research areas include isotope hydrogeology, including numerical modeling, contaminant transport, and water policy applications to society. He is a world renowned water scientist, leading several international initiatives and networks.

Amites Mukhopadhyay is a Professor in Jadavpur University, Kolkata. His research interests include landscape, ecology and governance, identity politics and institutional histories of science and knowledge making in South Asia. He is the author of *Living with Disasters: Communities and Development in the Indian Sundarbans*.



Amrita Sen is an Assistant Professor of Sociology at the Indian Institute of Technology Kharagpur. Her research interests include cultural and political ecology, politics of forest conservation, urban environmental conflicts and Anthropocene studies. She is the author of *A Political Ecology of Forest Conservation in India: Communities, Wildlife and the State* on the Indian Sundarbans. She has received the Junior Core Fellowship (2024-2025), awarded by the Institute for Advanced Study, Central European University, Budapest.

Invited Delegates



Anamitra Anurag Danda is a practitioner with research interests in nature conservation, natural resource management, sustainability and stewardship, adaptation to climate change, collective action, and institutionalism. He has over 27 years of experience in the Bengal delta region. He serves as the Director, Sundarbans Delta Programme, WWF-India and is a Senior Visiting Fellow at ORF.

Archan Kanti Das is the Principal Scientist, ICAR- Central Inland Fisheries Research Institute Barrackpore, Kolkata. She specializes in the field of limno-chemistry and works extensively in the area of inland fishing in delta and estuarine ecologies of India. He is actively associated with action-research in Sundarbans, working with IIT Kharagpur and beyond.



Dibyendu Sarkar, a retired IAS Officer has four decades of experience in the development sector, including providing state level leadership to flagship government programmes like MGNREGA, Swachh Bharat Mission. Post-retirement, he is actively engaged in the civil society space, works with and provides mentoring support to a wide range of CSOs.

Gopa Samanta is a Professor at the Department of Geography, The University of Burdwan. Her research interest cuts across the fields of Water, Urban and Gender. She has carried out extensive research in Eastern India with the financial assistance of ICSSR, Ford Foundation, World Bank, Australia India Institute and INR-France, and IRD-France. She is dedicated to disseminate the knowledge of Social Science in general and Geography in particular beyond the classroom and academic community. Her Bengali books are very popular among students.



Jyotirindranath Lahiri is the Editor of Sudhu Sundarban Charcha since 2010. The scientific approach, rich author list (from villagers to distinguished scientist-researchers), intensive field research, excellent photography, and international presentation quality make the magazine important and indispensable in today's Sundarban study. He has developed a huge collection of Sundarbans-related books and periodicals in his home. He has several books on the Sundarbans including Sundarban o Aila (2010), Bharatiya Sundarban Ekti Bhaugolik Ruprekha (2021) with Kalyan Rudra, Sundarban Abiskar (2023), and Sundarbaner Bagh (2024)

Invited Delegates



Kalpita Bhar Paul is an Assistant Professor of Philosophy at School of Liberal Studies, BML Munjal University. Her research interests are Applied Ethics, Environmental Philosophy, and Heidegger's Phenomenology. Before joining BMU, she was a founding faculty at Krea University. and taught Philosophy and Environmental Studies. She has also worked in Sustainable Development and natural resource management programs in NGDOs. Her is the author of Ecophenomenology and Environmental Crisis in the Sundarbans: Towards a Community-based Ethic (Routledge 2024).

Kausik Ghosh is an Assistant Professor in the Department of Geography, Vidyasagar University, India. He is involved in interdisciplinary research and teaching on river geomorphology, sedimentology, hydrology and river regulations. His research interest extends to climate change, transboundary water-sharing and governance, ecosystem services, and the water-energy-food nexus within the Himalayan River basin.



Magesh Nagarajan is an interdisciplinary researcher with a background in civil & environmental engineering and currently a faculty in IIM Nagpur. His research interests are disaster management, climate change adaptation, pro-environmental behaviour in sectors such as water management and transport. He has published in Nature climate change, urban climate, etc.

Megnaa Mehtta is an Assistant Professor in Social Anthropology at the Department of Risk and Disaster Reduction (DRDR), UCL, London. Her research is based on long-term ethnographic fieldwork in the Sundarbans of West Bengal, India. Her research interests range from interrogating conservation politics, the notions of sufficiency, vernacular ethics, state-society relations, understanding risk, informality, marriage and social reproduction.



Priyadarshi Patnaik is Professor and former Head, Department of Humanities & Social Sciences, IIT Kharagpur. He is a member of the Advisory Committee, Kolkata Museum of Modern Arts, and member of Board of Studies, Kala Bhavan, Viswa Bharati, KIIT and many other universities. He had led several global projects and programmes. His interests include visual art, photography, poetry, translation and flute-making.

Invited Delegates



Punyasloke Bhadury is a Professor of Biological Sciences and also leads the Centre for Excellence in Blue Economy in IISER Kolkata, India. He is the Coordinating Author of mangroves chapter of the Third World Ocean Assessment of United Nations and one of the Co-champions of OARS, an UN Ocean Decade endorsed program on ocean acidification science for society.

Radhika Mulay, with an MSc in Water Science, Policy and Management from the University of Oxford (UK), She started as an environmental researcher and also is one of the authors of the book: 'The Heads and Tails of Ganga River – the Cryosphere and the Delta' published by INTACH-Delhi. Currently, she is based at the Centre for Water Research, IISER-Pune and is exploring her interests in the field of water research. Her unique training as a water researcher and a dancer enables her to understand and work around water-related issues not just from a scientific lens but also from an artistic perspective.



Rukuh Setiadi is an Associate Professor in the Department of Urban and Regional Planning, Diponegoro University, Indonesia. He works in transformative adaptation and future-oriented urban and regional responses to climate change. Rukuh has participated as a contributing author in the 6th Assessment Report of the IPCC on Chapter 6: 'Cities, Settlement and Key Infrastructure.' He is investigating several projects funded by national and international organizations.

Sara Ahmed is currently an Adjunct Professor at IISER-Pune and the founder of the Living Waters Museum, a hybrid museum which includes a digital archive on India's water heritage, classrooms on water for schools and an arts-based community outreach program in the Sundarbans. Sara serves on the boards of WaterAid India, Wetlands International South Asia and the Global Network of Water Museums.



Sirajul Hossain is a naturalist, researcher, systems thinker, and expert resource person for complex social-ecological systems like the Sundarbans mangrove. An expert in systems modeling for complex nature and environmental scenario modeling, implementing long-term social, cultural, and psychological dimensions. Led social development activities as the CEO of a nonprofit organization, a regular writer, activist, and keen wildlife photographer.

Invited Delegates



Subrata Halder is a Superintending Engineer (Agri-Irrigation) in the Water Resources Investigation & Development Department (WRI&DD), Government of West Bengal, India. His expertise includes Hydrological Data Processing and Analysis, Groundwater and Surface Water Investigation, Groundwater Estimation and Assessment, Groundwater Modelling, Planning, Design and Execution of Minor Irrigation schemes, Execution of Artificial Recharge to Groundwater schemes, and implementation of National Hydrology Project in West Bengal.

Tuhin Ghosh is a Professor and Director of the School of Oceanographic Studies, Jadavpur University, India. He has expertise in coastal geomorphology, natural hazards management, social-ecological systems, climate change impacts, adaptation strategies, and human migration. He had led several projects including NERC-UK funded 'ESPA-Delta', Belmont Forum 'Deltas' project and IDRC-DfID funded 'DECCMA' project, and UKRI-GCRF 'Living Deltas' Hub. He was the lead author of IPCC Special Report on Ocean and Cryosphere, Chapter 4: Sea Level Rise and Implications for Low Lying Islands, Coasts and Communities.



Uday Chatterjee is an Assistant Professor at the Department of Geography, Bhatler College, Dantan, Paschim Medinipur, West Bengal, India. He is an Applied Geographer and his research interests span across Urban Planning, Social and Human Geography, Applied Geomorphology, Hazards & Disasters, and Ecology. He has edited books and special issues in journals from reputed publishing houses such as Elsevier and Springer.

Wiwandari Handayani is Professor at the Department of Urban and Regional Planning, Faculty of Engineering, Diponegoro University, Indonesia. Her research focuses on urban and regional resilience, in the context of disaster risk management, climate adaptation, and governance. She is leading several global projects and programmes including KONEKSI from the Australian Government, KOICA-South Korea, and LUCE-USA.

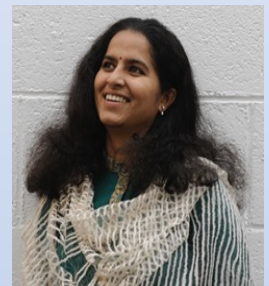


Project Team



Amit Kumar Das completed his PhD on community solid waste management in three sub-divisional towns of the Hooghly district, West Bengal, India from IIT Kharagpur. He has published in reputed journals including such as Asia-Pacific Journal of Regional Science, Socio-Ecological Practice Research, etc. He has been part of the ENGAGE ethnographic team, conducting training sessions with community mobilizers using digital software. Amit is currently teaching at the Department of Geography, Nabadwip Vidyasagar College, Kalyani University.

Anuradha Choudry is a Faculty at the Department of Humanities and Social Sciences, IIT Kharagpur and the Outreach Coordinator for the Indian Knowledge Systems (IKS) Division, Ministry of Education, Government of India. An international speaker, MOOC coordinator, and yoga practitioner, she specializes in cultural heritage and community traditions for ecosystem-dependent societies inhabiting vulnerable delta ecologies such as the Chilika and the Sundarbans. She is the recipient of many prestigious awards and accolades from institutes such as the European Union of Yoga, the United Nations, and IIT Kharagpur. She is the Indian Co-I for ENGAGE.



Emilie Cremin conducts research on community engagement in the management of river and coastal ecosystems, multi-hazard risk assessments with a critical approach to river development policies. Her goal is to help communities harness their knowledge to support sustainable agroecological practices in floodplains and coastal areas to adapt with multi-hazards and with the pressure of the globalisation. She has coordinated projects on river management in the Dordogne Basin (France) and has led the risk assessment working group within the UKRI GCRF Living Deltas hub. She is the Project Coordinator of ENGAGE from the University of Lausanne, Switzerland.



Gazi Inzamam Bruny is a Research Assistant at SAJIDA Foundation, where he manages the field implementation of ethnographic studies in Asasuni. With a degree in anthropology, he is particularly interested in exploring the cultural dimensions of climate extremes, aiming to understand how communities adapt and respond to environmental challenges.



Project Team

Jenia Mukherjee teaches at the Department of Humanities and Social Sciences, IIT Kharagpur. Her research spans across environmental humanities, political ecology, and transdisciplinary waters. She is the recipient of prestigious awards including Carson Fellowship, Australian Leadership Awards Fellowship, DAAD Grants, Salzburg-Nippon Fellowship, Faculty Excellence, etc. Presently she is investigating several global partnership grants, focussing on coastal livelihoods and resilience. She is the Indian PI for ENGAGE.



Md Faisal Imran is the Senior Research Associate cum Lecturer at the Center for Sustainable Development (CSD), University of Liberal Arts Bangladesh (ULAB). He has experience in working with multiple stakeholders, including government agencies, international organizations, NGOs, and communities, and has successfully completed numerous projects involving data management and analysis.

Nurul Islam Biplob is the Lead Researcher at the SAJIDA Foundation. He specializes in the societal impacts of climate change. His research focuses on climate governance, migration, and urbanization. He is a former Anant Climate Action Fellow and [Research Translation Lab](#) participant of 2024.



Priyanka Dey did her B.Arch from NIT Patna (Gold Medallist) and Masters in City Planning from IIT Kharagpur. She is a recipient of S.N. Haldar and K.K. Pal Awards from ITPI (West Bengal Chapter). She teaches at the Department of Architecture and Regional Planning, IIT Kharagpur. She has published in reputed journals including IJDRR. She is the Indian Co-I for ENGAGE.

René Véron is a Professor of geography with primary interests in the field of development studies. His policy-oriented research addresses urban and rural environmental governance issues in the global South with a regional specialization in South Asia. He is a Principal Investigator of the SOR4D ENGAGE Project hosted at UNIL, Switzerland.



Project Team



Samiya Selim is the Director and Professor, Center for Sustainable Development, University of Liberal Arts Bangladesh. She has studied and worked in Bangladesh and the United Kingdom the past 15 years in the field of environment conservation, climate change and sustainable development. Her specialization is in the areas of ecosystem-based management, sustainable livelihoods, socio-ecological systems, climate change adaptation and resilience, sustainability science, and science-policy interface. Additionally, she is the Bangladesh PI for ENGAGE.

Trained in the discipline of history and development studies, **Shreyashi Bhattacharya** pursues transdisciplinary research and has recently submitted her thesis on the River Adi Ganga where she has explored the complex historical, socio-ecological and cultural assemblages surrounding the river through the 'ethno-graphical' lens. She had led the ENGAGE archival research, compiling and analyzing historical records in mapping risks and resilience of the Sundarbans delta.



Souradip Pathak is a doctoral researcher at the Rekhi Centre of Excellence for the Science of Happiness at IIT Kharagpur. His work focuses on community resilience within the context of inland fishing in the Indian Sundarbans. He was part of CLOC K2A project funded by Swissnex. He has conducted training sessions with community mobilizers using digital software and has been part of the survey design implemented in Kumirmari.

Swarnadeep Bhattacharjee is an MS student at IIT Kharagpur as part of the project. He completed his MA in Sociology from Jadavpur University. He is trained in qualitative and quantitative research methods. His passion lies in interdisciplinary research, with a focus on environment and sustainability, political ecology, computational social sciences, and social innovation.



Field Implementation Leaders



Tapas Mandal is a proactive community leader with over more than 30 years of experience on community development and filmmaking, using the medium for grassroots activism and mobilization. He made a documentary on Voices of the Sundarbans, funded by the Global Green Grant (2018), chronicling the struggle for survival of the forest-dependent communities. He is the founder of the grassroots organization called the Sundarban Jana Sramajibi Manch (SJSM) and Kumirmari Jana Parjatan Samiti (KJPS) advocating for rights and livelihoods of ecosystem-dependent communities. He is also the founder of Farmers Producers' Organization (FPO) Sundarvan FED Honey and Natural Products Producer Company Limited.

Debjyoti Mondal, an experienced inland fisherman from Kumirmari has been associated with the rights movements of forest-dependent people from the Indian Sundarbans. He is one of the key members of the Sundarban Parjatan Parisheba Samabay Samity Ltd, a cooperative working in line with SJSM. He assists Tapas Mandal in the FPO activities. He is a field implementation leader for ENGAGE arranging and strengthening onsite logistical and elementary support-base.



Community Mobilizers



Ashoka Mandal is associated with SJSM since 2006, participating in the forest rights movement. He is experienced in different types of farming and fishing practices. He is also associated with Sundarban Parjatan Parisheba Samabay Samiti (SPPSS) that has an aim to promote community tourism in the remote islands of the Indian Sundarbans Delta. He is an active member of the FPO. He has experience in bee keeping as well.

Sagarika Ari is experienced in different types of farming practices and has expertise over catching fish using multiple techniques. Since 2014 she is a member of KJPS, and since 2016 she has been a board member of SPPSS.



Community Mobilizers



Samaresh Mondol lost his father from tiger attack while he was collecting honey in the forest. Samaresh has been connected to SJSM since 2008. He was an active protestor in the forest rights movement. He has experience in bee keeping and is also an active member of the FPO.

Sudha Rani Mondol is working with SJSM since 2018. She was an elected Panchayat member for 10 years. She is a board member of the FPO and also serves as cashier in one of the women's self-help groups in Kumirmari.



Tapan Mondol is a veterinary doctor and *Krishi Ratna* awardee. He is efficient in fishing, animal husbandry and farming, and has experience in beekeeping too. He works for SJSM and the Tagore Society For Rural Development, Rangabelia Project.

Ujjala Barman is experienced in different types of farming techniques and has been a member of KJPS since 2014. Since 2016 she has been a board member of the FPO and an active member of SJSM. She is enthusiastic to promote women-led scientific inland fishing in Kumirmari.



Exhibition Support and Documentation



Agrima Mishra is a doctoral candidate in the Department of Humanities and Social Sciences at IIT Kharagpur, specialising in Environmental Humanities. Her research interests encompass Indian literature in English, water narratives, and hydrosocial relations. Her work is particularly centered on examining the transdisciplinary connections between fluid interstitial spaces, socio-cultural dynamics, and ecological justice within South Asian contexts.

Barnali Chakraborty is an architect and urban planner, presently working in the domain of urban blight and renewal. She is a Prime Minister's Research Fellow at the Department of Architecture and Regional Planning, Indian Institute of Technology, Kharagpur. Her research interests include community studies, urban morphology, urban health, and spatial cognition.



Kasturi Mandal is pursuing her PhD in the Department of Architecture and Regional Planning from IIT Kharagpur. She has published few technical papers in different reputed journals like IJDRR and international conferences like ISOCARP. Her areas of interest include vulnerability studies, socio-economic planning, disaster management and resilience and tourism management.

Cultural Evening

Fluid Rhythmscapes

The performance embarks on a musical odyssey—an exploration that transcends borders, weaving together poetry and sound.

The *sarod* resonates with centuries of tradition humming with the wisdom of our rivers, while the electric guitar reflects on the terrain it flows through—their currents merging in harmonious dissonance. Indian classical ragas merge with rock and jazz—the dichotomy of concrete jungles and untamed wilderness. The rhythms of the *tabla* alongside mimics the heartbeat of Earth and the poet interprets it all—a primal dance that knows no borders.

The *ragas* chosen for this performance mirror the world's river basins. In one movement, the tune evokes the relentless flow—the urgency of a river carving through mountains, carrying stories of forgotten civilizations. Then, seamlessly, another tune settles—a tranquil stretch where herons wade and lotuses bloom. The *sarod* and guitar converse, bridging continents, while the *tabla* punctuates their dialogue.

As the crescendo builds, the musicians find unity. They become tributaries, merging their distinct voices into a singular current. The *sarod's* ancient melodies blend with the guitar's electric pulse, and the *tabla's* intricate patterns weave them together. The audience, transported beyond time and place, feels the pulse of all rivers—their wildness and serenity, their power to shape landscapes and souls.

And in that final note—a sustained harmony—the river finds its delta. The music bridges worlds, dissolves boundaries, and reminds us that every river, whether roaring or tranquil, carries the same longing: to flow freely, to nourish, and to sing its eternal song.

Performers

Palash Chaturvedi (Poetry)



After completing his education in advertising from St. Xavier's Mumbai, he started off his career as an ad-man, soon Brand Equity discovered him as the young equivalent of Prasoon Joshi. He co-founded East India *Dastangos* along with Zahid Hossain in 2017, which has now become an internationally recognized movement working towards the preservation of our cultural heritage. A marketing strategist, a poet, an educationist, a storyteller and a revolutionary, Palashh Chaturvedi dons many hats and has emerged as a gamechanger in the field of creative communication in the recent years.



Soumalya Sareswari (Sarod)

has been practicing Sarod since his childhood under the supervision of pt. Alok Lahiri ji and also his son Shri. Abhisek Lahiri ji. He had worked in the Indian Naval Central Band for 6 years in Mumbai, as a sailor, in the musician department of the Indian Navy. He had finished his service in January 2016 and has been working as a sarod player ever since. Raised as a practitioner of Indian Classical Music he got introduced to western classical music and played 'Oboe' and 'Bass Trombone' for 6 years. He has performed all over India and abroad and was a part of the 'Satyajit Ray Musical Archives' in 2024.

Sukrit Sen (Tabla)

is a Heritage and Disaster Management professional during the day and a musician by night and has collaborated with various artists and performed all around the globe. Primarily trained in the *tabla*, he also plays many other folk percussion instruments such as the *Srikhol*, *Morsing*, *Ghatam*, *Kanjira*, *Djembe*, *Cajon* etc. As a part of his organization the Living Waters Museum, he has been working around water and its association with music for a several years now and researches on the role of intangible cultural heritage and traditional knowledge in disaster risk reduction practices in contemporary times.



Swarnabha Gupta (Guitar)

is a Guitarist/Music Producer/Sitar Player based in Pune, Maharashtra. Born and brought up in Kolkata, Swarnabha was initiated into Sitar and Indian Classical Music at the age of 5 by guru Shree Anil Baran Kar. Always fascinated by the heavier genres of music, Swarnabha started playing guitar at the age of 10, and has been experimenting with blending eastern and western genres of music for quite some years. He is also a musical content developer for video game giants Ubisoft and has worked in various feature films, web series, audiobooks, major label and indie singles and albums.



ENGAGE4 Sundarbans



Solution-oriented
Research for Development
Programme

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