ISAP2024
持続可能なアジア太平洋に関する国際フォーラム

IGES 公益財団法人 地球環境戦略研究機関

Enhancing Community Adaptation in Vulnerable Riverine Islands

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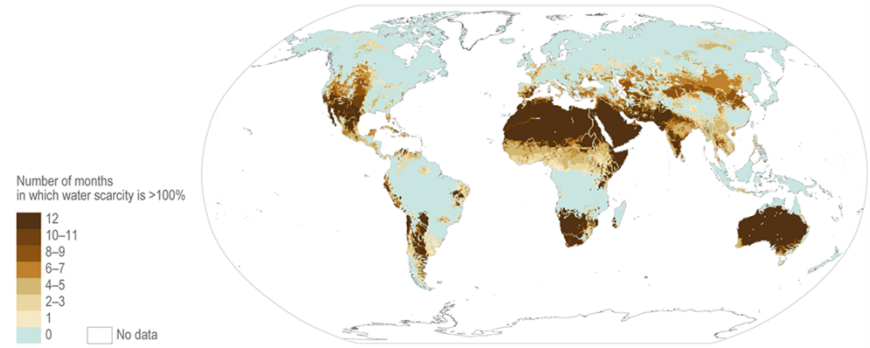
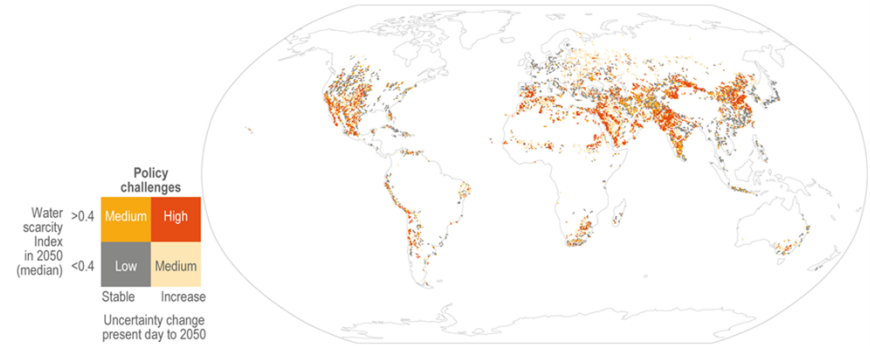
Background

Geographical distribution of current water scarcity and level of challenges for policies addressing future change



a) Number of months per year with severe water scarcity



b) Local levels of policy challenges for addressing water scarcity by 2050

(IPCC AR6, 2023)

Average per capita water availability is sufficient enough but spatio-temporal asymmetry is great, which is a matter of concern for policy makers.

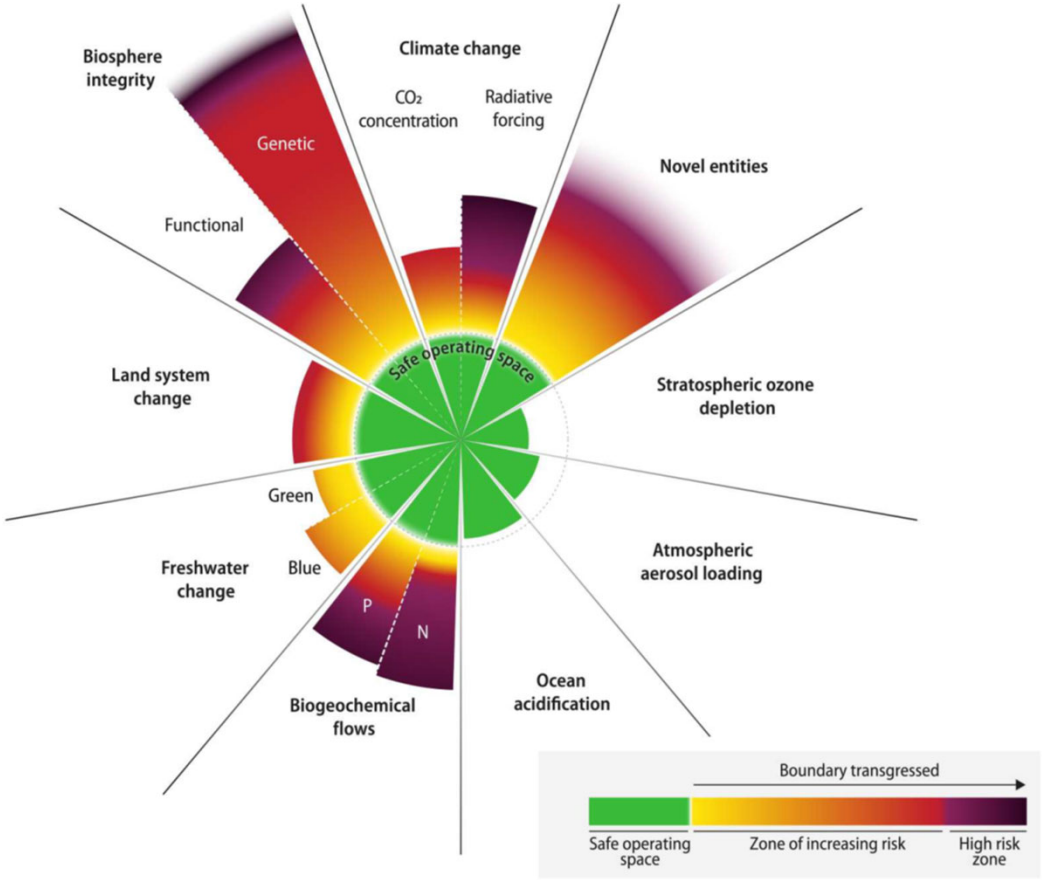


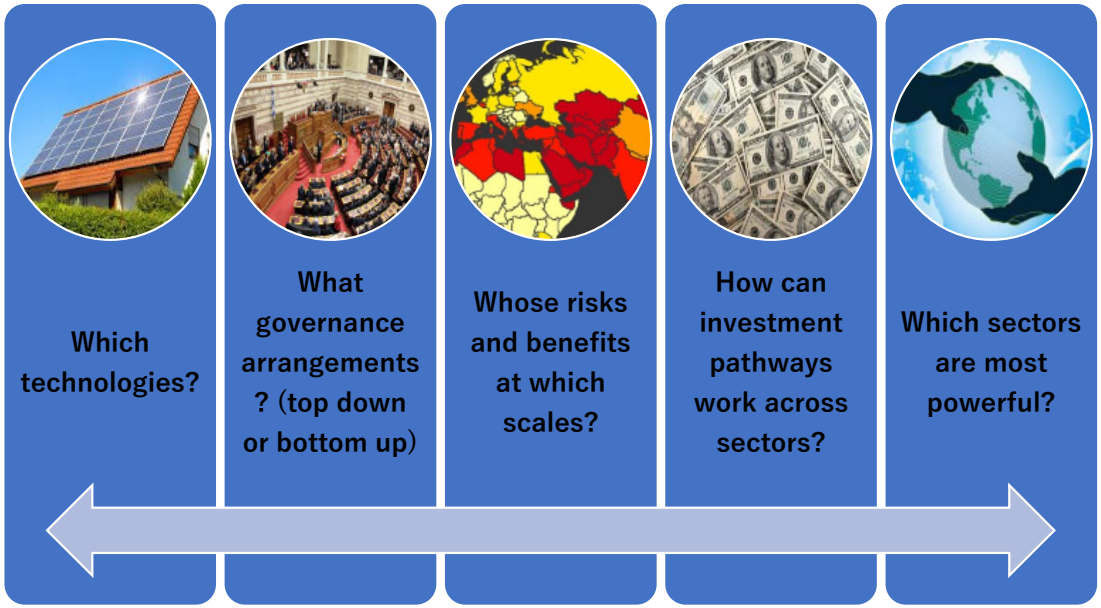
Fig. Earth reaches beyond six of nine planetary boundaries (Richardson et al., 2023)

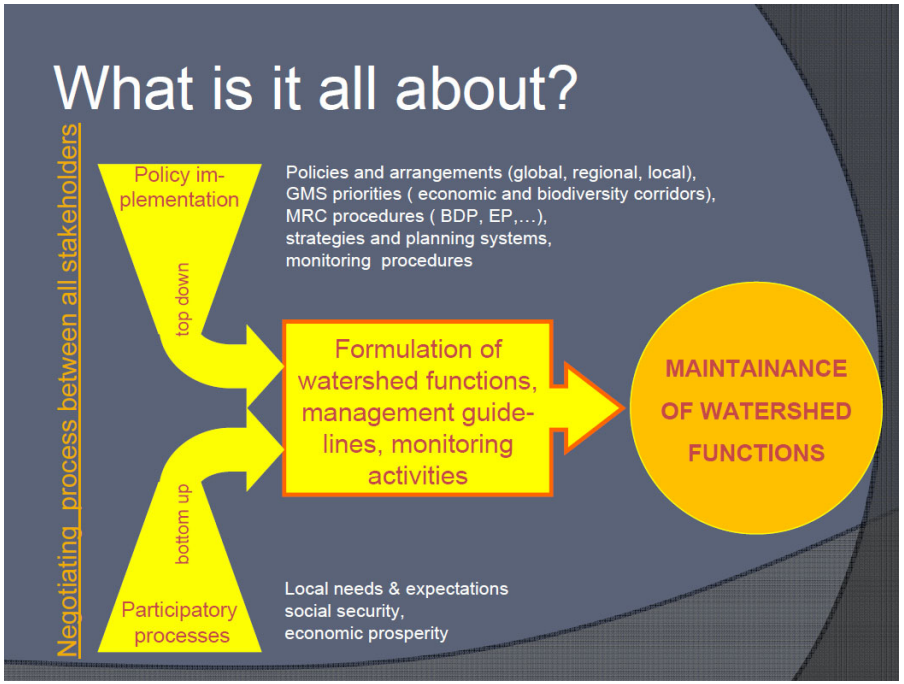
Rivers in Asian region

- Rivers are one of the most important geological features in this region, playing a key role in shaping histories, cultures, societies and economies.
- They provide freshwater for drinking, irrigation and hydropower; are home to unique plants and animals that contribute to well-functioning ecosystems; support transportation, recreation/tourism and many other functions.
- However, in lieu of triple planetary crisis (climate change, biodiversity loss, and pollution) and land degradation; river environment are under extreme pressure which affects overall human well-being as well.

IWRM and Nexus approach

- Complex nature of water resource management at the basin scale, needs a clear vision on the following:

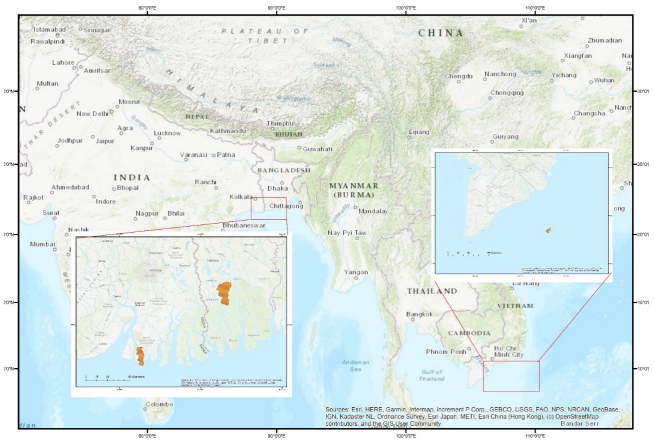


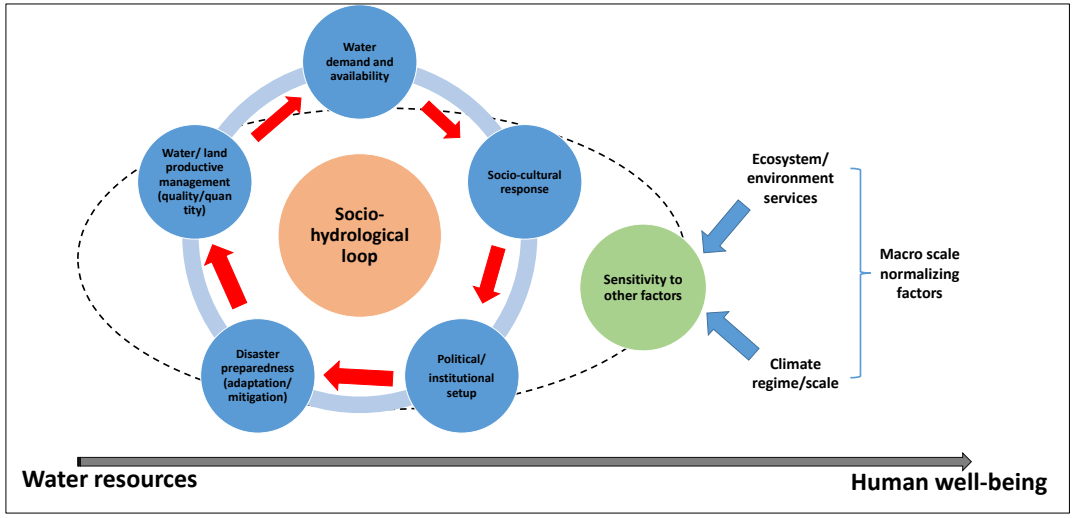


Integrated Water Resource Management (IWRM)

Siligato (2007)

Socio-hydrology

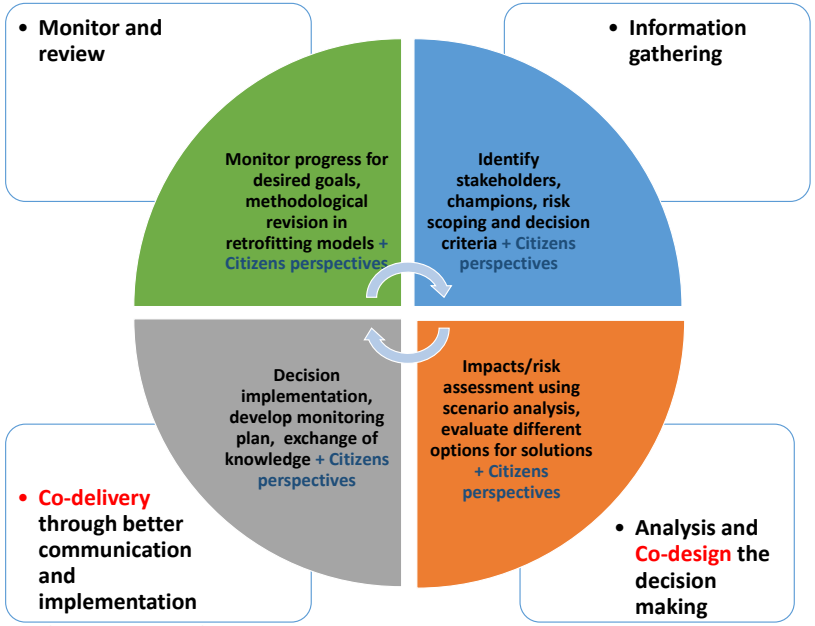




Why riverine islands?

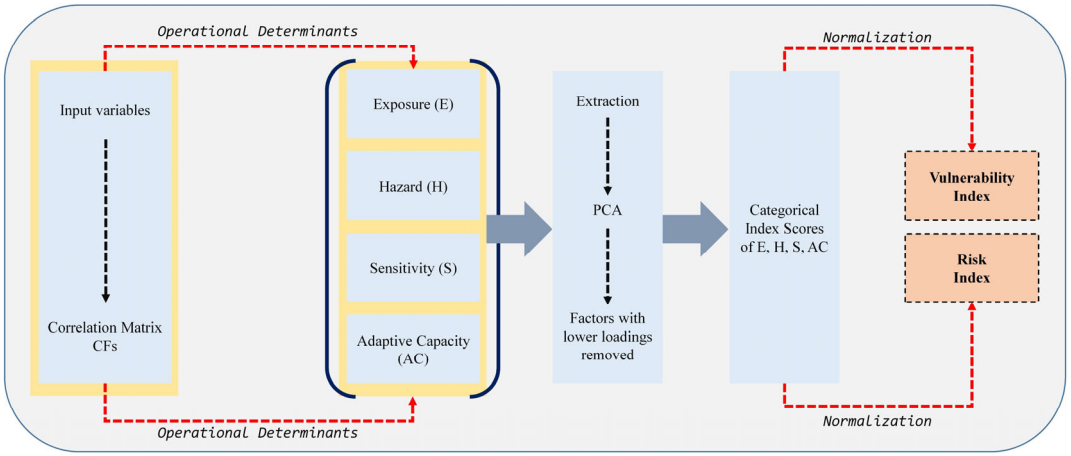
1. Huge productive zone
2. Very prone to hydro-meteorological hazards (frequent extreme weather conditions)
3. Densely populated area and extreme effects on the communities because of their poor adaptive capacities (limited resources/infrastructure as well as institutional setup)

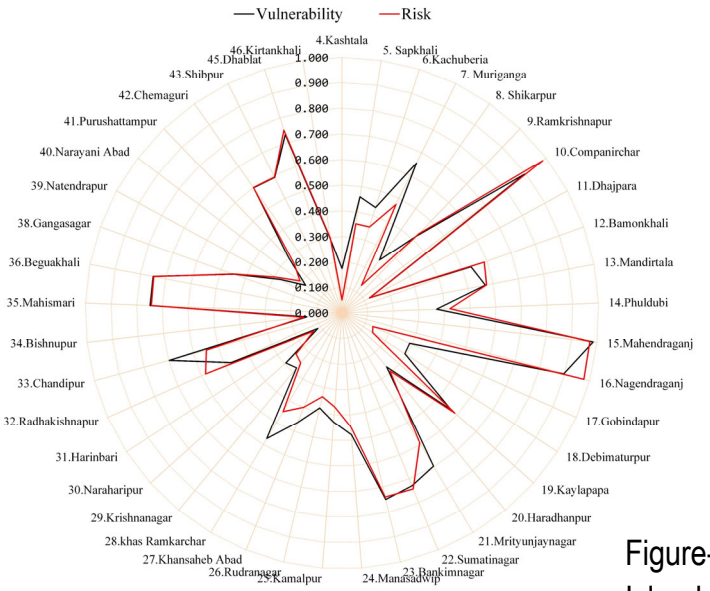
Objective- How socio-hydrological approach can help to design possible adaptation and mitigation measures for positively enhancing the relation between water resources and human well-being?

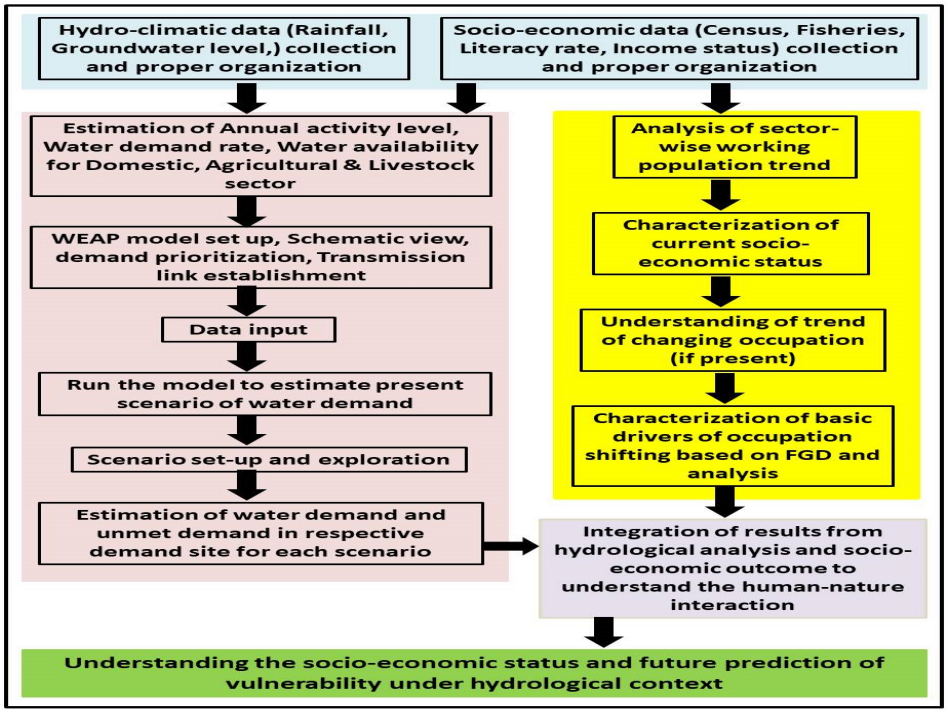


Pankaj et al., (2020) Progress in Disaster Science, 8, 100134

Socio-hydrology and some results







Dataset- Water quality/quantity, (primary data generated in case observed data was not there), Socio-economic data (Field based surveys (FGDs/KII/HH), Spatial data, Policy documents
Qualitative and quantitative analysis

Figure- Mouza-level relative ranking of risk and vulnerability for Sagar Island, India. Bera et al., (2022) Water, 14, 823. MDPI (IF- 3.530)

Socio-hydrology and some results

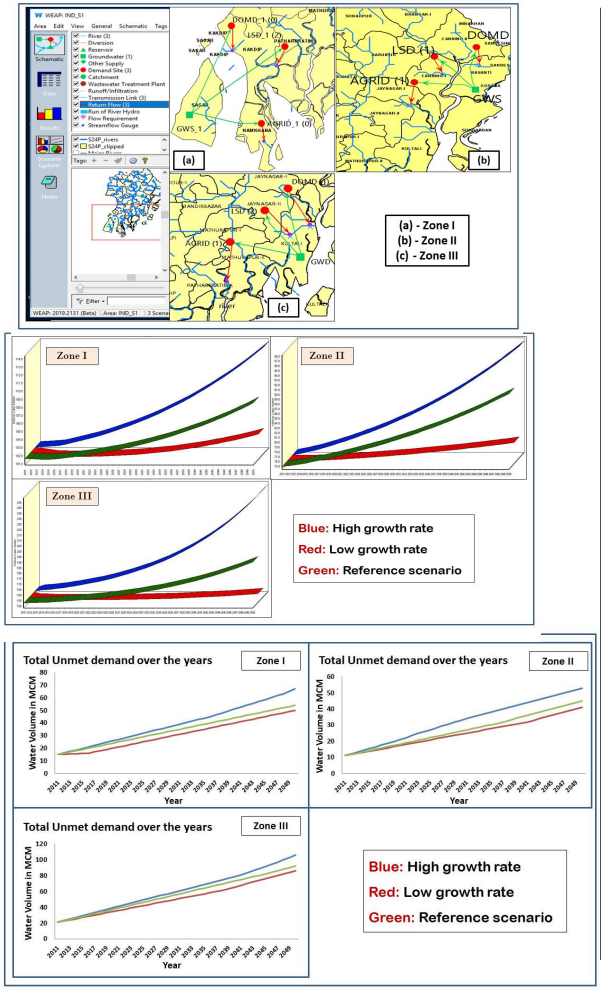


Fig- Plausible scenario based future of water resources in Indian site

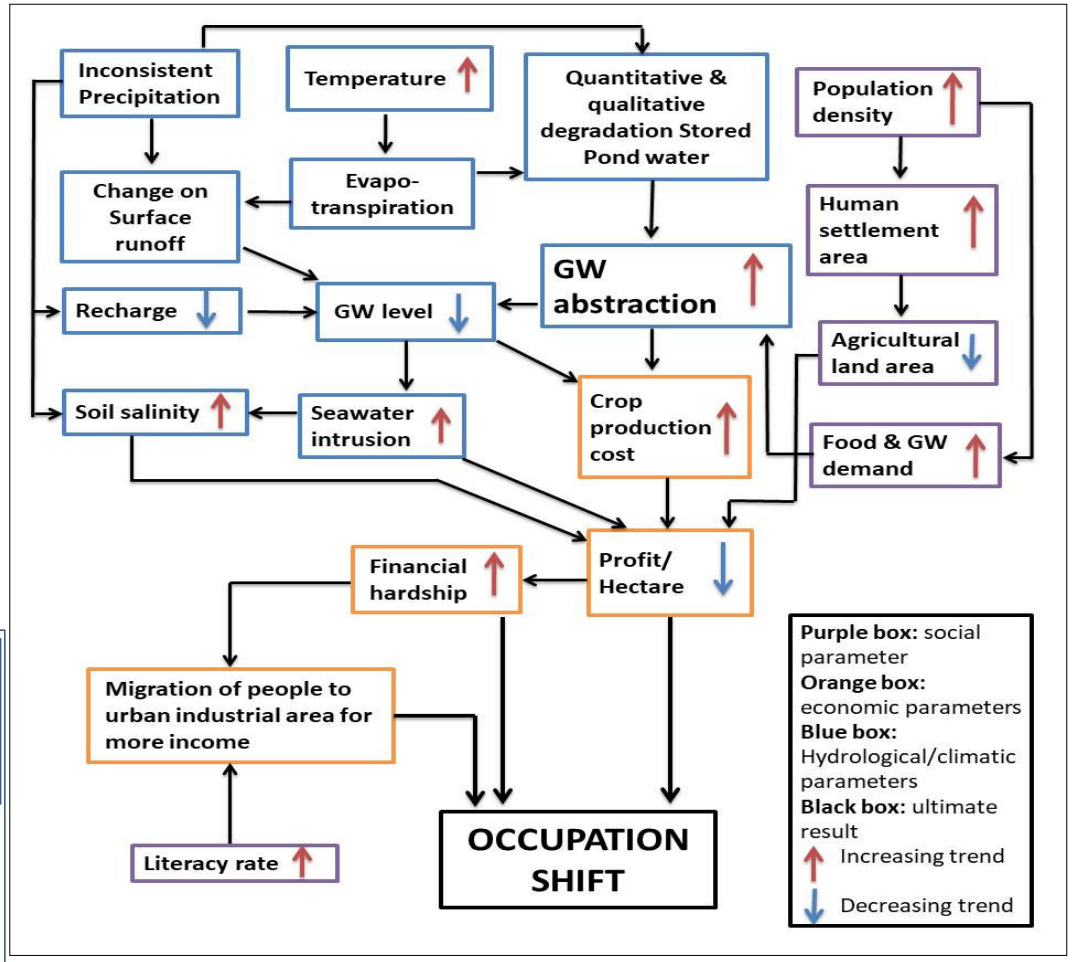
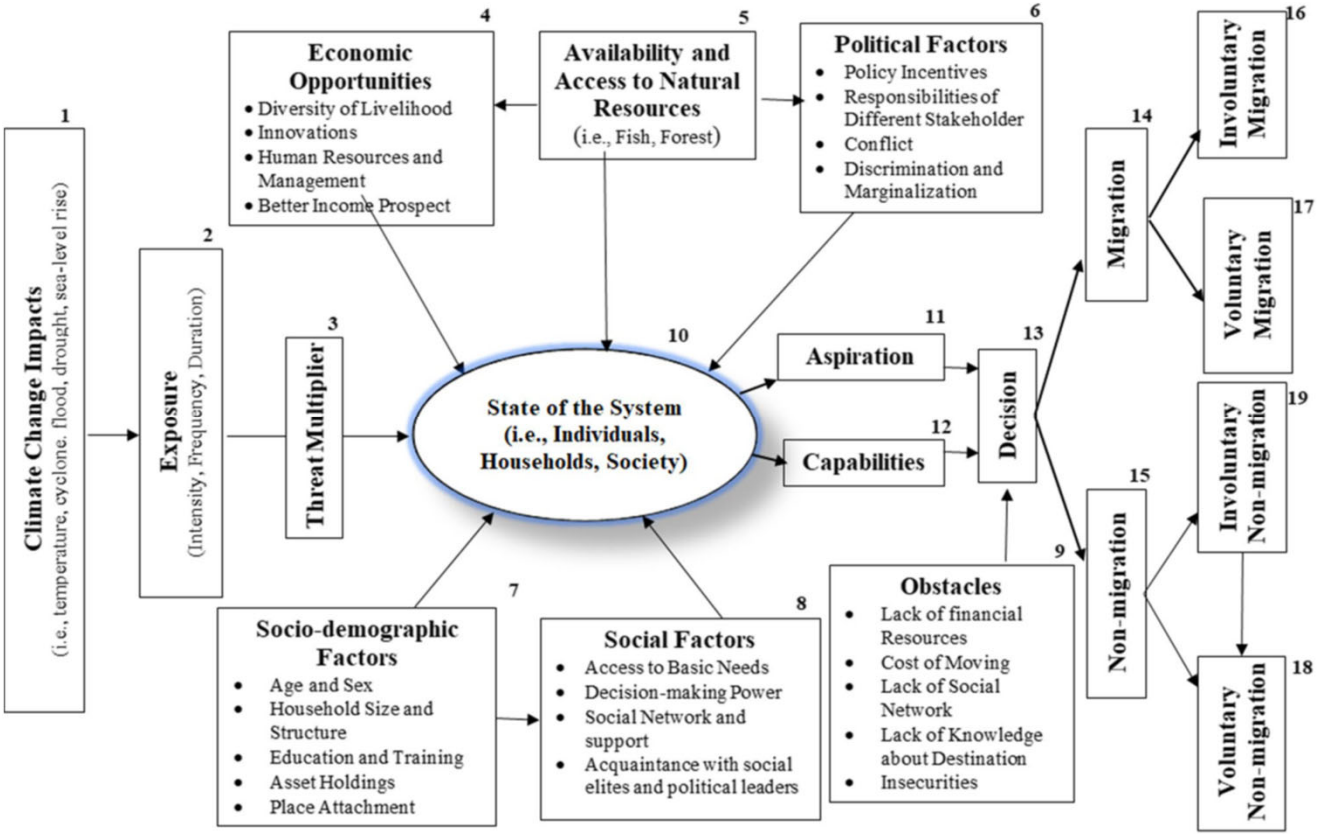
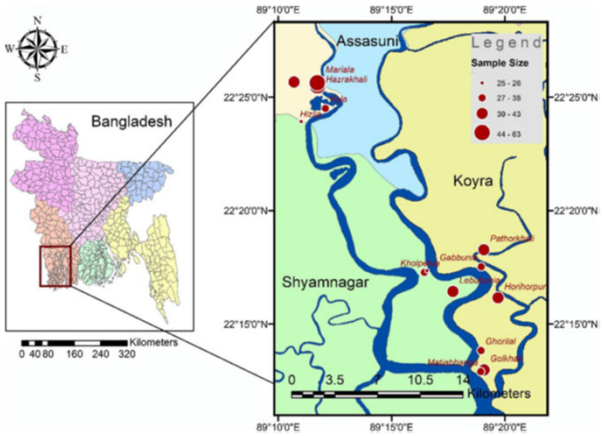


Figure - The drivers of socio-economic trend/status under hydroclimatic context in the study area.

For detail information- https://www.mdpi.com/2073-4441/13/12/1635

The Case of Voluntary Environmental Non-migration despite Climate Risks in Coastal Bangladesh





Khatun et al., Global Environmental Change, 77, 102610. **Elsevier Publication. (IF- 11.16)**

➢Furthermore, these non-migrants enjoyed higher socioeconomic and sociopsychological advantages and availed more local support from different government and non-government organizations than involuntary non-migrants.

➢Again, mutual assistance, connection with social groups, natural resource access, sense of secured livelihood, stable societal atmosphere, and participation in decision-making in society appeared to build their higher degree of social capital compared to involuntary non-migrants.

Key take away message

➢This project was a holistic approach first of its kind in this region, strives to addresses crucial hydrological queries regarding human–nature interaction along with socio-economic, capacity, institutional, policy related issues in riverine islands.

➢It is evident that triple planetary crisis with land degradation results in water insecurity. Since water is the limiting factor to socio-economic growth, it lead to a series of **cascading effects like changes in livelihood, financial hardship, mental health, occupation shift, migration, loss of self esteem** etc.

➢**Socio-hydrological an holistic approach was successfully applied to explore the nexus of human–water relations at different scales in three different study areas under different socio-economic/environmental conditions, which was further applied to improve adaptive measures to manage local water needs while mitigating undesirable changes to the hydrological cycle.**

➢Result shown that **both top-down and bottom-up approach, stakeholders participations, citizen science, diligent data monitoring, data sharing, numerical simulations with retrofitting approach to answer plausible what-if questions for designing various policy measures are the key ingredients** for achieving water security and human well-being

➢The research outcome was **helpful to sketch projections of alternatives that explicitly account for plausible and co-evolving trajectories of the socio-hydrological system, which will yield both insights into cause–effect relationships and help stakeholders to identify safe functioning space.**

Overall project outputs

- **Policy output -** Established great collaborations in these three countries, generated enough robust scientific data to help policy/decision makers
- **Scientific output-** Significant outputs in terms of publication (**peer reviewed journal articles (n=13), book chapters (n=2) and one conference proceeding**).
- **Capacity development-** Hands on training for socio-hydrological approach and some of necessary models/tools were provided to around 40 peoples from three countries

Acknowledgement – I am grateful for the support provided by the Asia Pacific Network for Global Change Research (APN) under Collaborative Regional Research Programme (CRRP) with project entitled “Socio-hydrological perspective of climate change adaptation in large riverine islands: Comparative study from India, Bangladesh and Vietnam” and project reference number CRRP2019-01MY-Kumar.

ご清聴ありがとうございました。

Thank you very much for your attention.

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