Landscapes and Disaster Risk

Lessons from Mahanadi Delta

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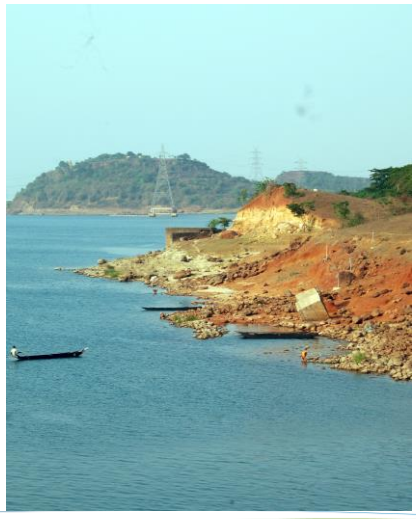
Landscapes and Disaster Risk

Social construction of risk, confounded development choices

Risk embedded in landscape structure and way of management

Ecosystems as buffers for several disasters



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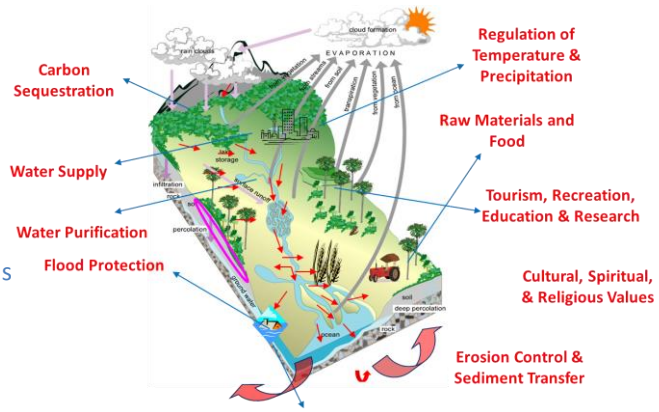
Integration challenges

Biophysical elements of risk construction underrated

Conventional assessment tools focus on household

Ecosystem services landscape interactions weakly understood



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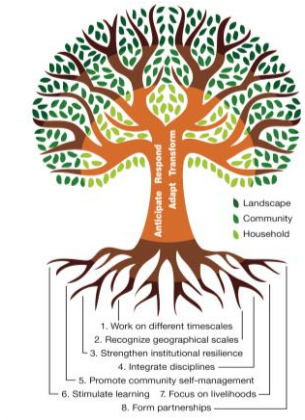
Partners for Resilience

- Recognizing geographical scales
- Integrating disciplines
- Work on different timescales
- Form partnerships



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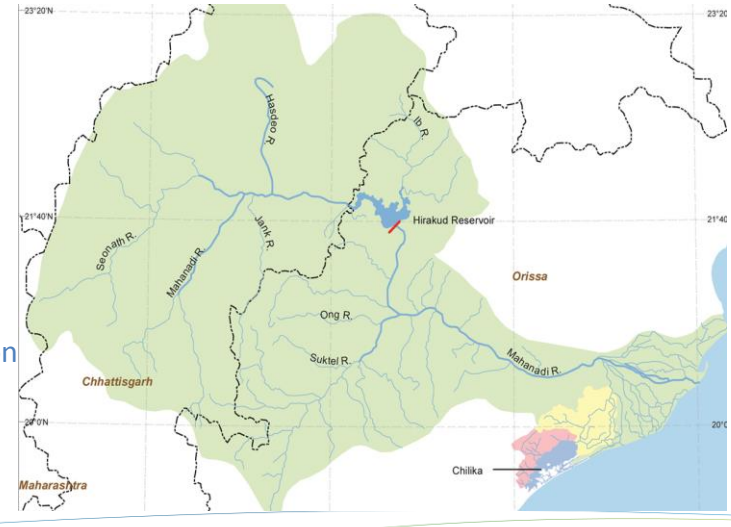
Mahanadi Delta, Odisha

9400 km^2

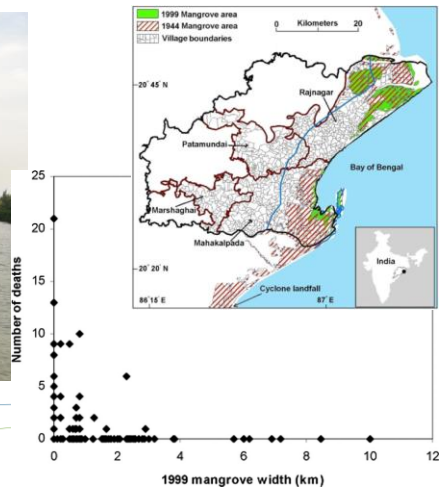
Highly productive landscape

High concentration of economic assets



Mahanadi Delta, Odisha

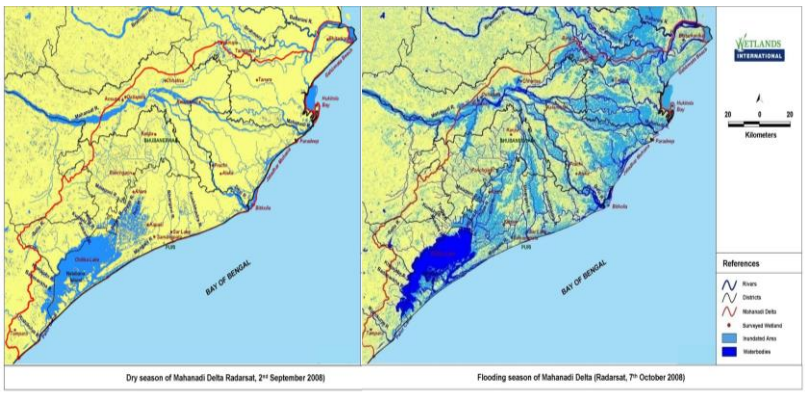
Ecosystems provide coastal protection and livelihoods



Risk context

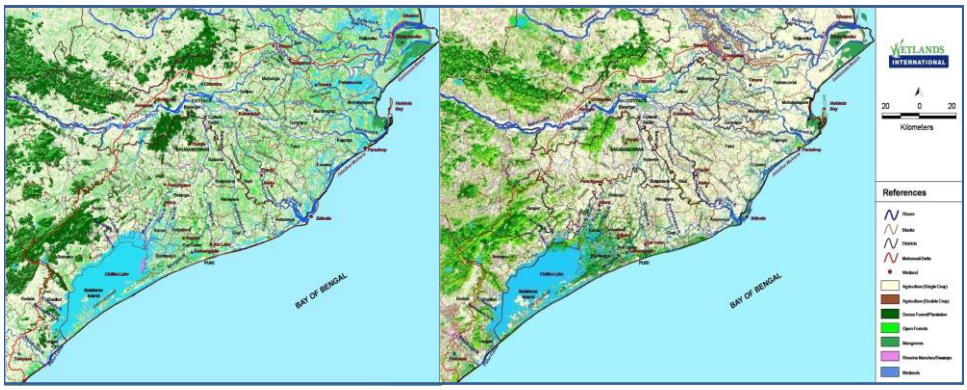
Landscape extensively fragmented for water resources development projects

Risk context



Flood dependent economy has turned flood vulnerable

Risk context



Over 30% of wetlands converted in last three decades

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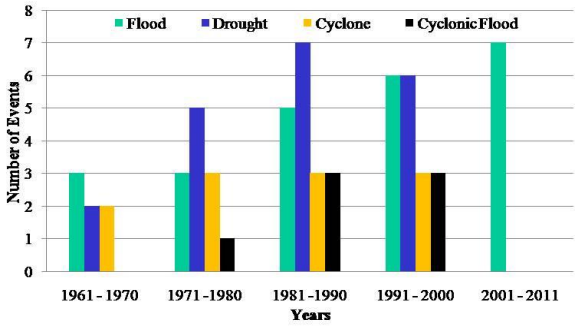
Mahanadi Delta

Multiple disasters



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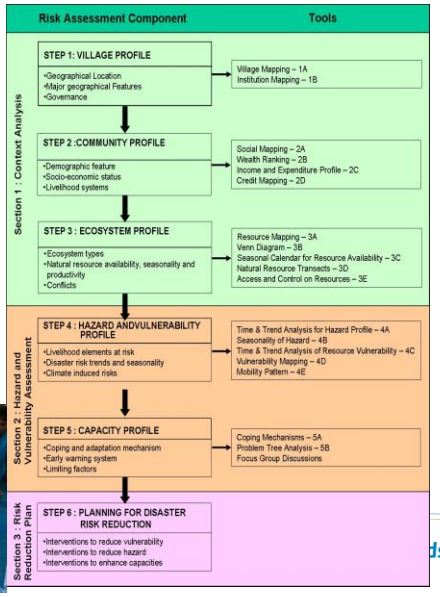
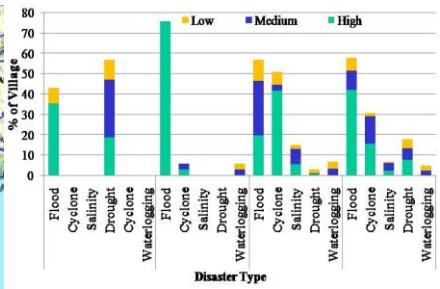
Risk assessment protocol

- Understanding risk context
- Locating ecosystem values in livelihood strategies and vulnerabilities



Risk patterns within landscape

Spatially segmented understanding of risk



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Risk assessment protocol

Indicator framework for compiling vulnerability capacity information

- Social aspects
- Economic aspects
- Environment aspects
- Institutions and governance

	Vulnerability Indicators	Capacity Indicators
Social aspects	Illiteracy	Technical education
	Lack of access to basic amenities	Access to basic amenities during disasters
	Physical disability	
	Membership of ethnic minority	
Economic aspects	High working population dependency ratio	Occupational diversity
	Proportion of household income derived from local sources	Asset diversity
	Income insufficiency	

	Vulnerability Indicators	Capacity Indicators
Environmental Aspects	Multiplicity of hazards	State of natural capital
	Frequency of prime hazards	
	High exposure to prime hazard	
	Membership of ethnic minority	
Institutions and Governance	Low use of early warning systems	Use of complex sources of information for early warning
	Low coverage of organizational membership	Functional diversity of local institutions
	Lack of use of individual risk management measures	Use of collective risk transfer mechanism
		Increased sufficiency of risk reduction planning and implementation

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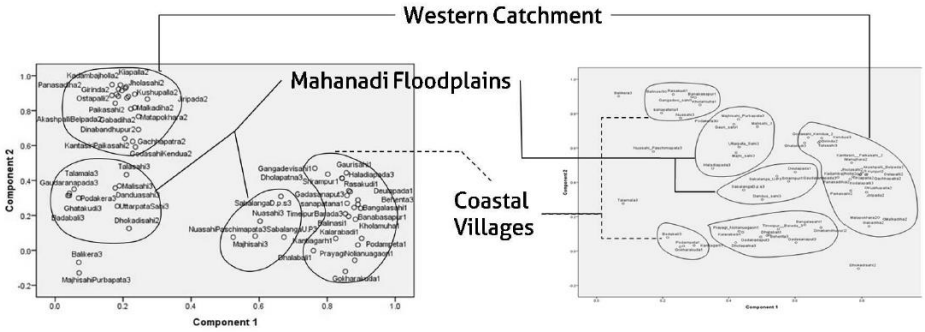
Vulnerability and capacity: Geomorphological influence



Clustering of vulnerability (left) and capacity (right) indications

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Cluster based approach for risk reduction

Increasing household and village preparedness for disasters

Considering landscape elements in implementation of risk reduction plans

- Increasing freshwater availability to manage salinization, water stress
- Increasing hydrological connectivity to reduce waterlogging
- Mangroves as shelterbelts

Community mapping for resilience building interventions in Puri, Odisha

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Cluster based approach for risk reduction

Influencing landscape processes

- Integrated coastal zone management
- Managing Hirakud Reservoir
- District Disaster Management Planning
- State Disaster Management Authority

Upscaling household interventions to act at multiple scales

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Lessons

Societies accumulate risks as landscapes and ecosystem functioning degrades

Spatial approaches required to address landscape dimensions, complementing household risk reduction approaches

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