Ganga Basin
Socio-economic values

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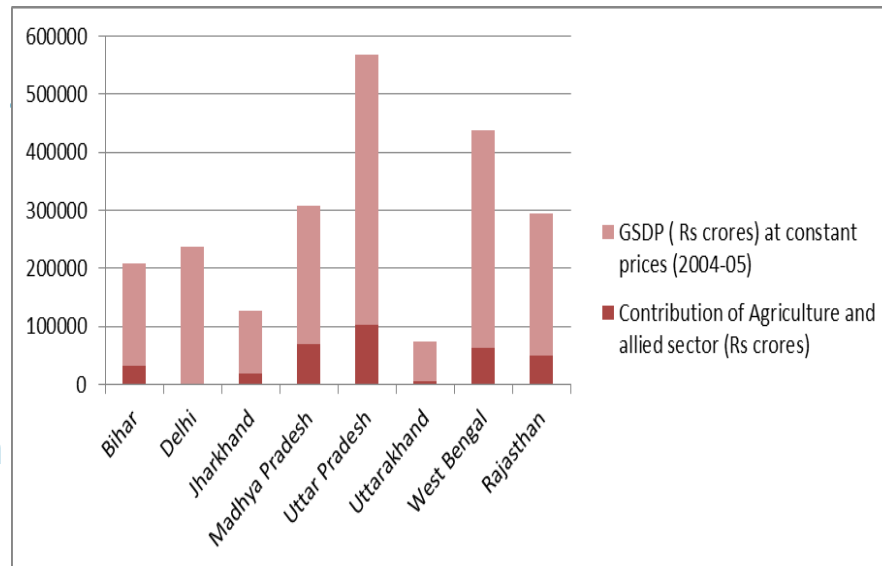# Ganga Basin

Socioeconomic dimensions

Most densely populated part of country (26.3% of land area, 33% of population 2001 census)

Two of world largest industrial cities, several industrial clusters

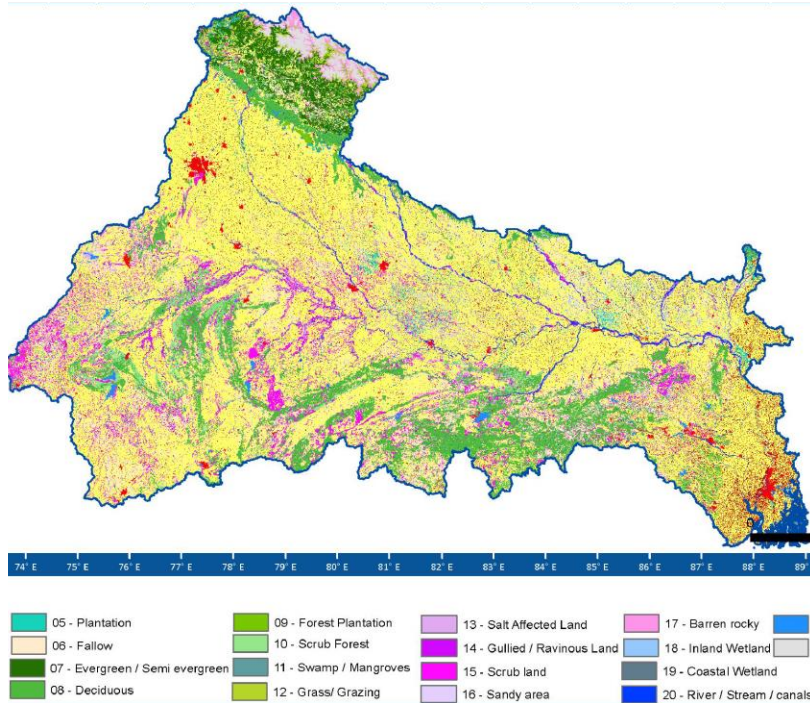Development extremes: over one fourth under income poverty

Major role of agriculture and allied sectors in income generation and employment

Grossly inadequate waste management infrastructure

Chart legend:
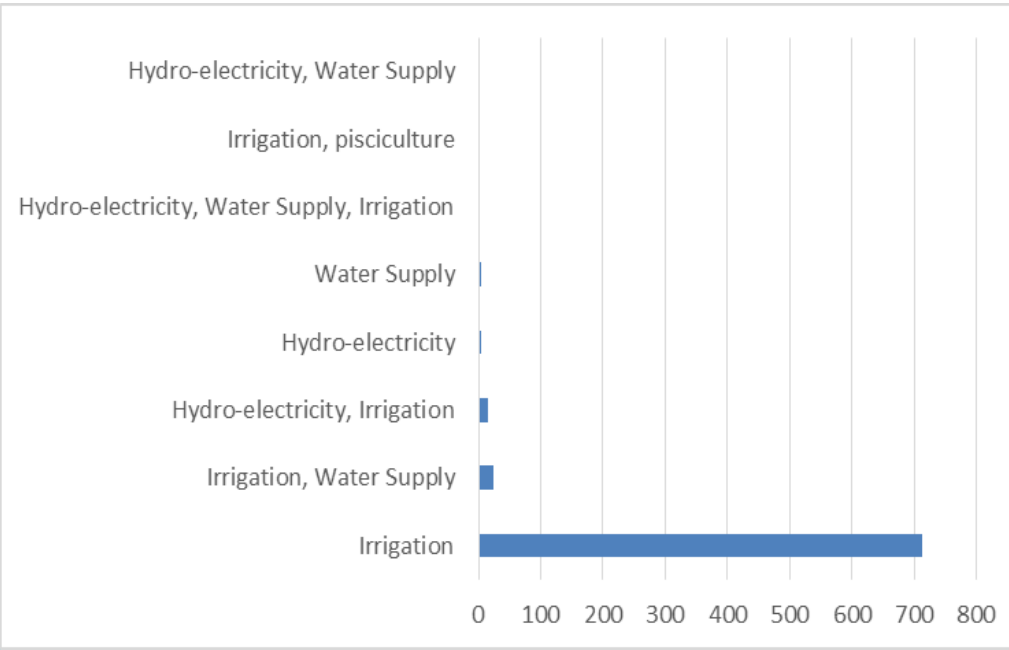- GSDP (Rs crores) at constant prices (2004-05)
- Contribution of Agriculture and allied sector (Rs crores)

X-axis categories: Bihar, Delhi, Jharkhand, Madhya Pradesh, Uttar Pradesh, Uttarakhand, West Bengal, Rajasthan

Y-axis: 0, 100000, 200000, 300000, 400000, 500000, 600000

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Ganga Basin

Food security

05 - Plantation
06 - Fallow
07 - Evergreen / Semi evergreen
08 - Deciduous
09 - Forest Plantation
10 - Scrub Forest
11 - Swamp / Mangroves
12 - Grass/ Grazing
13 - Salt Affected Land
14 - Gullied / Ravinous Land
15 - Scrub land
16 - Sandy area
17 - Barren rocky
18 - Inland Wetland
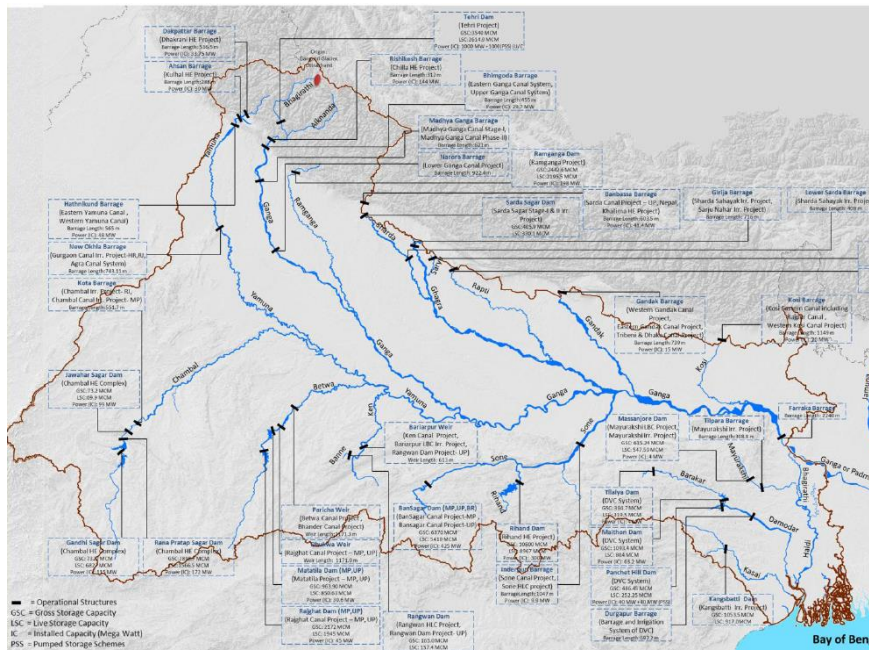19 - Coastal Wetland
20 - River / Stream / canals

Source: India.wris.gov.in

65% of basin cultivated, ~40% of total cultivated area of country
478 medium and major irrigation projects commanding 36.12% of basin area

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Water resources development

Source: India.wris.gov.in

Hydraulic structures complemented by 0.28 million waterbodies, of which 35% are tanks and 14% lakes and ponds

Ganga Basin

Cultural values

Holy river: aesthetic, religious and cultural heritage

Socioeconomic values and E-flows

- Development inter-twined with water use and management

- Development linked with hydrological regime regulation and modification, ecosystem integrity mostly aligned with natural flows

- Implicit ecological and economic costs of not considering environment and development within unified planning and decision making frame

Tradeoffs

Policy : Sectoral developmental planning (food, water, energy, climate security)

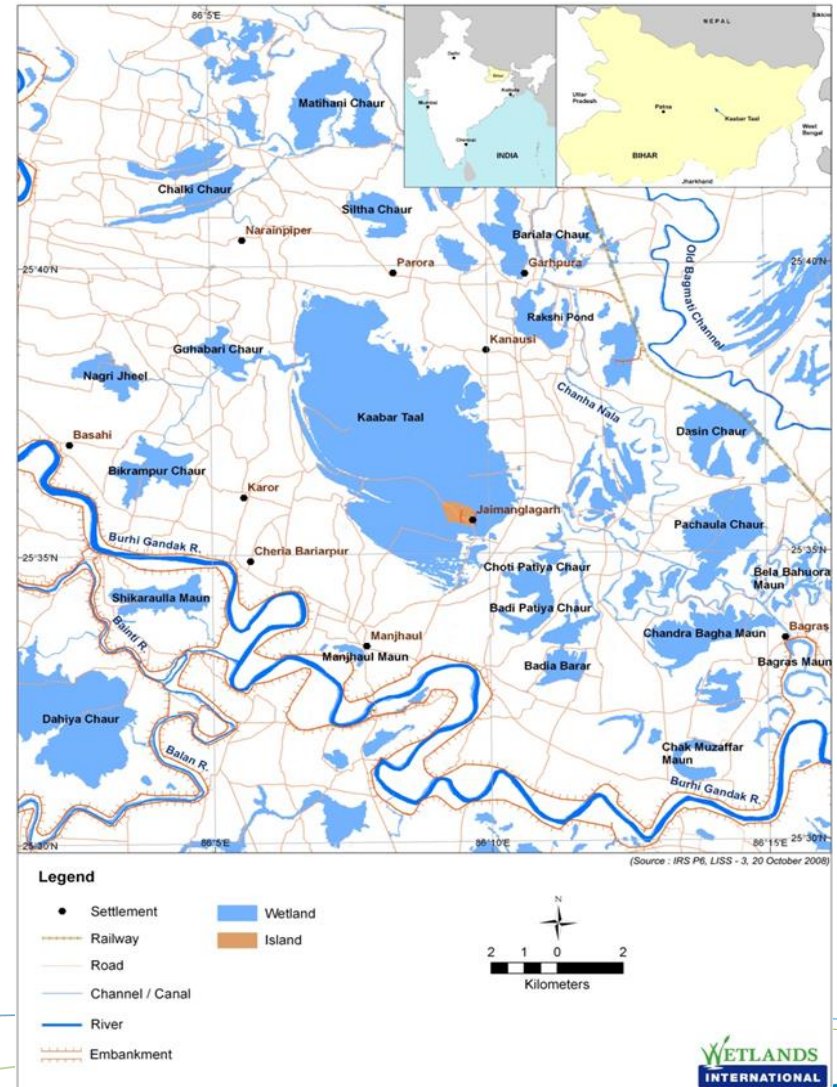Technology: Natural versus physical infrastructure

Stakeholders: Upstream versus downstream communities

Kanwar Jheel, Bihar

River – floodplains connectivity

Part of extensive floodplain wetland complex between Burhi Gandak and Bagmati palaeochannel (regime ~10,000 ha,Kanwar ~ 6300 ha)
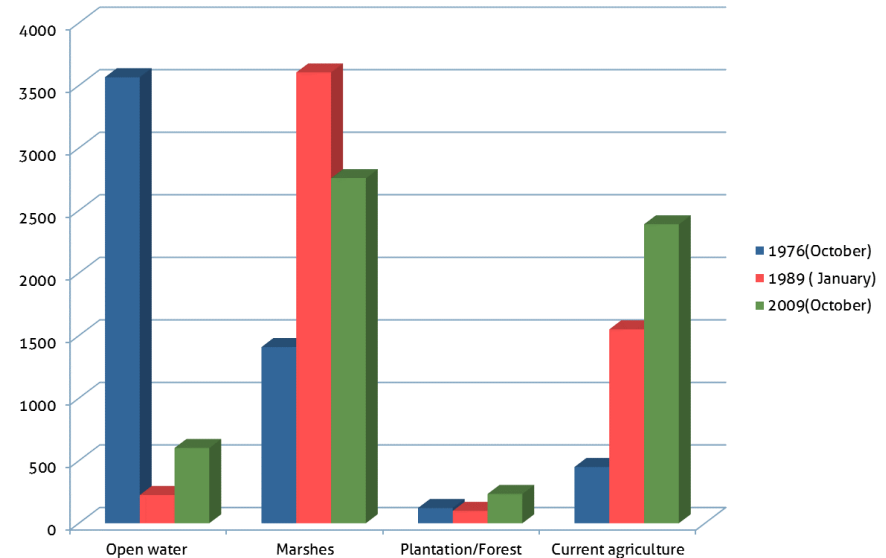
Kanwar Jheel, Bihar

Fluvial dynamics – environment, development interlinkages

- Source of livelihoods of ~15,000 fisher and farmer households

- Supports groundwater recharge and acts as buffer for floods

- Jaimangalagarh associated with archaeological and cultural significance

- One of the largest wintering grounds of migrating waterbirds in Indo-Gangetic floodplains -> Declared as Bird Sanctuary to control wanton killing

- Social contract between farmers and fishers for multiple resource use
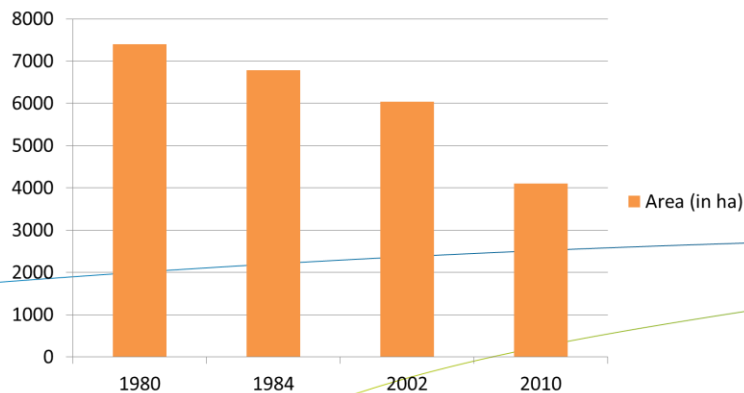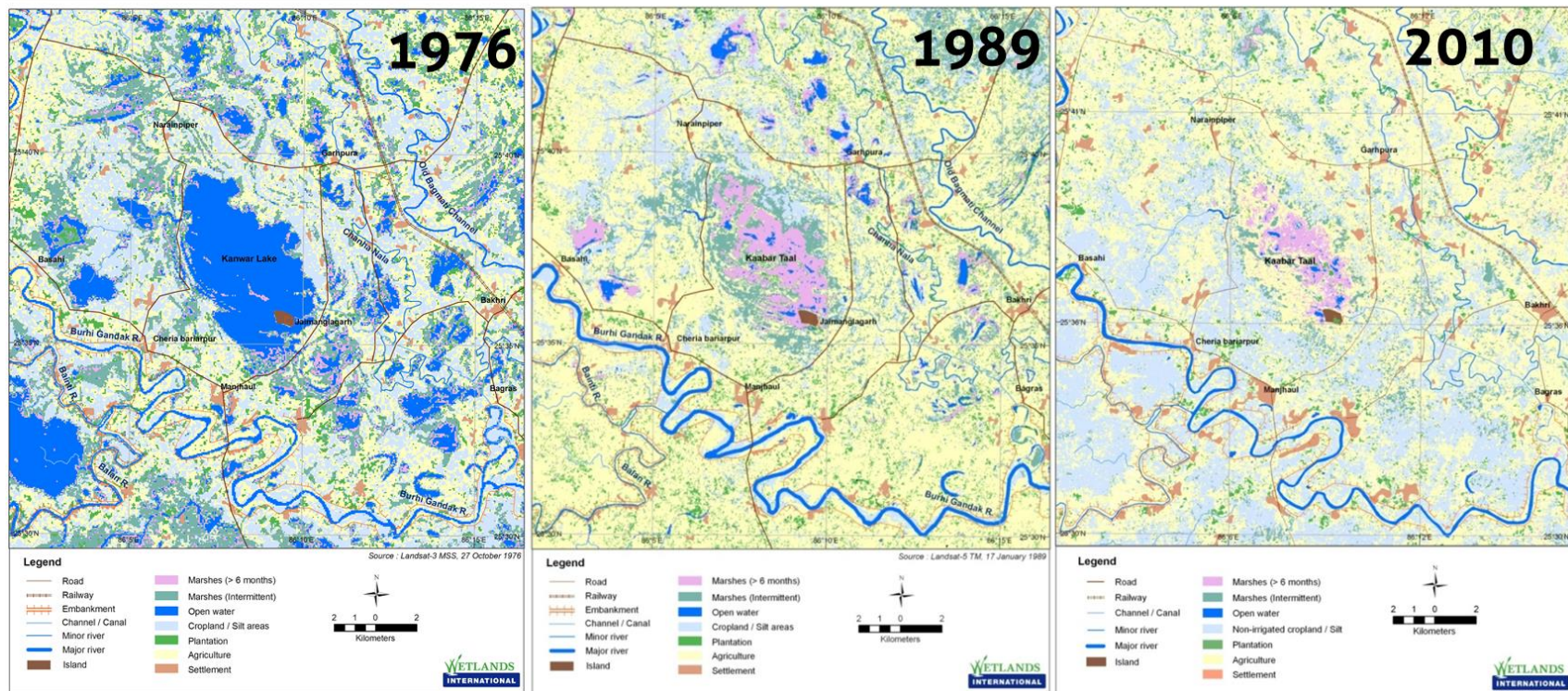
Developmental Planning

- Limited appreciation of role of floodplains, riverine interlinkages

- Channelization for reclamation

- Dynamic landuse progressively transformed into predominantly permanent agricultural landscape

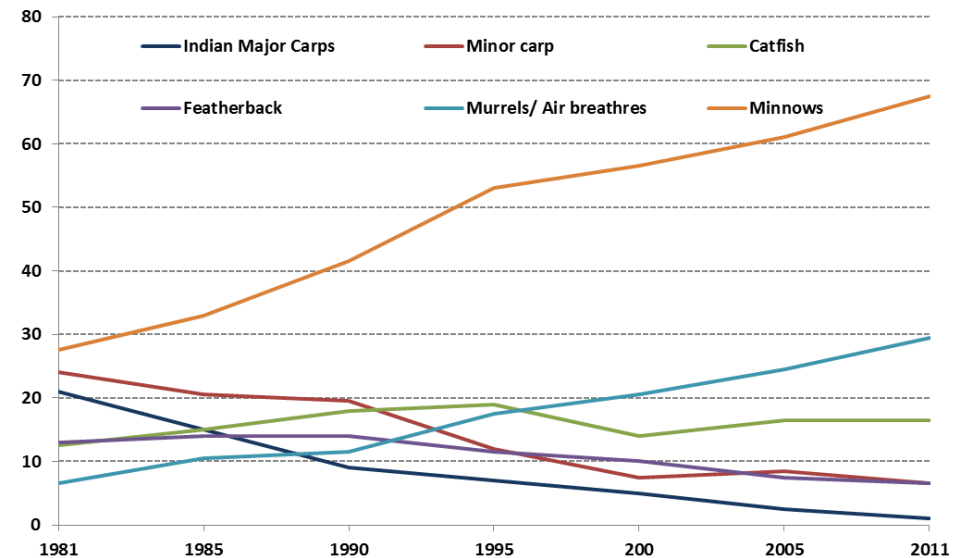- Expansion supported by increasing groundwater

Kanwar Jheel, Bihar
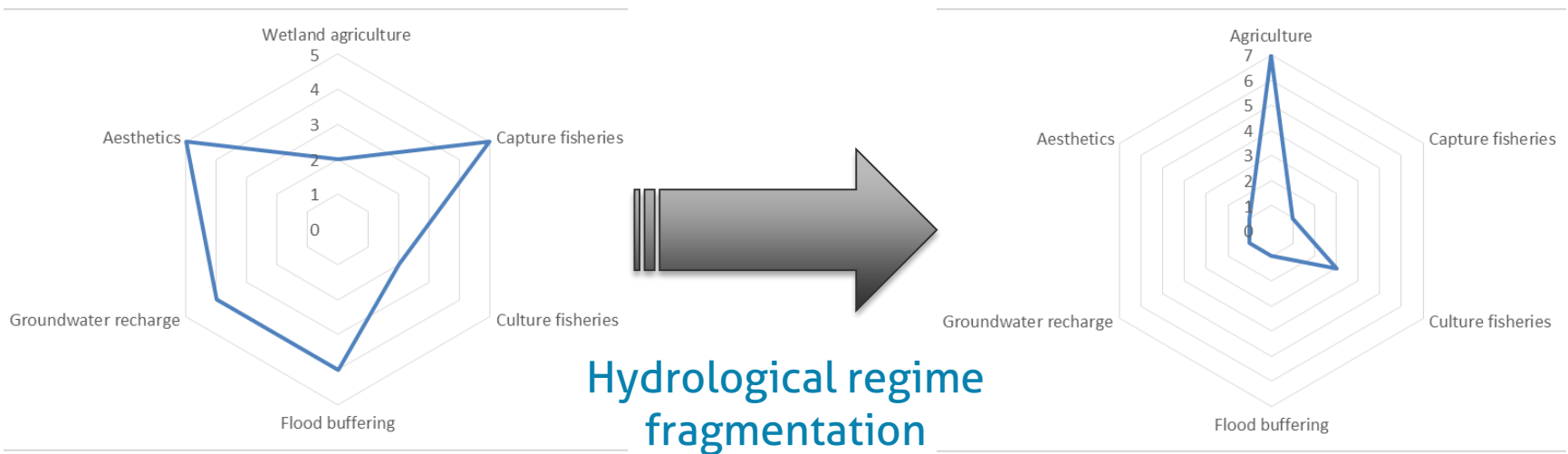
Shrinking inundation regimes

Impacts

- Complete disruption of capture fishery
- Dominance of species adapted to stressed conditions
- Progressive reduction in value as waterbird habitat
- Marginalization of fisheries based livelihoods
- Breakdown of social contract
- Insufficiency of patch centric management approaches

Tradeoffs

Hydrological regime fragmentation

Focus on agriculture than multiple values

Changing weather patterns

Tradeoffs

Equity considerations

	1960s	Present
Farmer (Large landholding)	++	++++
Farmer (Small landholding)	++	+++ (Escalated cost of water extraction)
Farmer (Marginal landholding)	++	+ (Lost flood buffering value)
Fisher (Capture)	++++	+
Fisher (Culture)	++	+++ (Poor productivity from GW)

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Addressing tradeoffs

- Recognizing ecological and developmental role floodplains and riverine connectivity

- Developing an institutional platform for inter-agency coordination

- Restoring hydrological regimes considering socio-political contexts

- Revising institutional arrangements to allow for stakeholder engagement

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In conclusion

- Need to position e-flows from environmental as well as developmental perspective

- Need for cross-sectoral institutional arrangements to address tradeoffs

- Science base to assess and evaluate environmental as well as developmental consequences of water management

- Consideration of full range of water management solutions for meeting developmental objectives

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