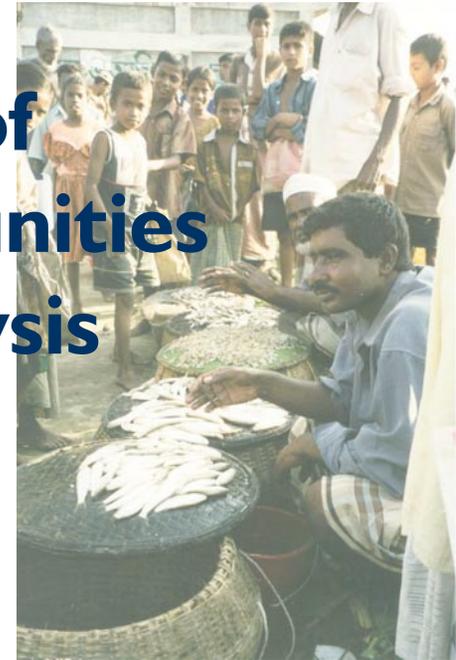# Quantifying the importance of environmental flows for local communities in IWRM water allocation analysis

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Contents

- **Rationale and research objective**

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Rationale

- **Balancing environmental flows in IWRM requires quantification of economic and social benefits**

- **Ecosystem use by local communities may have little economic value**

- **But may be the source of livelihoods, good health and traditional ceremonies for local people**

Research objective

To develop an approach for the assessment of human well-being values and social equity related to environmental flows for application in Integrated Water Resources Management

Research Approach

- **developing conceptual model of flows, ecosystem and human well-being**
- **applying the approach in two case studies:**
  - **Surma-Kushiyara rivers in Bangladesh**
  - **Sistan Inland Delta in Iran**
- **role of case studies**
  - **improvement of conceptual model**
  - **lessons for actual quantification**

Conceptual Model

1. Definition of human well-be...

2. Links **between hur...** **ecosystem and th**

3. Context **to understand th** **ecosystem goods and services for people**

4. Stepwise approach **to apply conceptual model in** **IWRM analysis**

factors influencing the links between flow-ecosystem-people

first or...
- incon...
- healt...
- perce...

- **alternative sources**
- **access to goods and services**
- **vulnerability**

...being for the identified groups

second water migration, conflicts

social equity: the distribution of changes in well-being over groups of people

Sistan Inland Delta incl. Hamoun Wetlands

birds

fish

reeds products

reeds

prevention of sandstorms
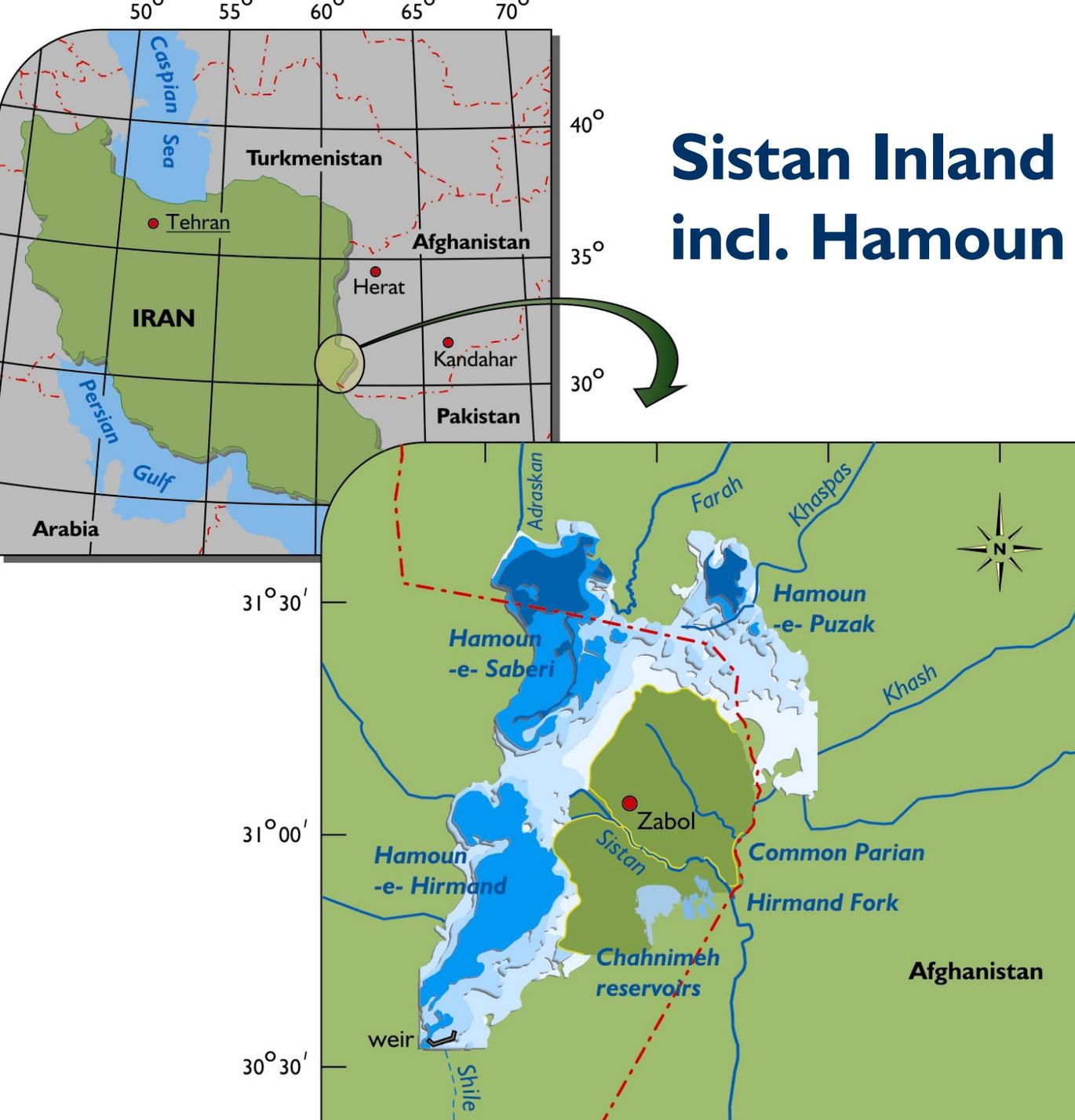
Problems

- **Drought: 1997-2004 – reduced inflows from Afghanistan**

- **Loss of agricultural production**

- **Loss of wetland goods and services**

- **Migration and illegal activities**

- **IWRM study: insight in alternative strategies to improve agricultural production and protect the wetlands**

assessment step	data/source	example Sistan case
stakeholder groups and numbers	authorities statistics field visit	1000 bird catchers 2500 fishermen 500 reed harvesters
important EGS for well-being	group discussion	income & food resources sandstorm protection
detailed info on link & context for selected EGS	household interviews	70% income from fishing 28.5% other wetland use 1.5% other sources
analysis quantitative links EGS and flows	using result ecosystem-flow study	wetland 'flushing' > once per 15 years
assessment impacts of WRM strategies	water allocation model RIBASIM: strategy → change in flow parameters	

		Current	Increase	Decrease
Ecosystem condition				
Reed	**% of ref**	**90-100**	**73-87**	**90-100**
Fish	**% of ref**	**90-100**	**60-67**	**90-100**
Bird	**% of ref**	**90-100**	**87-100**	**90-100**
Income & food				
Bird catchers	**T <50%**	**5**	**2**	**10**
Fishermen	**T <50%**	**5**	**1**	**8**
Reed harvesters	**T <50%**	**5**	**1**	**10**
Pastoralists	**T <50%**	**5**	**2**	**5**
Field cult. Hamoun	**T <50%**	**2**	**4**	**1**
Animal farmers	**T <50%**	**1**	**n/a**	**1**
Field cult. other areas	**T <50%**	**1**	**n/a**	**1**
Urban people	**T <50%**	**n/a**	**n/a**	**n/a**

Conclusions – Hamoun Wetlands

- **Wetlands & agriculture important for various groups of people**
- **Wetlands: income for approximately 20% of population**
- **Wetlands: sandstorm protection valued by most people**
- **Results lead to more distinction between alternative strategies**

Conclusions overall

Conceptual model + steps provides structured approach for the quantification of human well-being and social equity and the links with the ecosystem and river flows

Contribute to the consideration of social equity in decision-making in IWRM

Future research

- **Formalising EF en social aspects in IWRM tools (see also poster)**

- **More details on social impacts (second order impacts)**

- **Perhaps more important:**
  - **attention for social aspects of EF in all studies**
  - **focus on links between flows and social aspects instead of detailed social assessments**

THANK YOU FOR YOUR ATTENTION