Environmental Flow Needs: Negotiate and manage sustainable water uses

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Environmental Flows – Revised Definition 2018

Brisbane Declaration 2018: " *Environmental flows describe the quantity, timing, and quality of freshwater flows and levels necessary to sustain aquatic ecosystems* which, in turn, support human cultures, economies, sustainable livelihoods, and well-being*"

**Aquatic ecosystems include rivers, streams, springs, riparian, floodplain and other wetlands, lakes, coastal water-bodies, including lagoons and estuaries, and groundwater-dependent ecosystems.*

Brisbane Declaration 2007 *"the quantity, timing, and quality of water flows required to sustain freshwater and estuarine ecosystems and the human livelihoods and wellbeing that depend on these ecosystems".*

Arthington et al, 2018

Progress over past decade (since Brisbane Declaration 2007)

- Environmental flow assessment methods are now cognizant of stakeholder participation and co-design, and recognize the dual role of environmental water in supporting ecological and social values, especially for those who rely on rivers and floodplains to support their livelihood.
- There has been significant progress in our understanding of the scientific concepts and ecological processes that underpin environmental flows.
- Environmental water requirements have now been discussed and incorporated into high-level water policy and legislation in many countries across the globe.

Horne et al, 2017

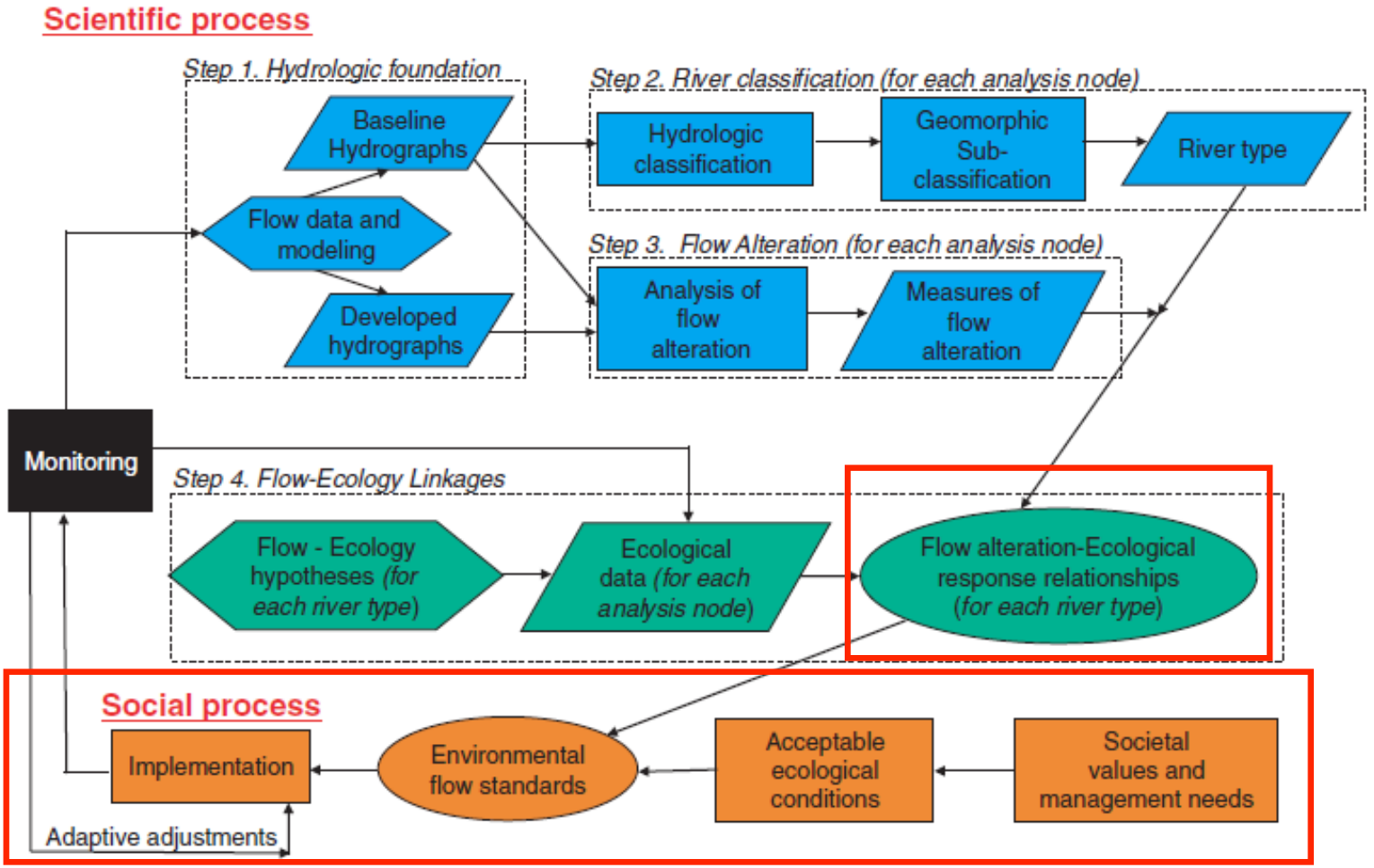
Persistent Challenges

- Need for more multidisciplinary and inclusive approaches in environmental water research and management.
- Recognition that sustaining river health and resilience is the foundation for achieving human water security, and with the need to develop infrastructure and institutional arrangements that allow multiple outcomes for society.
- Continuing to develop our fundamental understanding of how natural flow variability influences riverine and other river dependent ecosystems such as floodplains and wetlands.
- Disconnect between processes of knowledge generation and uptake into management processes and adaptive learning.
- Insufficient efforts integrating growing body of work examining legal, regulatory and organizational tools for allocation and management of environmental water into mainstream environmental flows literature.

Horne et al, 2017

From the ELOHA
(Ecological Limits of Hydrologic Alteration)
to the SUMHA
(Sustainable Management of Hydrological Alterations)
framework

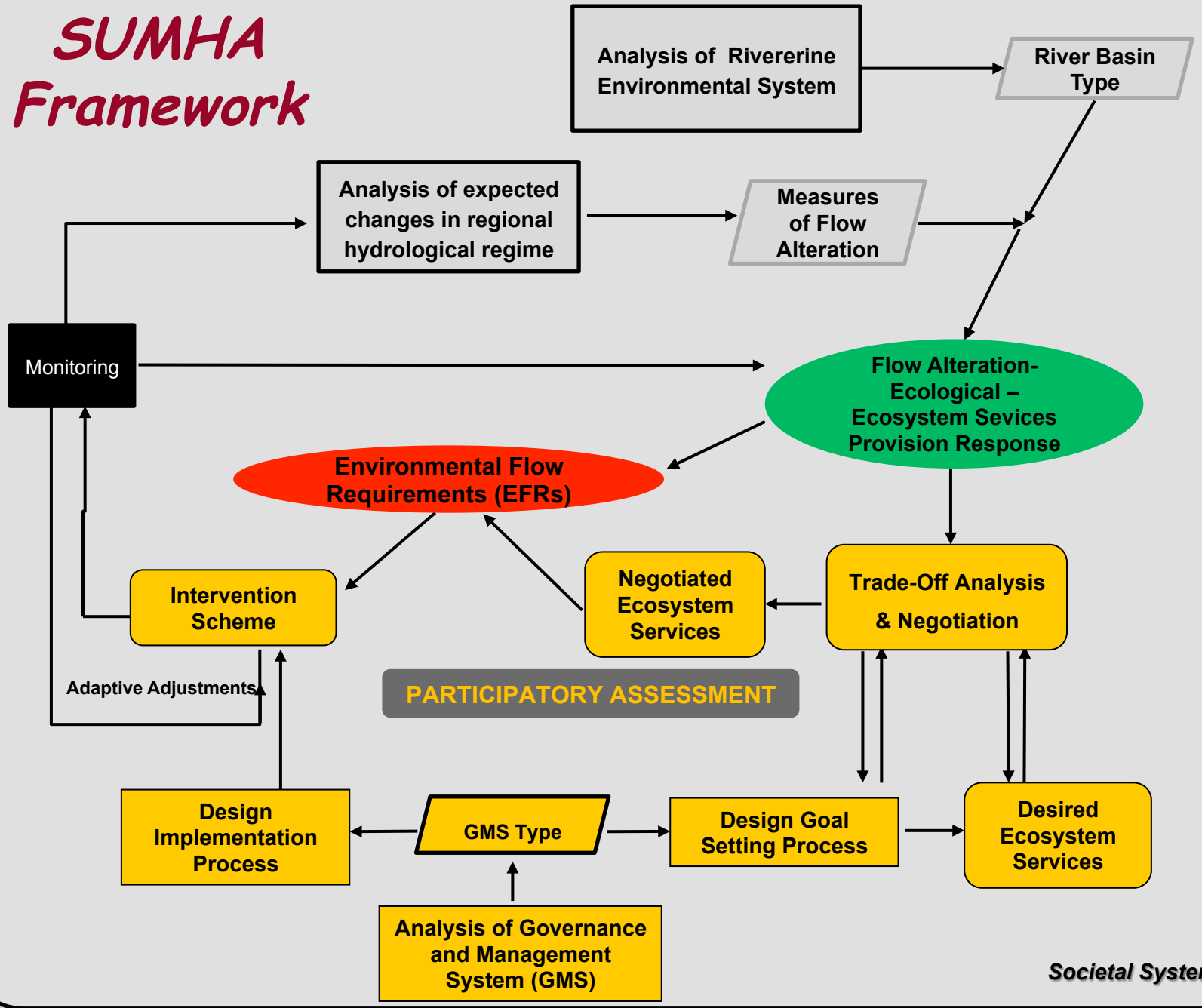
ELOHA Framework



Bottleneck in societal processes!

Poff et al, 2010

SUMHA Framework



Pahl-Wost et al, 2010

Framework of Analysis

-> standardized representation for comparative analyses of implementation processes

Framework of Implementation

-> guidance for policy implementation

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Challenges to implement SUMHA illustrated for the implementation of the concept of Water Security

Governance Challenges

- Need to deal with different framings and logic of water security - what is a risk for whom
- Negotiation of conflicts

Water Security - one Definition

- "*Water security can be defined as the availability of an **acceptable quantity and quality** of water for health, livelihoods, ecosystems and production, coupled with an **acceptable level of water-related risks** to people, environments and economies*". (Grey and Sadoff, 2007)

How to define what is acceptable?

- by scientific analysis – expert judgement
- by widely shared societal norms
- by economic cost-benefit type of analysis
- by place based assessment of perceptions of concerned stakeholders

Pahl-Wostl, Palmer, Richards 2013

Water Security….

…. further governance challenges

- Negotiation of conflicts
- **Coordination of sectors – power imbalances**

Governance Failures

- Inappropriate governance settings – lack of horizontal and vertical coordination, sectoral fragmentation
- Lack of implementation of governance arrangements (capacity problems, lack of political will, asymmetric power structures)
- Focus on technical, natural science approaches to analyse problems and to identify solutions
- Prevailing water governance and management paradigms leading to increasing trade-offs between human and environmental water security

→ **Need for innovative governance solutions**

What do we understand when we talk about Water Governance and what does it mean to design governance systems?

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The capacity to govern is a systemic, emergent property

Water governance is the social function that regulates development and management of water resources and provisions of water services at different levels of society and guiding the resource towards a desirable state and away from an undesirable state.

A **water governance system** is the interconnected ensemble of political, social, economic and administrative elements that performs the function of water governance. These elements embrace institutions as well as actors and their interactions.

Pahl-Wostl, 2015

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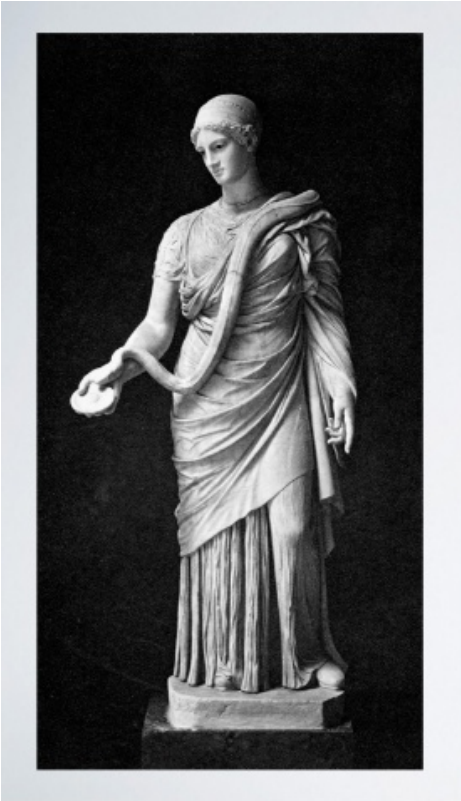


The Magic Pill

From Panaceas towards a Diagnostic Approach

Panaceas <-> Diagnosis

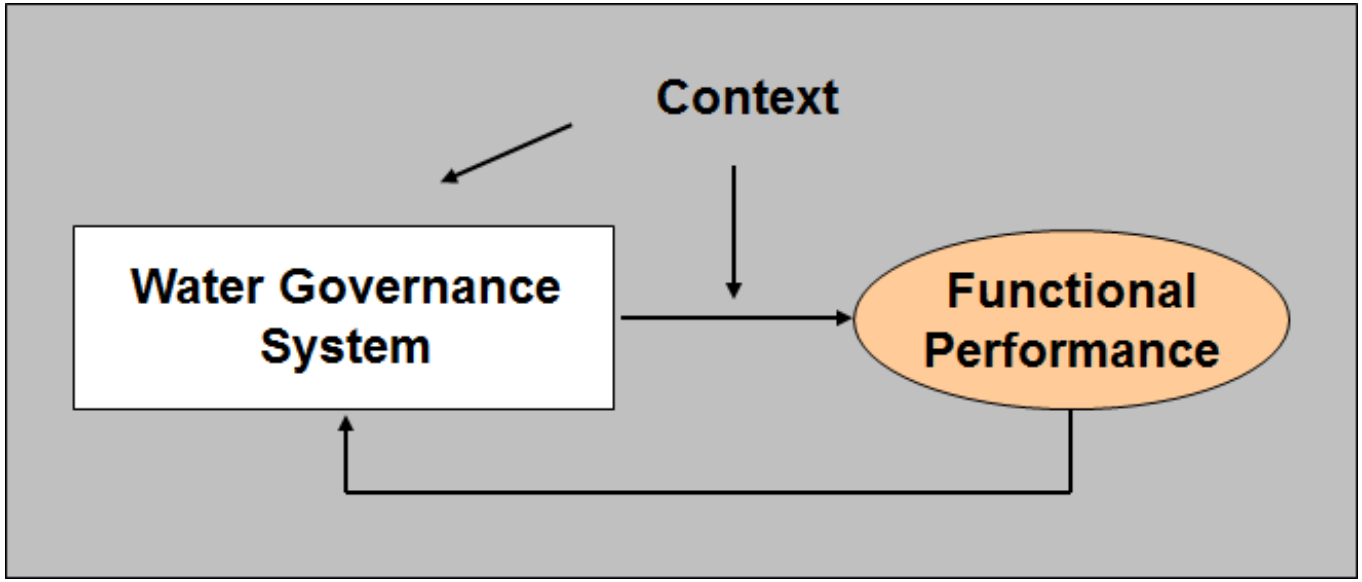
Panaceas – „one size fits all“ recipes – some examples

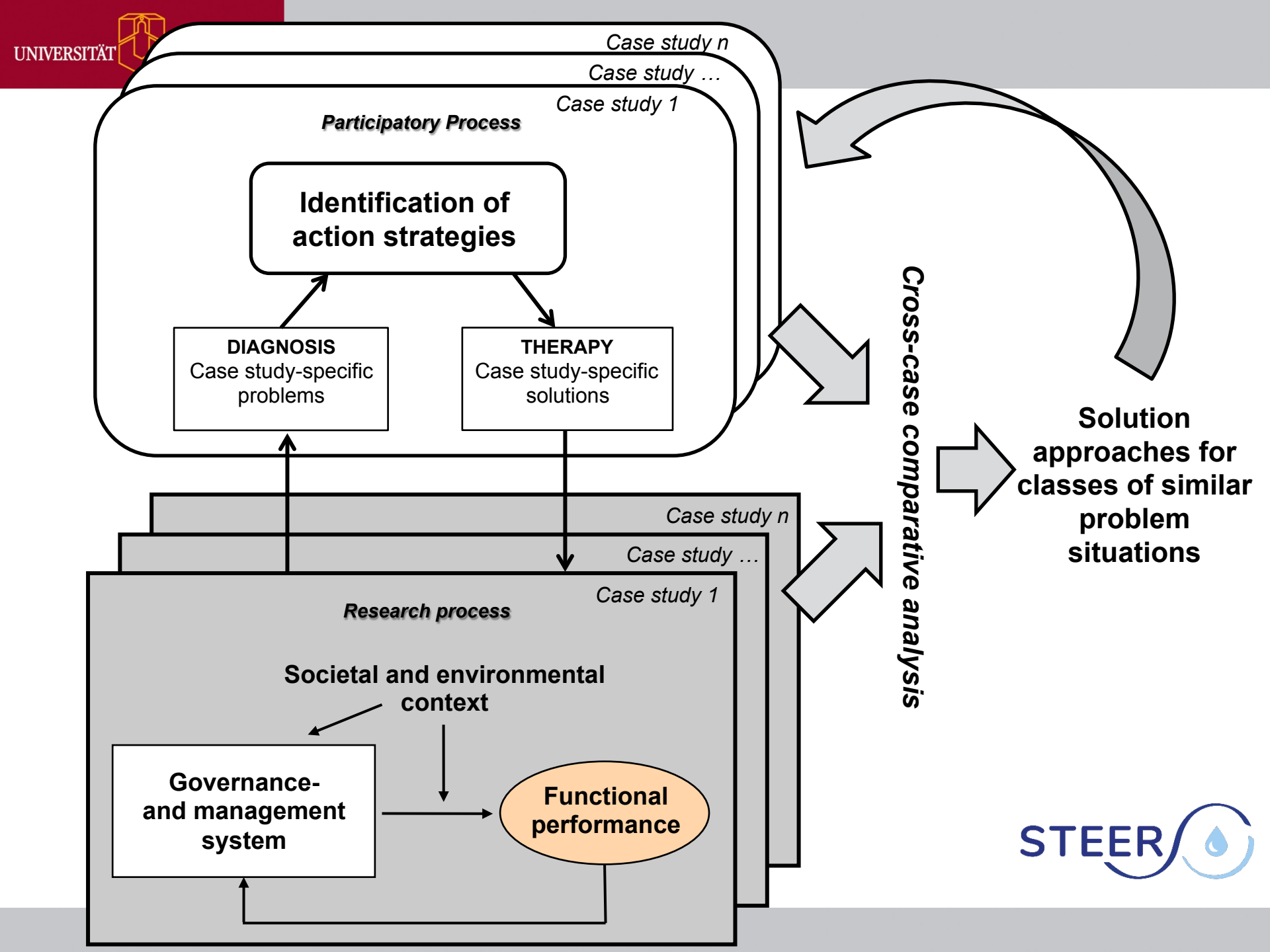
- Privatization
- Water User Associations
- Centralized Waste Water Treatment
- …..

Diagnostic approaches

- take into account the complexity of social-ecological systems in a systematic fashion
- support context-sensitive analysis and transferability of insights among similar classes of problems and contexts

Framework of Analysis for a Diagnostic Approach




Case study n
Case study …
Case study 1
Participatory Process
Identification of action strategies
DIAGNOSIS
Case study-specific problems
THERAPY
Case study-specific solutions
Case study n
Case study …
Case study 1
Research process
Societal and environmental context
Governance- and management system
Functional performance
Cross-case comparative analysis
Solution approaches for classes of similar problem situations
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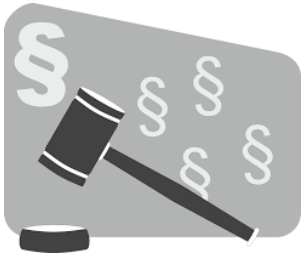
Some guiding hypotheses on elements supporting Governance Capacity

- Polycentric structures with flexible coordination across sectoral and administrative boundaries
- Combination of governance modes (Markets, Bureaucratic Hierarchies, Networks) – capacity for metagovernance needed
- Synergistic not conflictual relationships between formal and informal institutions
- Ecosystem services approach to make complex interdependencies and trade-offs explicit and meaningful

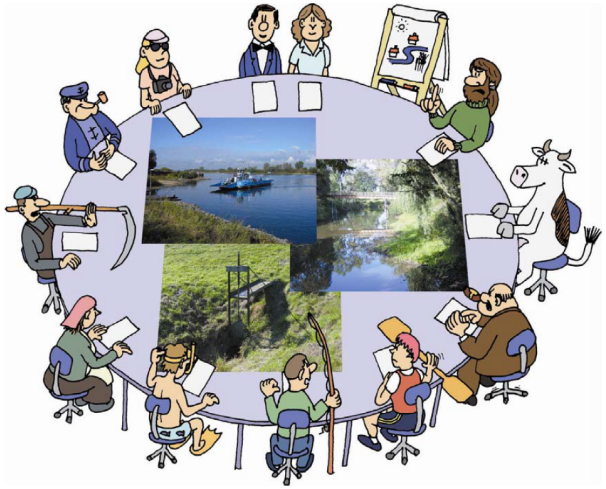
Combination of Governance Modes – Governance Styles

Governance Modes

HIERARCHICAL STYLE



NETWORK STYLE



MARKET STYLE

Integrative Potential of an Ecosystem Services Approach

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Ecosystem Services – TradeOffMatrix

Ecosystem Services (x) → ES-Use (y)	Regulating Services			Provisioning Services			Cultural Services		
	ES1	ES2	ES3	ES4	ES5	ES6	ES7	ES8	ES9
ES-Use 1			–	↘	↘				
ES-Use 2	↗		↗	↗	↗				
ES-Use 3	↘					↘			↘
ES-Use 4		↗	↗		↗				↗
ES-Use 5									↗
ES-Use 6		↘				–			
ES-Use 7		↗	↘	↘		–		↗	
ES-Use 8		↗	↗	–	↘				
ES-Use 9			↗	↗			↘	↘	

From Schweigatz et al 2018, based on Kandziora et al., 2013

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