Multi-Level Learning Processes in (Water) Resource Governance Systems

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Insights developed in context of...

▶ *NeWater (New Approaches to Adaptive Water Management Under Uncertainty)*

▶ *Twin2Go (Coordinating Twinning Partnerships towards more Adaptive Governance in River Basins)*
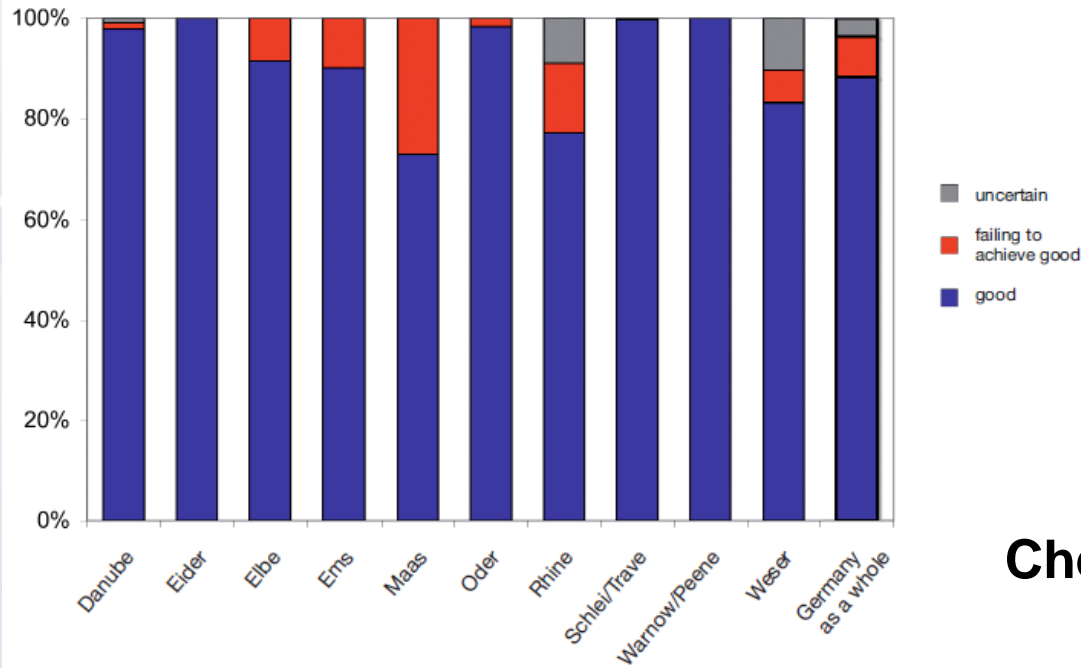
▶ *GWSP (Global Water System Project)*

Tradition of water management

▶ **Command and control paradigm**

▶ **Technical end-of-pipe solutions**

▶ **Narrowly defined problems dealt with in isolation**

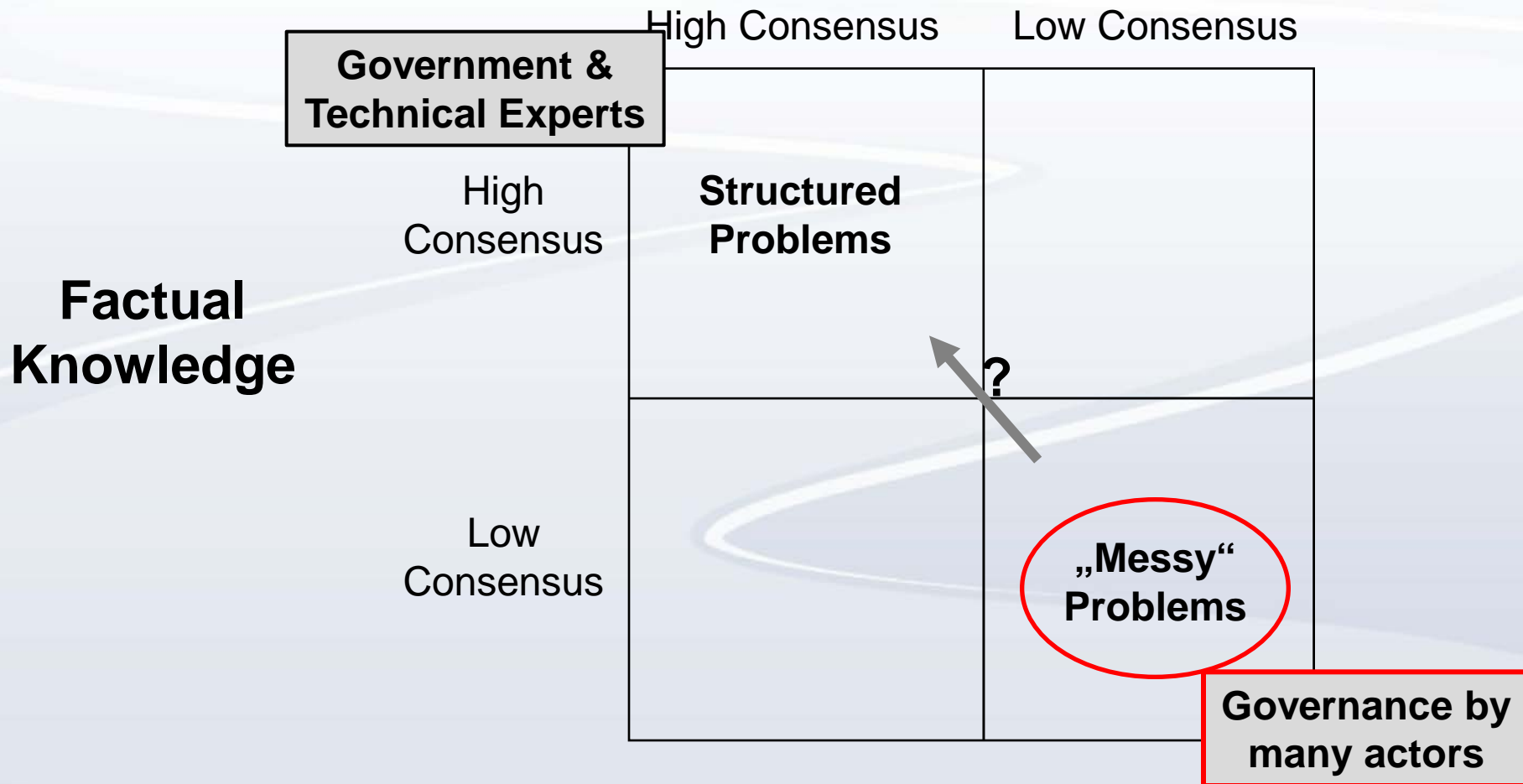▶ **Human dimension as "external factor"**

Ecological Status
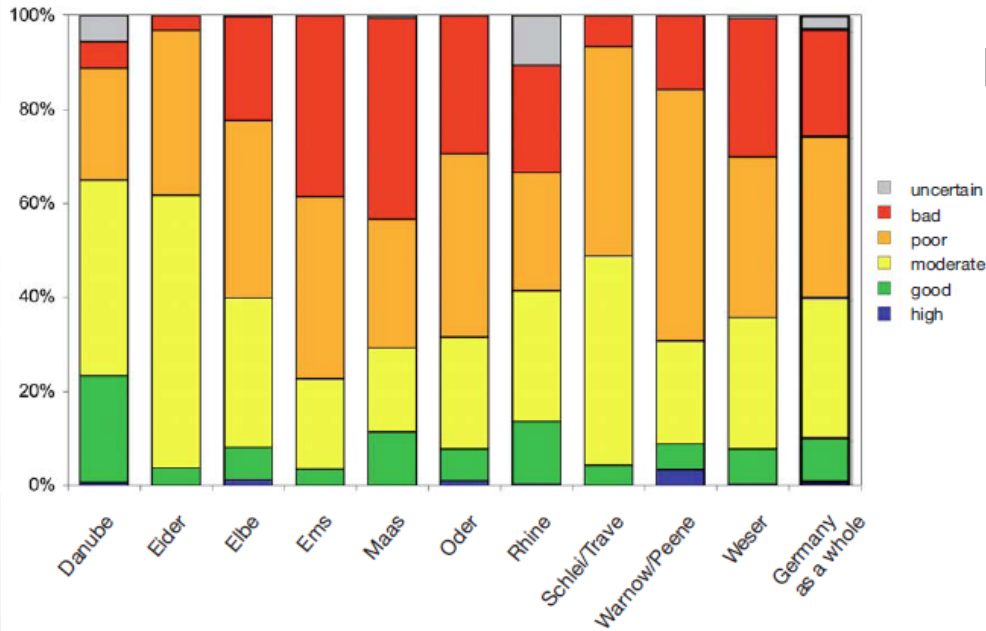
WFD - Classification of Surface Waters in Germany

Chemical Status

Failure to acknowledge messy problems

Values and Goals

	High Consensus	Low Consensus
High Consensus	**Structured Problems**	
Low Consensus		**„Messy" Problems**

Factual Knowledge

Government & Technical Experts

?

Governance by many actors

Paradigm Shift in Water Management

Similarities in paradigm shifts in water management derived from sources published during past decade

- *participatory management and collaborative decision making*
- *increased integration of issues and sectors*
- *management of problem sources not effects*
- *decentralized and more flexible management approaches*
- *more attention to management of human behaviour by "soft" measures*
- *include environment explicitly in management goals*
- *open and shared information sources (including linking science and decision making)*
- *incorporating iterative learning cycles*

Reflections on IWRM – integrated water resources management

▶ **Implementation suffering from legacy of prediction and control paradigm – IWRM as multiobjective optimization problem**

▶ **Claim for mega-bureaucracies and superministries**

▶ **Institutional barriers - sectoral policies not subordinate to water related considerations**

▶ **Integration requires adaptive governance and management**

– **Flexible coordination mechanisms**

– **Ability to respond to unintended consequences of policies**

– **Ability to respond to unpredictable changes in context**

▶ **Legal frameworks are a necessary but not sufficient condition for moving towards integration**
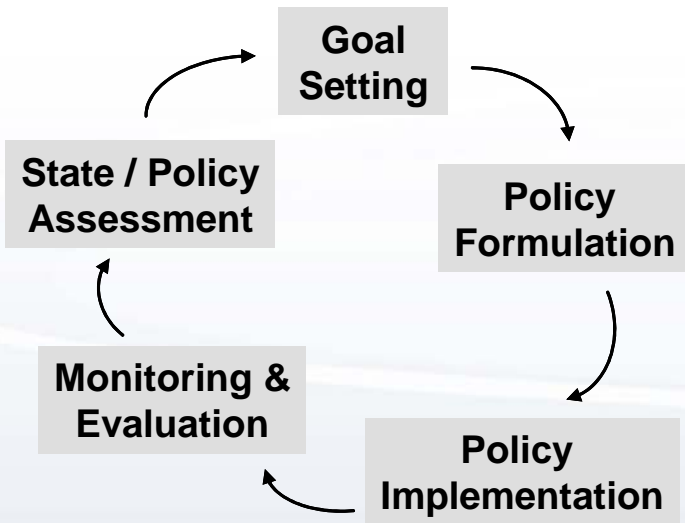
Adaptive Management (AM)

AM is a <u>systematic process</u> for improving management policies and practices by <u>systemic learning</u> from the outcomes of implemented management strategies and by taking into account changes in external factors

AM requires integrated system design to build and sustain enabling <u>structural conditions</u>

AM – process requirements

Policy Cycle Addressing Uncertainties

Goal Setting

State / Policy Assessment

Policy Formulation

Monitoring & Evaluation

Policy Implementation

▸ *Problem definition – take <u>different perspectives</u> into account*

▸ *Design of policies should include <u>scenario analyses</u> - find strategies performing well under different future developments*

▸ *Decisions should be evaluated by <u>costs of reversing</u> them.*

▸ *Implementation should include learning platforms and experimentation in case of high uncertainties*

▸ *Monitoring programmes should include different kinds of knowledge to detect undesirable developments at early stage.*

▸ *Management cycle must include <u>transparent</u> institutional settings where actors assess performance of management strategies and implement change*
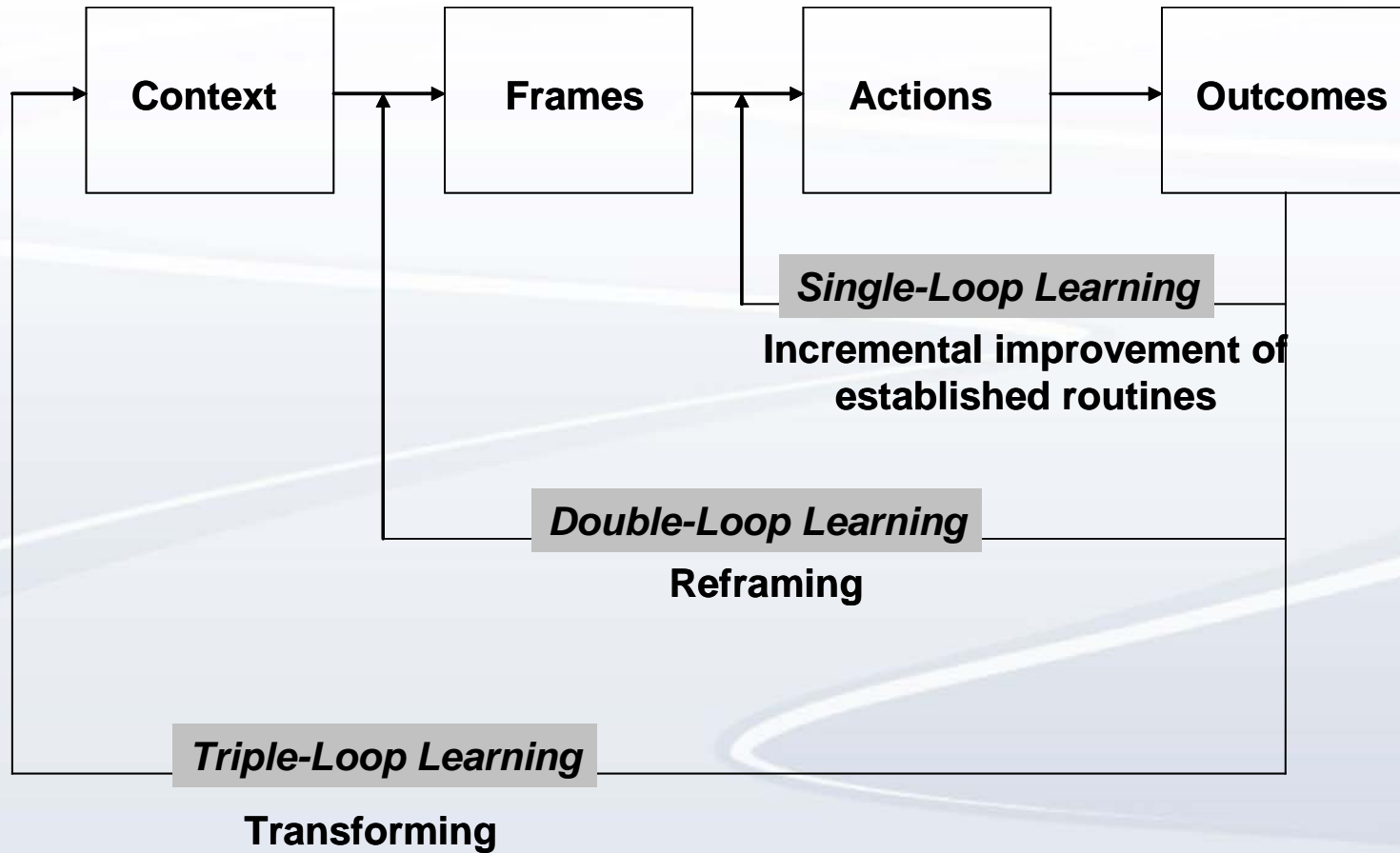
Experience AM Implementation

▶ **Structural conditions as barrier for successful implementation**

– *Institutional inertia due to deeply entrenched norms and dominant practices and behavior*

– *Vested interests in entrenched actor networks*

– *E.g. EU-WFD (Olsson and Galaz, 2009; Pahl-Wostl, et al, 2009); Australia (Allan and Curtis, 2005), US - Everglades (Gunderson and Light, 2006)*

AM – structural requirements

Characteristics of…..

	…..Integrated, Adaptive Regimes
Governance style	Polycentric, broad stakeholder participation
Sectoral Integration	Cross-sectoral analysis identifies emergent problems and integrates policy implementation
Scale of Analysis and Operation	Transboundary issues addressed by multiple scales of analysis and management
Information Management	Comprehensive understanding achieved by open, shared information sources that fill gaps and facilitate integration
Infrastructure	Appropriate scale, decentralized, diverse sources of design, power delivery
Finances and Risk	Financial resources diversified using a broad set of private and public financial instruments

A concept for societal learning

Context → Frames → Actions → Outcomes

Single-Loop Learning
Incremental improvement of established routines

Double-Loop Learning
Reframing

Triple-Loop Learning
Transforming

Pahl-Wostl, 2009

Change along different dimensions

	Single Loop	Double Loop	Triple Loop
Institutions - general	No calling into question of established institutions, signs of unilateral reinterpretation		
Uncertainty and risk management	Uncertainty used to justify non-action. Activities to reduce uncertainties. Reliance on science to find the truth/ a solution.		
Actor Network	Actors remain mainly within their networks – communities of practice Established roles and identities are not called into question		

Develop knowledge base and test assumptions by systematic comparative analyses!

Adaptive Water Management and Policy Learning in a Changing Climate: a Formal Comparative Analysis of Eight Water Management Regimes in Europe, Africa and Asia

Huntjens, Pahl-Wostl et al, 2011
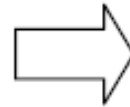*Environmental Policy and Governance*

NeWater Basins
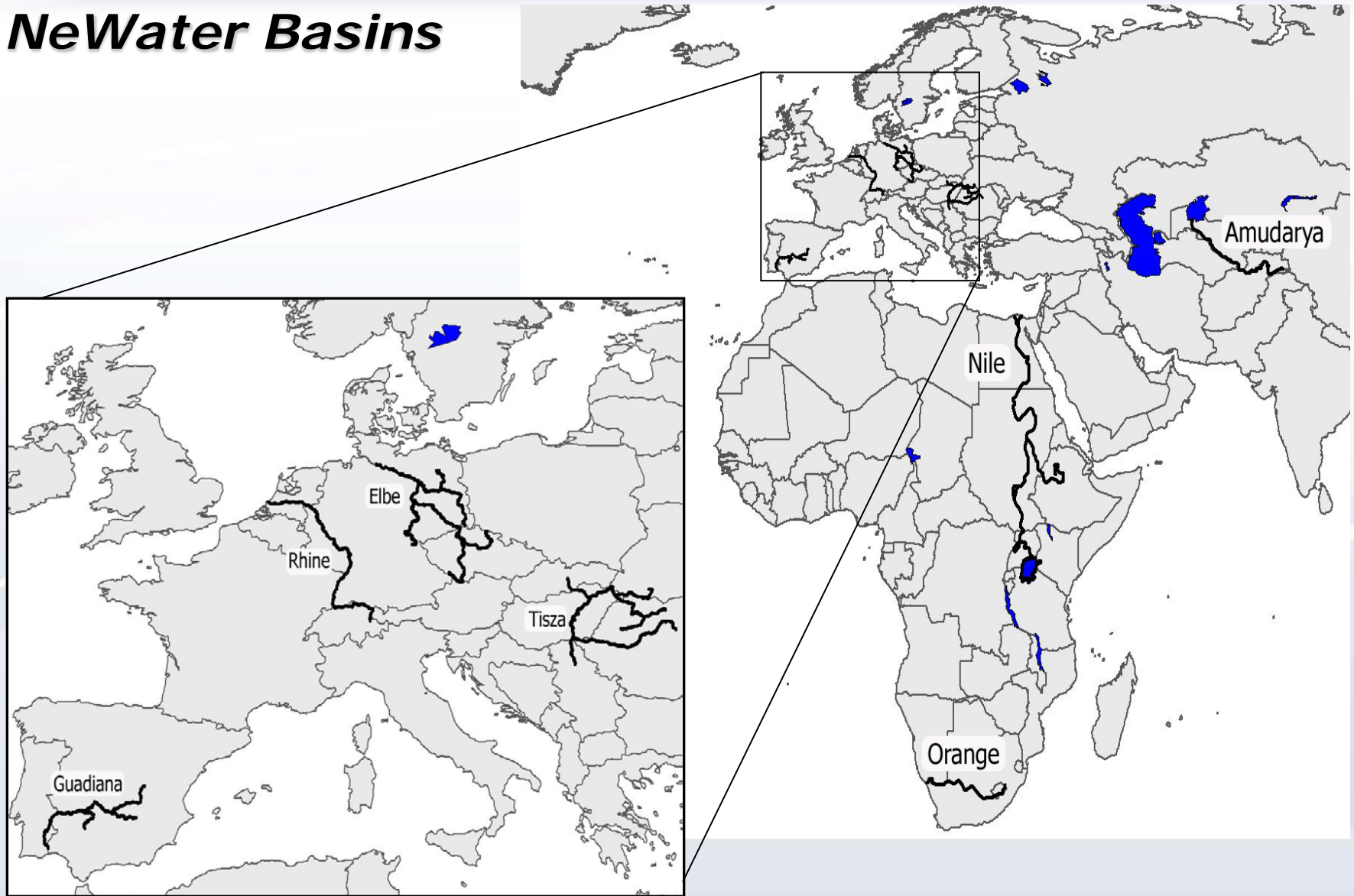
Major Research Question

Do higher levels of Adaptive and Integrated Water Management support a more advanced response in adapting to climate change (focus on) dealing with floods and droughts?

Analytical Framework Comparative Analyses

Knowledge Base - Expert Elicitation

QUESTIONNAIRE

Variable in River Basin Management		Please click on one of the three options				Comments	Please indicate a weight for each indicator				
Category A: Agency							Very important	Fairly important	Important	Not important	Can't choose
		Left is Dominant ←	Medium or In between ↔	Right is Dominant →							
2. Please indicate type of leadership for dealing with climate-related extreme events Please specify in which organization:	Leadership does not mobilize allies	☐	☐	☐	Leadership does mobilize allies		☐	☐	☐	☐	☐
	Leadership does not take advantage of exogenous factors (e.g. political climate)	☐	☐	☐	Leadership takes advantage of exogenous factors (e.g. when political climate is right)		☐	☐	☐	☐	☐
	Barriers are dealt with effectively, causing no serious delays or problems	☐	☐	☐	Barriers are causing serious delays or problems		☐	☐	☐	☐	☐
	Leadership is proactive; anticipates on problems	☐	☐	☐	Leadership is reactive; problems must first occur before taking action		☐	☐	☐	☐	☐
3. Please indicate level of cohesion	Leadership is able to formulate and articulate internally consistent policy preferences	☐	☐	☐	Leadership is not able to formulate and articulate internally consistent policy preferences		☐	☐	☐	☐	☐
4. Please indicate level of authority	Leadership has authority to act externally, in particular the legal competence in given subject matter	☐	☐	☐	Leadership has no authority to act externally; lacking legal competence in given subject matter		☐	☐	☐	☐	☐

Comparative Analyses

1. **Regression analysis between regime characteristics**

2. **Qualitative Comparative Analysis (QCA)**

   - **Standardized evaluation of qualitative case study knowledge medium number of cases (5-50)**

   - **Identification of combination of necessary and sufficient causal conditions which explain an outcome**

Major Results

➢ **Better integrated cooperation structures and advanced information management are the key factors leading to higher levels of policy learning**

➢ **Higher levels of learning are reflected in more advanced adaptation strategies for dealing with floods and droughts**

➢ **AIWM facilitates climate change adaptation**

➢ **Balance between bottom-up and top-down processes required**

From Flood Protection to Integrated Flood Management: A multi-level societal learning process towards sustainability

Pahl-Wostl, Becker, Knieper and Sendzimir, in review

Three National Basins
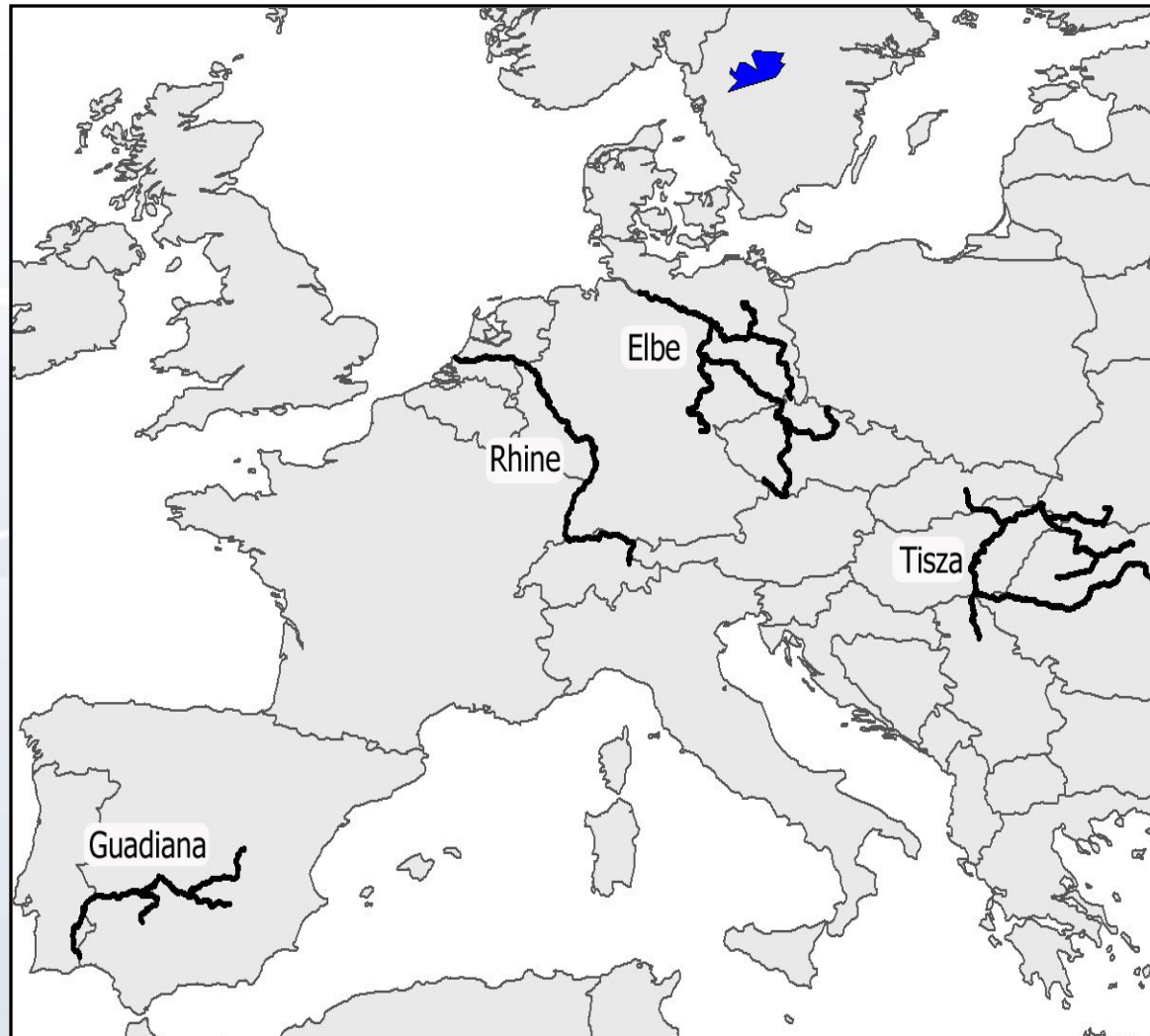
Major Research Goals

Analyse the importance of higher levels of learning for the transition from traditional to integrated flood management.

Test the appropriateness of the triple-loop learning concept to analyse and explain change

Dimensions of analysis

➢ **Multi-level structure and interactions between levels**

➢ **Connections between formal and informal processes**

➢ **Institutional change**

➢ **Actor networks**

➢ **Knowledge Integration**

# *Application of the Management and Transition Framework (MTF)*

The MTF

▸ **is a <u>flexible (methodological) framework</u> to analyse complex water systems and transition processes**

▸ **is applicable in and supports analysis of different environmental and governance <u>contexts</u>**

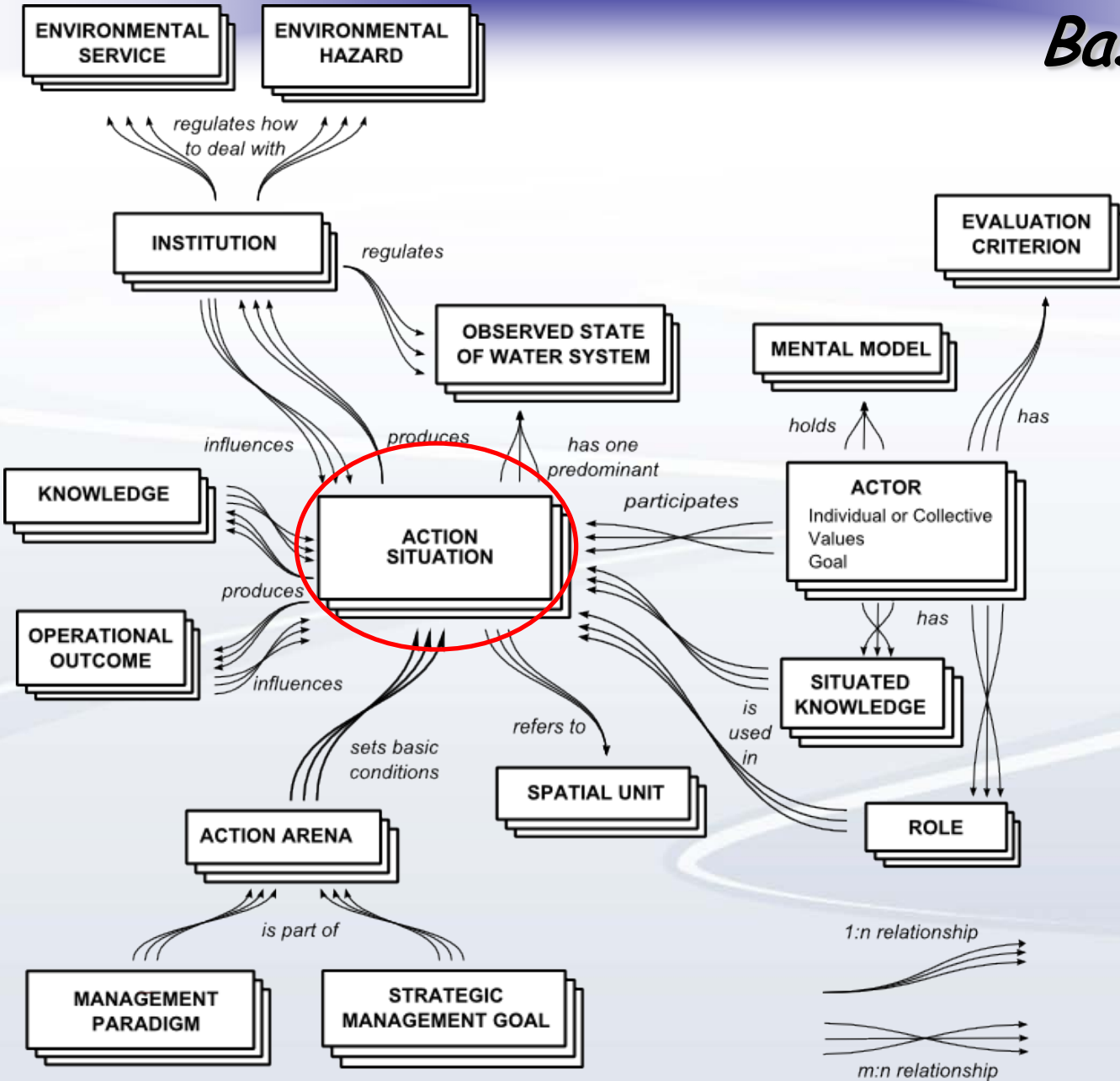▸ **provides base for comparative analysis (<u>standardized language</u>)**
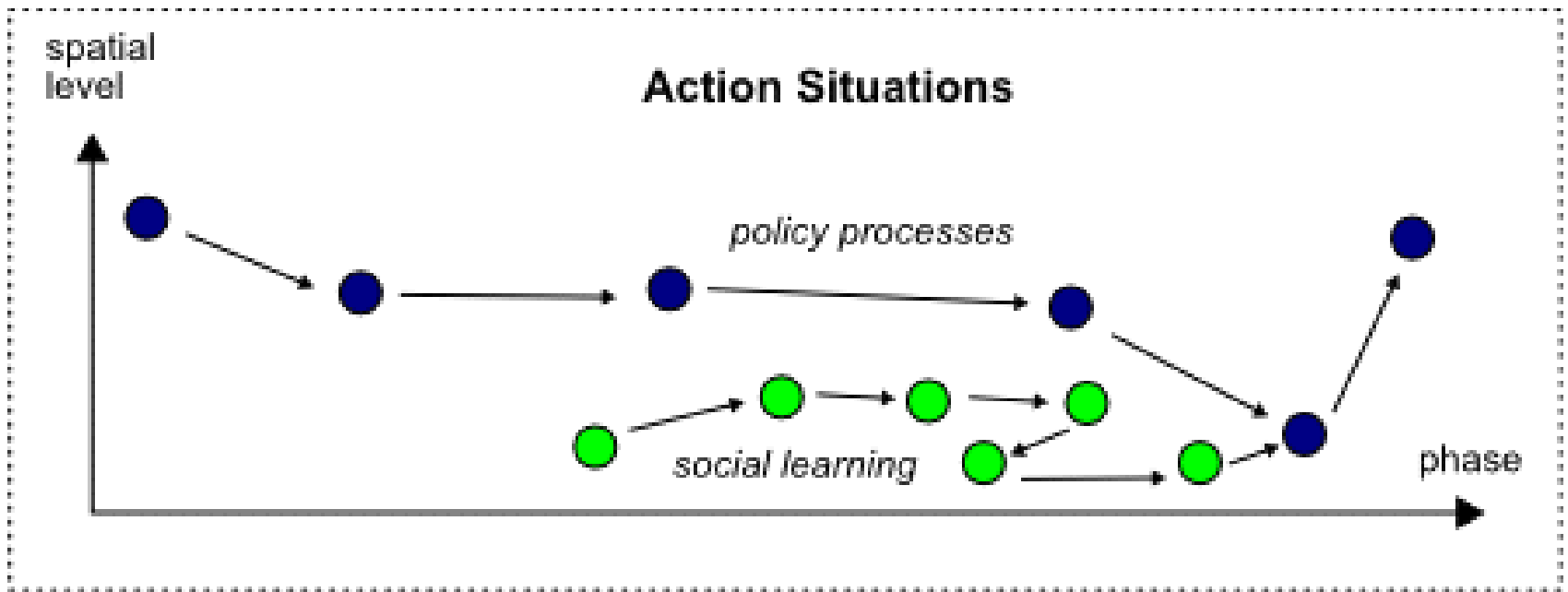
MTF Class Diagram

Pahl-Wostl, et al 2011
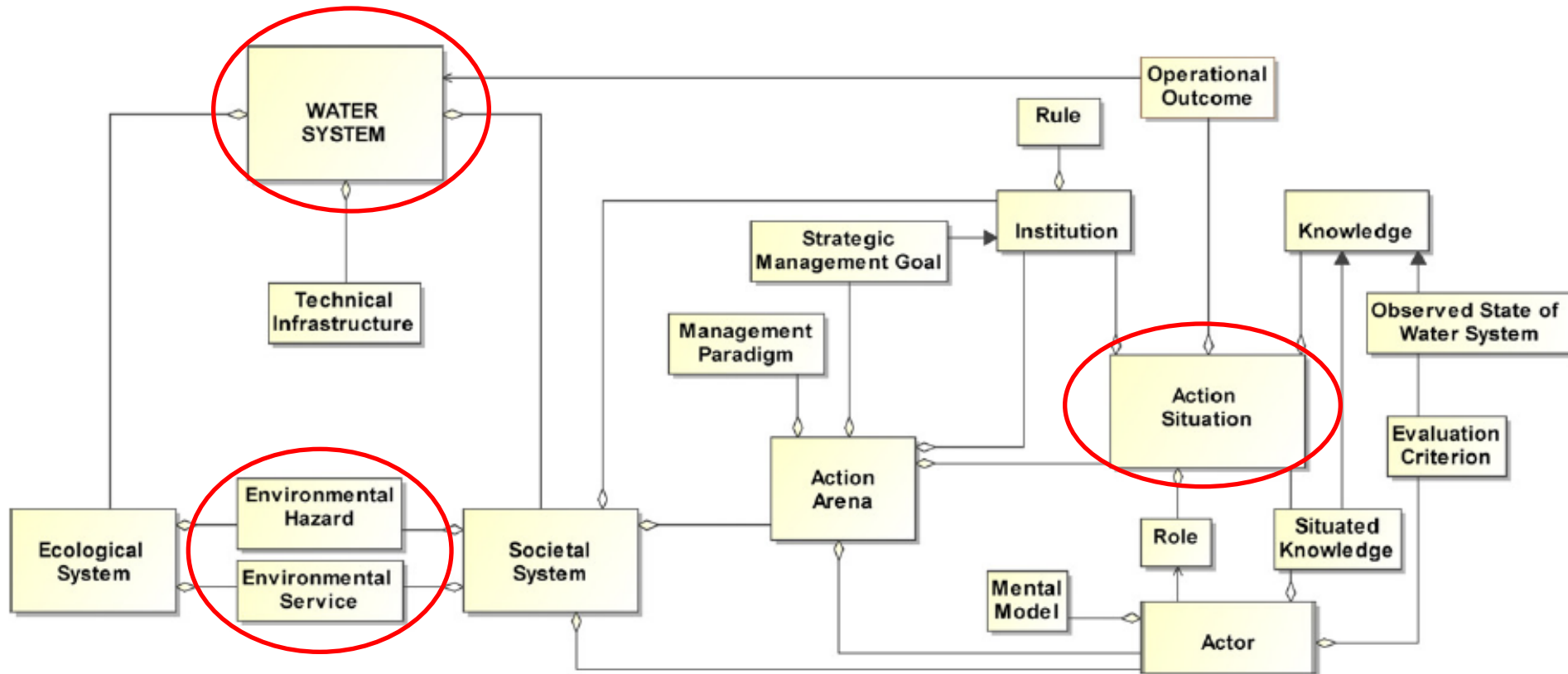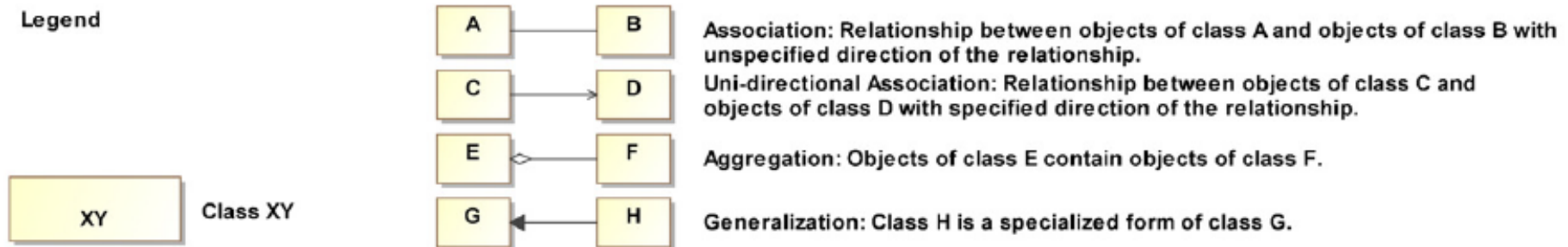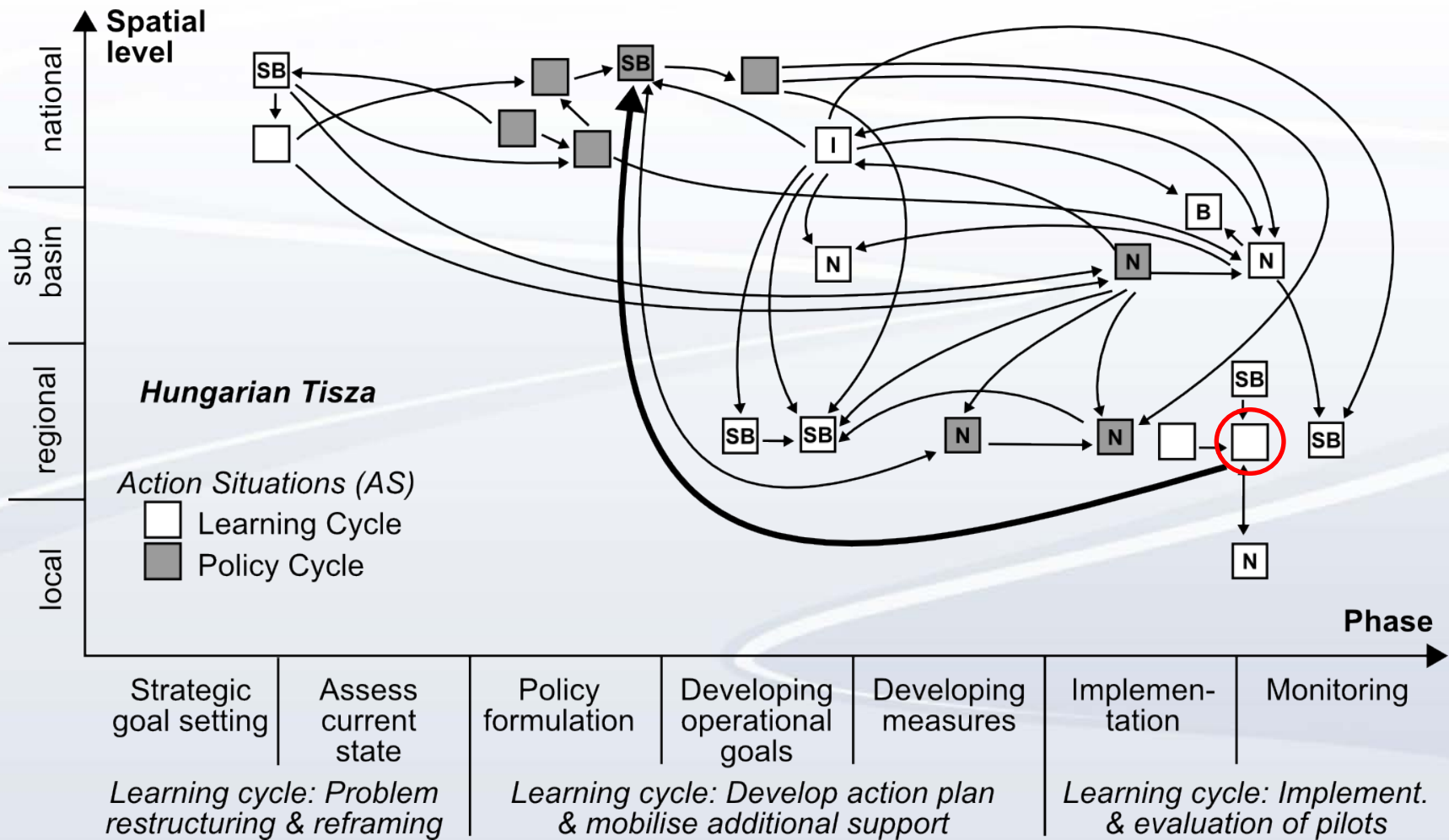
Relational Data Bases

Guidance Books

Muliti-level process representation

Multi-level representation Hungarian Tisza

Some elements of the comparison

	Tisza	Rhine NL	Rhine D
Multi-level interaction	National dominance. Shadow network effective in bridging levels – national, regional, local.	National dominance Key governmental organization (RWS) linking levels.	Federal state with autonomy at provincial level. National level comparatively weak.
Learning process	Driven by informal bottom-up process, shadow network developing around shared mission and new management paradigm.	Effective integration of new insights from expert communities into policy process. Opposition to implementation triggers efforts to increase stakeholder participation	Collaboration NGO and government. Opposition to implementation triggers efforts to increase stakeholder participation.
Learning process outcome	Discourse was advanced but weakly implemented in formal process and practice. ➔ mainly double loop learning with signs of triple loop learning	Advanced in terms of rethinking (discourse), long-term policy and implementation in formal policy and practice. ➔ double loop learning with clear signs of triple loop learning	Discourse emerging but weakly coordinated and implemented in policy and practice. ➔ mainly double loop learning with signs of triple loop learning

Major insights

➢ **Results confirm importance of informal learning and actor networks and their connection to formal policy processes.**

➢ **Enhancing society's capacity to adapt is a long-term process evolving over decades, punctuated by disastrous flood events that promote (or facilitate) windows of opportunity for change.**
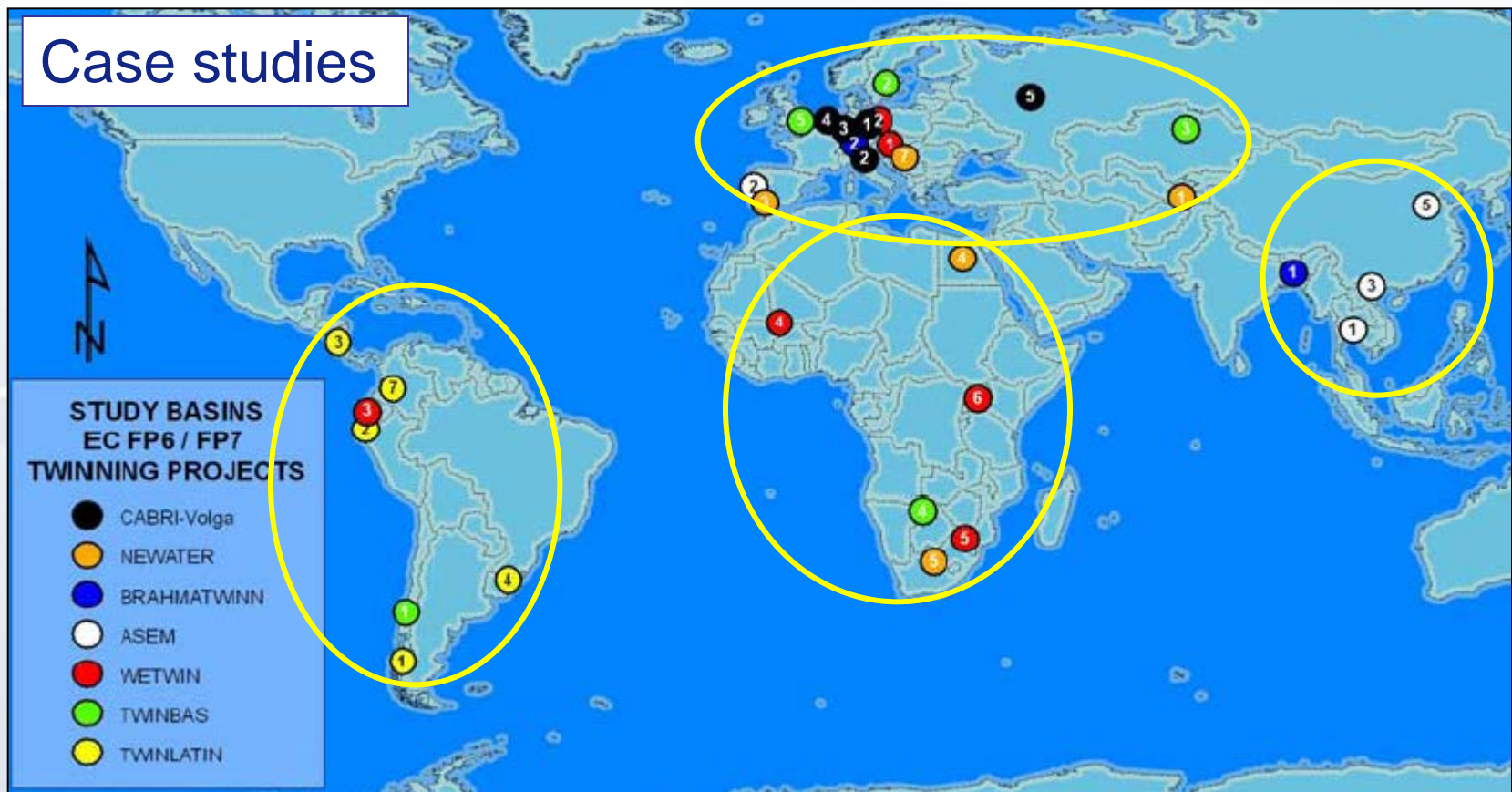
Major Research Question

What is required for adaptive water governance?

How does the performance of water governance systems depend on their characteristics and the context in which they are embedded?

Projects & Case Studies

Synthesis of results from 7 Projects: CABRI-Volga, NeWater, Brahmatwinn, ASEM WaterNet, WETwin, TwinBas, Twinlatin

Framework of analysis for diagnostic approach

CONTEXT
Economic and institutional development
Environmental dimension

GOVERNANCE SYS
Institutional Characteristics
Institutional & legal framework
Actor Networks
    Cooperation and coordination
    Information sharing
Multi-level interactions and cross-s

PERFORMANCE
Progress towards stated sustainability goals (MDGs)
Good governance principles (realized)
Response to Climate Change
State of the aquatic environment
Water Management Practice

…. analyse how certain characteristics of a water governance system influence its performance and how this is affected by the context in which the system is embedded

Twin2Go

Knowledge Base - Twin2Go Questionnaire

▶ 98 indicators - Governance regime, context, performance

A) Water governance regime

No.	Indicator	Score	Comments
I) Characteristics of environmental governance regimes			
a) Water policy, institutional & legal framework (formal and informal)			
1.	Domestic water legislation (laws, by-laws, etc.) in place?		
2.	Domestic Water Law: Public character of water and legal status of water use rights		
3.	Domestic Water Law: Explicit recognition of traditional and indigenous water uses		
4.	Domestic Water Law: On flow availability, third party rights and ecological requirements		
5.	Integration of domestic water legislation		
6.	Multilevel structure of domestic water legislation and subsidiarity		

Guidance

| 6. | Multilevel structure of domestic water legislation and subsidiarity | Allocation of responsibilities and dependencies across levels | More distributed and legally institutionalised functions, responsibilities and power improve performance. | - A
- B
- C | (A) Functions, responsibilities and authority are allocated to various levels
(B) Functions and responsibilities are distributed, but no authority
(C) Legislation only at one level, no distribution at all | http://waterlex.fao.org/waterlex/srv/en/home
see: Administration (differentiated in decentralisation, federal countries, RBM, water user's associations, local administration; FAO/WHO Water Law and Standards Database) |

Comparative Analyses – based on hypotheses

Two complementary approaches

1. **Qualitative examination of hypotheses**

2. **Quantitative statistical modelling**

Some InsightsTwin2Go

➢ *No support for simple recipes (panaceas) for water governance reform*

➢ *Associations between regime features and performance rarely confounded by context – but context important to explain a lot of variation in performance-regime measure associations*

➢ *Transfer of general guiding principles and good practice that still can be tailored to context*

➢ *Advanced forms of climate change adaptation strongly related to polycentric governance, knowledge management and innovative ways for dealing with uncertainty*

➢ *Economic development leads to fulfilling needs of human population but to a much lesser extent of the environment*

Online Data Base

Water Governance Database

The Water Governance Database serves to record case study data from various river basins. The overall aim is to get insights into associations between characteristics of water governance systems and water management performance given different societal and environmental context. On these sites, you can view existing case study data and add further case studies to the database. Furthermore, information is provided about the underlying concept of this database and about about hitherto data collection and analysis.

Please select one of the following options:

1: View case study data	This option allows to view and comment on existing data for case studies that have been recorded in the database.
2: Add a case study	Choose this option if you wish to add data about a new case study or if you would like to continue data collection.
3: About this database	Choose this option to get background information about this database or about hitherto data collection and analysis.

CONTRIBUTIONS WELCOME!!

www.twin2go.eu

Methodological Conclusions

➢ **Different kinds of comparative analyses complement each other**

    ➢ **Qualitative, quantitative**

    ➢ **Individual variables, regime/system properties, typologies**

    ➢ **Expert based knowledge synthesis - primary data collection**

➢ **Formalized – standardized representation of knowledge needed**

Transformation towards and sustaining adaptive water management requires …

…. a balance between decentralization and coordination to avoid both fragmentation and rigid central control

…. an explicit integration of learning cycles into policy and management processes

…. a profound shift in science, policy and management in the understanding what „management" means

…. no panaceas but a "diagnostic approach"

Future research priorities

▶ **Analyse transformative capacity of Water Governance and Management Systems**

    – **Comparative case study analyses using shared frameworks**

    – **Further work on typologies**

    – **Role of ecosystem services**

▶ **Development of context-sensitive policy advice to support transformations towards sustainable water management**

▶ **Build global learning network of transition basins – Global Water Needs Initiative**

Some references of interest

▸   Pahl-Wostl C (2009) A conceptual framework for analysing adaptive capacity and multi-level learning processes in resource governance regimes. Global Environmental Change, 19: 354-365.

▸   Pahl-Wostl C et al (2007) Social learning and water resources management. Ecology and Society 12(2): 5.

▸   Pahl-Wostl, C. et al (2010) Analysing complex water governance regimes: The Management and Transition Framework. Environmental Science & Policy, 13: 571-581.

▸   Pahl-Wostl,C. et al (2011) Maturing the new water management paradigm: progressing from aspiration to practice. Water Resources Management, 25:837-856.

# *Performance in geographic regions*
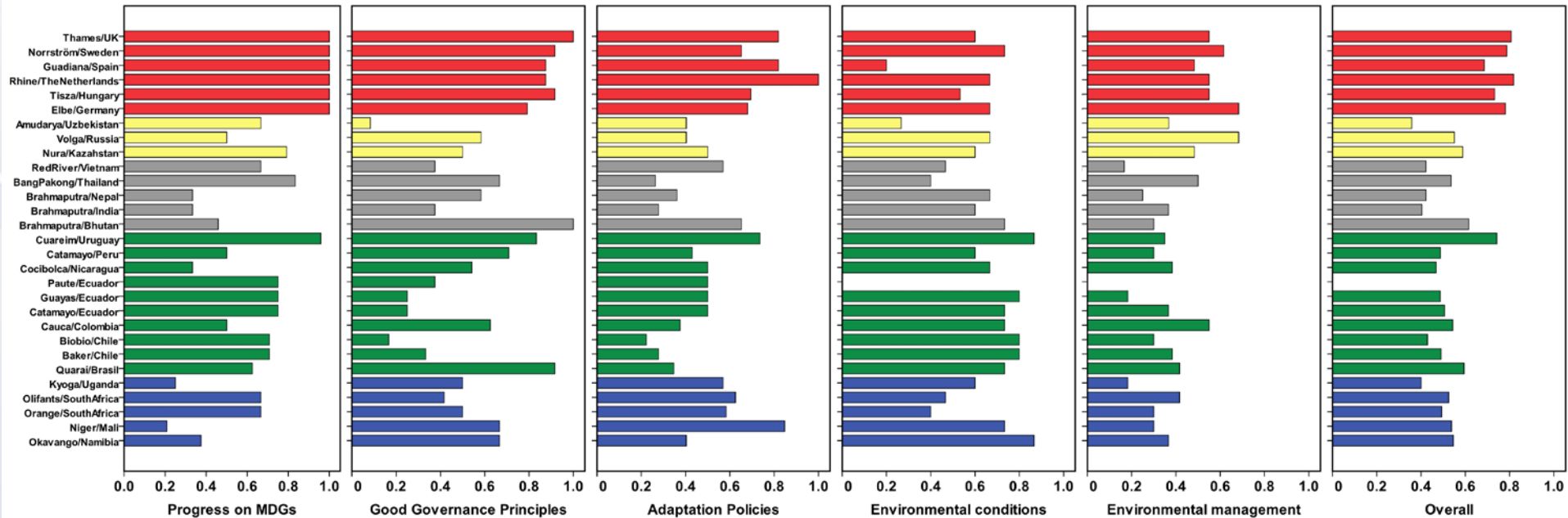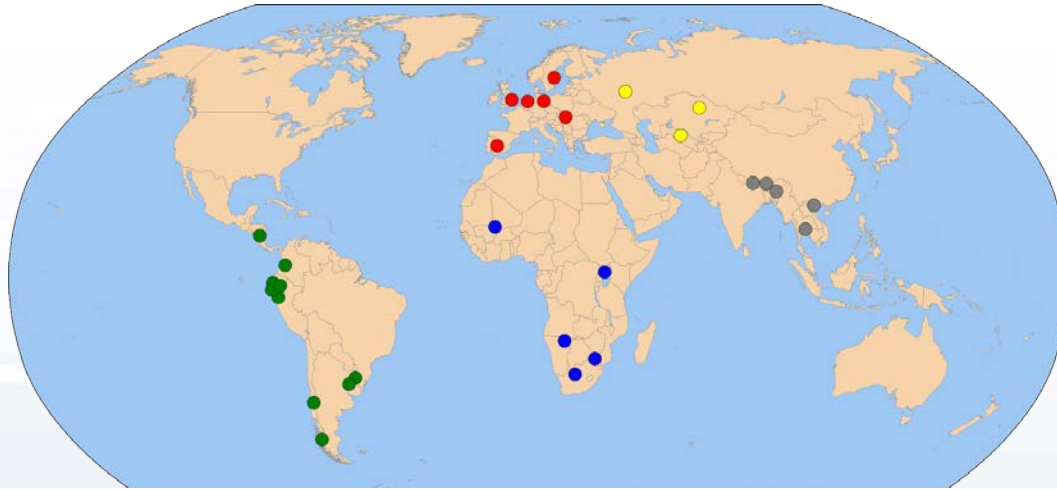
Distinction Governance and Management

DEFINITION (Pahl-Wostl, 2009):

▶ Resources management' refers to the activities of analysing and monitoring, and developing and implementing measures to keep the state of a resource within desirable bounds.

▶ Resource governance' takes into account the various actors and networks that help formulate and implement environmental policy and/or policy instruments. Governance sets the rules under which management operates.

Hungarian Tisza AS network
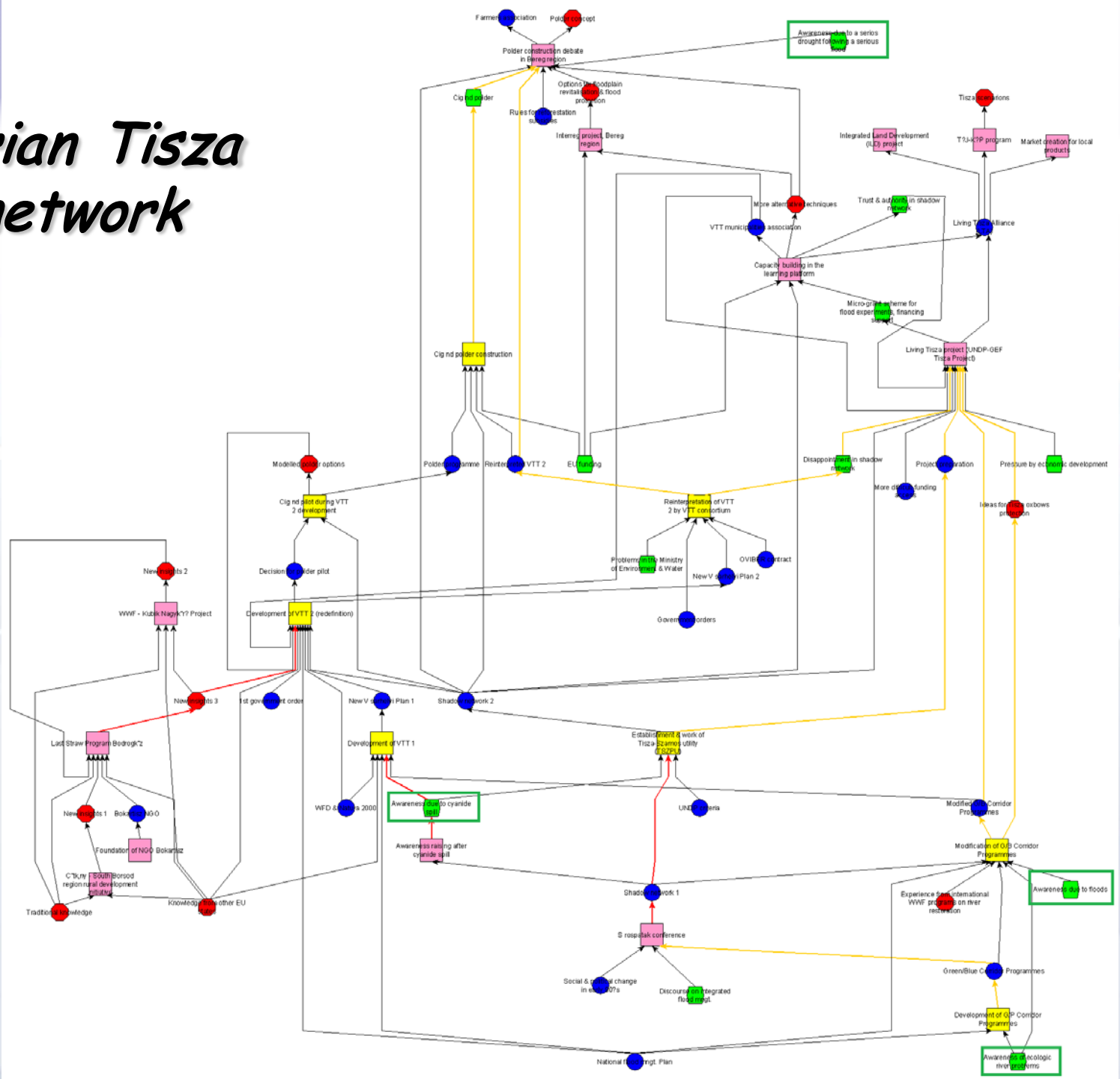
Indentification of Regime Typologies

Table 3 Characteristics of different governance regime types

	Polycentric	Fragmented	Centralized
Distribution of formal power	High	High	Low
Multi-level distribution of functions and resources	High	High	Low
Coordination vertical	High	Low	Low
Coordination horizontal	High	Low	Low
Typical countries - cases	Netherlands	India	Uzbekistan