

The HydroSocial Cycle approach to deepen on socio-ecological systems analysis and water management

Sandra Ricart¹ and Andrea Castelletti¹

¹Politecnico di Milano

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Abstract

Balancing socio-ecological systems among competing water demands is a difficult and complex task. Traditional approaches based on limited, linear growth optimization strategies overseen by command/control have partially failed to account for the inherent unpredictability and irreducible uncertainty affecting most water systems due to climate change. Governments and managers are increasingly faced with understanding driving-factors of major change processes affecting multifunctional systems. In the last decades, the shift to address the integrated management of water resources from a technocratic “top-down” to a more integrated “bottom-up” and participatory approach was motivated by the awareness that water challenges require integrated solutions and a socially legitimate planning process. Assuming water flows as physical, social, political, and symbolic matters, it is necessary to entwining these domains in specific configurations, in which key stakeholders and decision-makers could directly interact through social-learning. The literature on integrated water resources management highlights two important factors to achieve this goal: to deepen stakeholders’ perception and to ensure their participation as a mechanism of co-production of knowledge. Stakeholder Analysis and Governance Modelling approaches are providing useful knowledge about how to integrate social-learning in water management, making the invisible, visible. The first one aims to identify and categorize stakeholders according to competing water demands, while the second one determines interactions, synergies, overlapping discourses, expectations, and influences between stakeholders, including power-relationships. The HydroSocial Cycle (HSC) analysis combines both approaches as a framework to reinforce integrated water management by focusing on stakeholder analysis and collaborative governance. This method considers that water and society are (re)making each other so the nature and competing objectives of stakeholders involved in complex water systems may affect its sustainability and management. Using data collected from a qualitative questionnaire and applying descriptive statistics and matrices, the HSC deepens on interests, expectations, and power-influence relationships between stakeholders by addressing six main issues affecting decision-making processes: relevance, representativeness, recognition, performance, knowledge, and collaboration. The aim of this contribution is to outline this method from both theory and practice perspective by highlighting the benefits of including social sciences approaches in transdisciplinary research collaborations when testing water management strategies affecting competing and dynamic water systems.

HS1.2.1 Role of hydrology in policy, society and interdisciplinary collaborations: across disciplines and beyond scientists

Conceptual framework

Stakeholders' competing objectives affect the **management and governance** of socio-ecological systems.

The **HydroSocial Cycle (HSC)** considers that **water and society are (re)making each other**, and its **management** needs **social-learning** and **mutual understanding**.

Starting from **Stakeholder Analysis** and **Governance Model approaches**, we **re-think HSC** by deepening on **stakeholders' roles, expectations, and perceptions** by addressing **six issues**: relevance, representativeness, recognition, performance, knowledge, and collaboration.

Data collection → Questionnaire

11 qualitative questions
Closed-ended and multi-choice
Likert scale

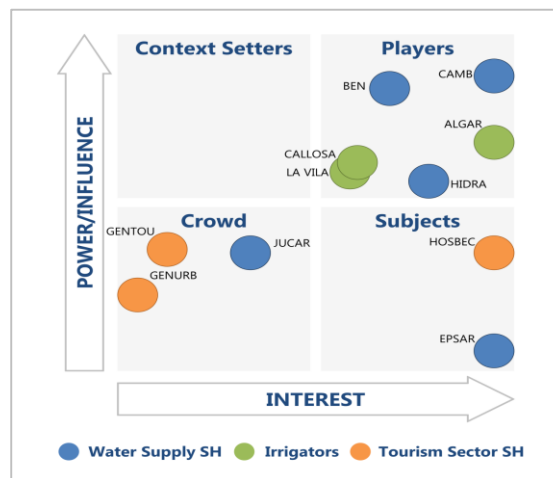
Data analysis → Descriptive statistics and matrices

6 issues

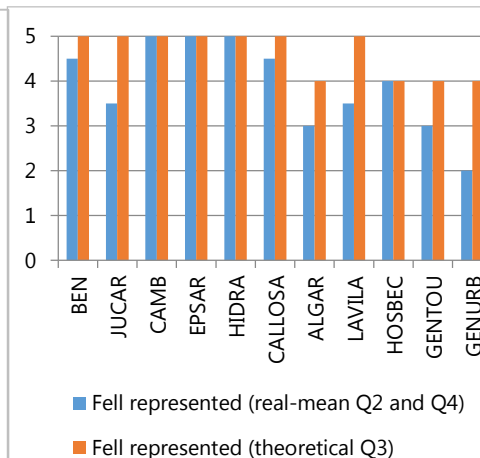
Relevance: Power/interest, and actions developed by each SH
Representativeness: Involvement and participation of each SH
Recognition: Bilateral valuation and importance between SH
Performance: Bilateral under/overvalued assessment between SH
Knowledge: Bilateral (lack of) background on SH' role and actions
Collaboration: Current and potential agreements between SH

Sandra Ricart and Andrea Castelletti
Politecnico di Milano
sandra.ricart@polimi.it

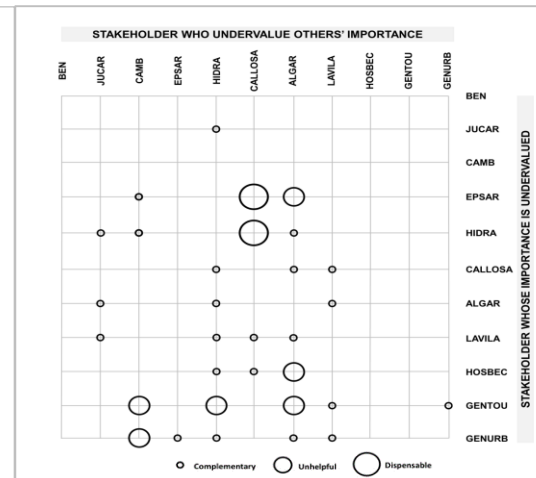
Relevance



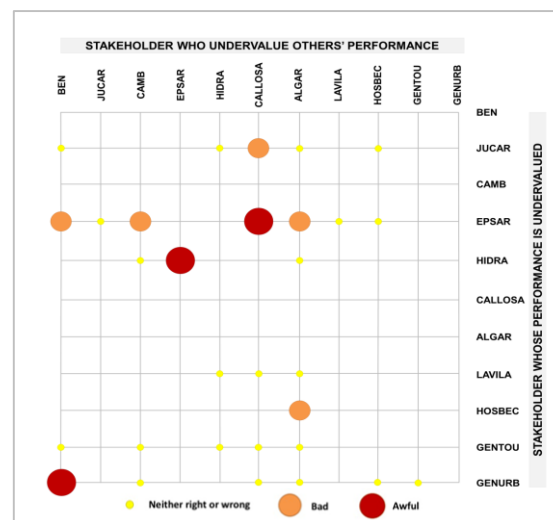
Representativeness



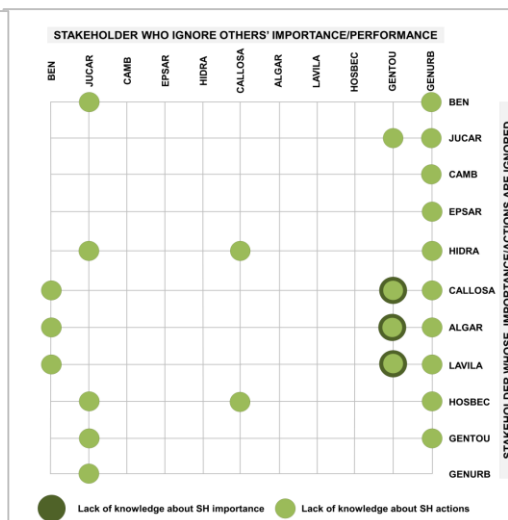
Recognition



Performance



Knowledge



Collaboration

