



# Multi-Loop Social Learning for Sustainable Land and Water Governance: Towards a Research Agenda on the Potential of Virtual Learning Platforms



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## ABSTRACT

Managing social-ecological systems and human well being in a sustainable way requires knowledge of these systems in their full complexity. Multi-loop social learning is recognized as a crucial element to sustainable decision-making for land and water resources management involving a process of managing change where the central methodological concern is with effectively engaging the necessary participation of system members in contributing to the collective knowledge of the system. Ensuring the inclusion of the community of concern may help to ensure robust knowledge, the necessary plurality of views, responsibility sharing and trust enhancement. This will also provide more dynamic lines of input to problem solving: local and changing forms of knowledge, emerging concerns and constraints all feed into an ongoing decision-making process. This conceptual paper is focused specifically on identifying the key drivers and conditions that facilitate multi-loop social learning and the untapped potential of virtual learning platforms in this context. The hyper-connectivity that characterizes digitally mediated networks opens up significant possibilities for information exchange, knowledge creation, feedback, debate, learning and innovation, social networking, and so on. This paper provides a thorough literature review of the conditions and affordances that are conducive to multi-loop social learning in the context of sustainable land and water governance. The insights from this review confirm the potential of a 'learning ecology' or virtual learning platform for knowledge co-production, trust building, sense making, critical self-reflection, vertical and horizontal collaboration, and conflict resolution, while serving as a facilitating platform between different levels of governance, and across resource and knowledge systems. To conclude this paper, a developmental research agenda is proposed to refine and improve understanding of multi-loop social learning processes and their effective facilitation through virtual learning platforms.

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## 1. Introduction

The overall purpose of this paper is to provide a thorough literature review of the conditions and affordances that are important to facilitate multi-loop social learning. Subsequently, a research agenda is proposed that focuses on the so far relatively untapped potential and opportunities of virtual learning platforms to facilitate multi-loop social learning processes that address the complex, multi-dimensional challenges to sustainable land and water resources management. Multi-loop social learning is increasingly viewed as a crucial element to sustainable decision-making in the field of land and water resources management, involving ongoing reflection, not only on objectives, actions and outcomes but also on the interactive process and individual and group learning that takes place during this process [1–7]. The sustainable governance of land and water resources has become one of the major challenges for environmental policy in the 21<sup>st</sup> century due to factors such as population growth, climate variability and uncertainty, regulatory requirements, and transboundary considerations [3,8–11]. Addressing the challenges posed for sustainable resource governance is hampered by serious knowledge gaps and the lack of a sound conceptual base to understand learning and change in multi-level governance regimes [3,12–14]. In this light, more emphasis has to be given to network governance and processes of social learning [5,15,16].

Despite decades of research into sustainable governance systems, there remains a gap between theory and practice [17]. Multi-stakeholder collaboration and multi-loop social learning processes have been recognized as key elements to understanding and developing collective commitment and capacity to tackle increasingly complex problems with innovative and creative solutions [18–20]. Learning processes in particular have increasingly become the focus of much social-ecological systems literature with emphasis on social learning and self-organized learning processes through collaboration, joint decision-making and multi-stakeholder arrangements (e.g. [1,2,4,5,21,22]). The ability of regional and local collaborative groups and networks to: (a) integrate different sources of knowledge; (b) undertake iterative and transformative planning and management change in response to new learning and information; and (c) to ensure that there is an impact from such collaborative efforts, are key potential areas for effective facilitation of sustainable land and water governance [18,19,23].

In this light, it is essential to recognize multi-loop social learning as a process of managing change, where the central methodological concern is with effectively engaging the necessary participation of system members in contributing to the collective knowledge of the system with the aim to generate more sustainable policy choices for land and water resources management [1,15,24]. Although social learning is increasingly viewed as crucial for the transition to more sustainable land and water resources governance, not much effort has yet been put into defining how to achieve this in a practical sense [25]. And although there seems to be a shared understanding of some of the key aspects of social learning, its outcomes and contributions to sustainable land and water resources management, the academic literature neglects to reflect an unambiguous specification of multi-loop social learning as a process, as well as to

provide strong empirical evidence on the role of social learning in decision making regarding land and water resources [e.g. [1,26,27].

In other words, not much is known about how to effectively facilitate social learning processes, about whom to involve and to what extent [2,15]. In addition, the required horizontal links (between local actors) and vertical links (navigating the larger environment) between relevant organizations, institutions and knowledge systems have received relatively little attention [21,28–31]. It is crucial, therefore, to develop a much greater understanding of whom to involve in social learning processes and how to effectively facilitate multi-loop social learning processes while taking into account the vertical and horizontal linkages among learners and learning communities. Additionally, it is important to develop greater specificity when it comes to learning expectations and processes in policy making and in natural resource management practices if learning processes are to be linked to learning outcomes [5,26]. Clearly articulated learning goals are fundamental to effective monitoring and evaluation of learning outcomes [32,33].

When it comes to promoting and intensifying the application of social learning, participatory learning platforms need to be established where individuals can meet, interact, learn collaboratively and take collective decisions [27]. Although there is evidence that participatory processes may stimulate and facilitate social learning [34] it cannot be automatically assumed that collaboration implies that social learning takes place [35]. In order for social learning to occur when stakeholders are brought together to deal with their differences and collaborate, it is crucial to nurture opportunities for learning [26]. Reed *et al.* (2010) state that there have been numerous examples of supposed social learning projects that simply facilitated stakeholder participation and collaboration, but that have not shown clear empirical evidence of multi-loop social learning.

Reed *et al.* (2010) also suggest that for multi-loop social learning to occur, a change in understanding and behavior must take place in the individuals involved. Subsequently, for a phenomenon to be described as social learning, it must demonstrate 'a change of understanding that takes place amongst both individuals and small groups to become situated within and diffused to wider social units or communities of practice'. Ultimately, however, it is critical to note that it is not just the change in understanding or the scale at which it takes place that denotes social learning, but also the mode of social interaction through which learning occurs [1]: (i) information transmission (i.e., simple learning of new facts through social interaction); and (ii) deliberation (referring to dialogue and a genuine exchange of arguments). These social interactions may take place directly (e.g., conversation) or indirectly (e.g., social media, telephone, or Web 2.0 applications).

Most research on collaborative approaches to social learning for sustainable land and water management [36,37] focuses on face-to-face interactions. A vexing issue remains who participates and how do different actors and stakeholders acquire the right or ability to participate in learning processes. It is crucial to give a much greater amount of attention to the potential of innovative learning environments that enable different segments of heterogeneous communities an opportunity to transform traditionally disadvantageous power relations and engage in truly collaborative social learning [2] thus democratizing the decision-making process [38].

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