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SOCIAL LEARNING AS A KEY ELEMENT IN PARTICIPATORY ENVIRONMENTAL MANAGEMENT PROCESSES

APRENDIZAGEM SOCIAL COMO ELEMENTO CHAVE NOS PROCESSOS DE GESTÃO AMBIENTAL PARTICIPATIVA

EL APRENDIZAJE SOCIAL COMO ELEMENTO CLAVE EN PROCESOS DE GESTIÓN AMBIENTAL PARTICIPATIVA

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Abstract

This essay conceptualizes 'social learning' in contrast with other theories of learning. Here we present some principles and key elements found in participatory processes based on social learning, which could guide the design of related activities in this type of process. Moreover, we indicate some learned lessons and challenges derived from the analysis of cases of participatory processes associated with the collaborative management of natural resources in which social learning was monitored. In sum, we present a panorama that shows the strategic connection between participatory processes, social learning, and environmental management.

Keywords: Social learning, participatory processes, environmental management.

Resumo

Este ensaio conceitualiza a 'aprendizagem social' em contraste com outras correntes teóricas da aprendizagem. Apresenta princípios e elementos chave encontrados em processos participativos apoiados pela aprendizagem social que podem orientar o desenho de atividades ligadas a esses processos. O texto também aponta algumas lições aprendidas e desafios a superar derivados da análise de casos de processos participativos associados à gestão colaborativa e ao manejo de recursos naturais em que a aprendizagem social foi monitorada. Em resumo, é apresentado um panorama que mostra a ligação estratégica percebida entre processos participativos, aprendizado social e gestão environmental.

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Palavras-chave: Aprendizagem social, processos participativos, gestão environmental.

Resumen

Este ensayo conceptualiza el 'aprendizaje social' en contraste con otras corrientes teóricas del aprendizaje. Presenta principios y elementos clave encontrados en la revisión de procesos participativos apoyados en el aprendizaje social que podrían orientar el diseño de actividades vinculadas a estos procesos. Señala además algunas lecciones aprendidas y retos a superar derivados del análisis de casos de procesos participativos asociados al manejo colaborativo y la gestión de recursos naturales donde el aprendizaje social ha sido monitoreado. En resumen, presenta un panorama que muestra la vinculación estratégica percibida entre procesos participativos, aprendizaje social y gestión ambiental.

Palabras clave: Aprendizaje social, procesos participativos, gestión ambiental.

Introduction

Our global socio-ecological context presents different kinds of crisis – environmental, economic, social, political, spiritual – which are perceived as a "civilization crisis" (Leff, 2009). It has been intensified, by the economic model and consumerism practices of a civilization based on the over-exploitation of natural resources, to keep the growth of continuous and unlimited development. This situation is unsustainable and even dangerous in complex systems like the earth, with its limits and finite resources (Meadows, 2004; García, 2004). The crisis will grow if unsustainable consumption continues and it will be harder to guarantee the subsistence not only of the future generations but also of present vulnerable communities who day by day face the struggles associated with the current planetary crisis (García, 2006).

The effect of this civilization crisis is translated as a set of socio-ecological issues that are characterized by complexity and uncertainty, where a problem becomes the symptom of other problems and so on (Kim, 2014). In order to discuss this, it is necessary to increase our capacity to work with diverse perspectives, learning how to integrate different kinds of knowledge and interests implicated in the situations which we are trying to solve (Pahl-Wostl, 2002; Schusler et al., 2003; Woodhill, 2003). In order to work with diverse perspectives, a complex approach is needed. This is different from the (reductionism and fragmented) disciplinary view that has characterized the modern normal science (Morin, 1999; Gadotti, 2002; Leff, 2009).

The disability of governments to attend contingencies that are manifested at all levels adds to the urgent socio-environmental crisis and the need of integrative approaches (Ison et al., 2004; Röling and Maarleveld, 1999; Röling, 2002). The socio-environmental crisis increases the need to imagine and build other ways of governing, in which social participation has a central role (Pacheco and Vega, 2001). Horizontal and inclusive forms of government are required to exercise the power to decide and act on the territories, learning to govern with others (Garmendia and Stagl, 2010). The challenge to transit towards these forms of government implies learning to create a platform of constructive dialogue, capable of integrating different actors and social groups, where decision-making processes and collective actions to solve complex socio-environmental situations become main tasks. The way towards participative governance, where diverse social actors assume the co-responsibility of natural resources' management, is thus crucial as it allows new models of shared territorial management to be enacted (Bouwen y Taillieu, 2004; Tippett *et al*, 2005).

Models of participatory environmental management include pertinent processes in which to practice collective decisions and actions (Buck *et al.*,2001). Multi-actor negotiation and deliberation processes offer evidence of the central role played by social learning (Roling, 2002; Kim, 2014). The successful response to problems depends on the capacity exerted by decision makers to effectively coordinate themselves at different levels and scales, including multiple stakeholders in the deliberative (Allen, 2018). These capacities can be implemented in participative spaces with special attention to processes that integrate social learning. This essay is about the participatory process

linked to the management of protected natural areas, where social learning is perceived as a key element in the facilitation of participatory environmental management.

Social learning is promoted by horizontal dialogue between diverse actors who attempt to learn collectively and solve problems. It could be a pathway through which different actors, including governments, could be articulated by means of common interests and motivations. Social learning offers the chance to work with and from diversity in the search of different ways to organize experiences of shared territorial management.

A possible application of social learning in participatory environmental management consists of using it to generate dynamics that do not reproduce vertical or authoritarian forms of government and organization. This may prevent conflicts and discomfort that may result from this type of intervention. A specific example of this kind of politics is the establishment of protected natural areas in Mexico. The lack of public consultation and citizens' participation in the decision and management of these places lead to the consideration of vertical and excluding powers in their support. This perception is based on the fact that orders are not based on participatory assessments that support the decision making and the shared management of natural areas.

In this essay, social learning is conceptualized against other theoretical strands of learning. We present the principles and key elements that are found in participatory processes supported by social learning. We also discuss the main research perspectives on social learning processes, particularly, in the environmental management field. These perspectives show how social learning has been studied, taking into account its context, influence focus, levels of analysis and assumptions. We finalize by describing cases where social learning has been monitored in participatory processes associated with collaborative management of natural resources. We derive from the cases some learned lessons and challenges that must be overcome. We thus present an overview that shows the strategic link between social learning and participatory environmental management.

What is social learning?

The concept of social learning has long and diverse historical origins (Kilvington, 2007). For instance, in pedagogy (Miller and Dollard, 1941) and in behavior psychology (Bandura, 1977), social learning is associated with the learning happening when the subject is observing and imitating behaviors, attitudes and emotional reactions from others. Here the learning focus lies on individual adaptation based on the social relations that are established with others; we learn from observing the behavior of others and interacting with them in a social context. In the field of planning and public politics, social learning is used to refer to the learning that occurs in social affairs (Maarleveld and Dangbégnon, 1999), acknowledging its importance in collective decision-making. In this study field, it is associated with organizational learning (Argyris and Shön, 1978) which studies the ways the organizations learn as groups and how they change as a result of their learning.

Regarding the environmental management field and the sustainable management of natural resources, authors like Kenn et al. (2005), Wals et al. (2009), Cundill (2010), Reed et al. (2010), among others, use the social learning concept to study processes of change in which people not only learn from the direct interactions with one another, but also learn from the indirect interactions between individuals and their environment (Muro y Jeffrey, 2008). In this sense, the benefits of social learning transcend the immediate relations and go beyond the individual to reach higher social levels. Nevertheless, it is important to emphasize that so far there is not much literature clearly describing how it is possible to achieve these social transformations starting with participatory processes with a social learning approach (Garmendia y Stagl, 2010a). More research is needed to deepen our understanding of social learning process, its worth and function in participatory environmental management, as well as how these processes can be improved (Kim, 2014).

As an attempt to find ways to identify and distinguish "social learning" from its basic form, Bawden, Guijt and Woodhill (2007) choose to use the term "societal learning", or "learning in society", in their article "The critical role of civil society in fostering societal learning for a sustainable world". With this term, they intend to move away from the simplistic notion on group learning, referring to a wider social scale, which takes into account the collective capacity of societies or communities to learn and address important matters related to sustainability and social transformations. According to these authors, any social change requires some kind of learning; the important matter here is how to turn "social learning" into more critical, self-reflective, transformative and effective processes. The first step, according to these authors, is increasing the comprehension of our learning processes and finding ways to enhance its quality and development.

The review of studies on participatory environmental management allows us to identify other ways to refer to collective learning and how its benefits go beyond individuals. We can find terms like collaborative learning, collective learning, interactive learning, transformative learning, adaptive learning, to mention a few. These terms indicate inherent characteristics to the learning process in its wider sense. In our case, we consider it important to maintain the term "social" with the clarification that this makes reference not just to the context where learning occurs, as it is indicated in areas such as pedagogy and behavior psychology, but to the fact that through the interaction between individuals and their environment learning can impact on greater units of analysis (groups, communities, societies, social-ecological systems) and be materialized in the transformation of the practices. In this sense, social learning is not just about group work, but it is about the process that helps social groups construct knowledge and strengthen capacities involved in dialogical exchanges, negotiation, decision-making and collective action.

In the field of participatory environmental management, social learning is viewed as a process whereby a group of people make decisions through constructive dialogue and also through conflicts (Tippett et al., 2005; Toderi et al., 2007). In these processes, several areas of opportunity can be identified, shared values can be worked constructively and processes can be implemented in order to negotiate, deliberate and solve conflicts. In sum, social learning is promoted when different actors gather to consider their distinct opinions, acknowledging the place of shared learning in complex situations and allowing for open dialogue and common directions to be built.

In the last decades, the interest to explore the scope of social learning in participatory environmental management has increased (Buck et al. 2001, Schusler et al. 2003, Ison and Watson 2007, Mostert et al. 2007). Today, social learning is recognized as a concept that responds to the growing need to understand how different social actors (planners, political leaders, organized civil society, academy, entrepreneurs) and their knowledge (scientific, traditional knowledge, etc.) contribute to better decisions and actions to solve complex problems (Kilvington, 2007). Therefore, social learning provides an analytic frame that can be used to facilitate the decision- making processes and collective actions aimed to set the models for shared environmental management (Buck et al. 2001; Pahl-Wostl and Hare 2004; Keen et al. 2005). In this sense, social learning acquires meanings that connect it to the active participation in a group, in pursuit of the social transformation needed to strengthen our societies and forms of government.

What are the principles that support participatory processes from a social learning perspective?

Social learning is described by Wals et al. (2009) as a long-term process constituted to create a "learning system" in which people learn in a group from the interactions between each other and the environment (Muro and Jeffrey, 2008). This process has, as a result, the capability to make space for errors and confront the insecurity, complexity, and risks that dealing with a changing reality represent. Working with an approach of social learning requires not only to accept the differences of others, but to use them in order to learn from them and create solutions. This perspective shows its relevance as an analytic reference to approach complex social-ecological issues, as it is a perspective that promotes reflection (Bouwen y Taillieu, 2004), creating spaces that open new perspectives and common actions.

In the publications "*Social learning. Towards a sustainable world*" (2007) and "*The acoustics of social learning*" (2009), Wals provides some key attributes that can be linked to social learning in order to distinguish it from other learning processes. Based on his articles it is relevant to point out that:

- It is about learning together (with each other) and taking diversity as an advantage; it is about considering differences as opportunities, not as obstacles;
- It is assumed that we can learn more if everyone thinks and acts differently. In other words, *the knowledge building potential in heterogeneous groups is higher than in homogenous groups*, however, this potential does not always work because it depends on the kind and density of inherent tensions; in this way, the application will depend on how tensions are considered and solved;
- It is about creating confidence and social cohesion, having more acceptance of different perspectives of the world:

- It is about creating a higher appropriation towards the learning process, as well as to the solutions that can be found or built as it increases the chances that actions are decided by the group;
- It is about creating shared interests and values. Consensus is not required, but a minimum vision or shared sense about the situation has to be built.

The principles pointed by Wals (2007, 2009) match with the highlighted attributes identified by other authors. This is the case of Lave and Wenger (1991), Wildemeersch (1995), Leeuwis and Pyburn (2002), Olsson *et al.* (2004), Kenn *et al*. (2005), Fernández-Giménez *et al.* (2008), Muro y Jeffrey (2008), Pahl-Wostl *et al.* (2008), Woodhill (2010), Cundill (2010) and Reed *et al.* (2010). These authors agree in defining social learning as a process that involves active participation inside the community, actions and collective self-reflection. In one way, they share the idea that we, citizens, are capable of developing skills and capabilities that allow us to adequately respond to current social-ecological changes, by focusing on the transition or solution of complex issues that take into account collective well-being, empowering, self-reflectivity and creative capabilities.

Which key elements take part in social learning processes?

In the previous section, we summarized some elements that define social learning, although in the literature we can also find indications of other elements that can be key in participative processes within a social learning approach. In this sense, we concur with what Allen (2018) describes about social learning on his digital page "Learning for sustainability"[3]. Allen claims that social learning can hardly be planned in advance as it happens with other processes and group activities. According to Allen, there are no recipes or right ways to think about social learning processes, nevertheless, he identifies five elements that may guide us in its construction: 1) systemic thinking, 2) network creation, 3) conversation, 4) knowledge management, and 5) reflexive practice. With these elements, it is possible to summarize the attributes that other authors have also acknowledged in social learning theories. Based on his reflections we summarize the following elements:

a) Systemic thinking

This way of thinking suggests that we consider systems from a holistic approach. To understand a system, we have to understand the connections and interactions existing between the elements that integrate the system. Systemic thinking encourages us to explore the interrelations (context and connections), the perspectives (each actor has its own and unique perspective about the situation) and the boundaries (definition of the scope, the scale and what could be improved) of a situation. In this way, systemic thinking becomes very useful to approach complex problematic situations. A complex problem cannot be solved by one actor as a complex system cannot be understood from only one perspective.

b) Network creation

Communities are based on a significant number of connections, which we can make visible through network mapping. These networks represent a social capital that can be used to solve common problems as complex situations present in the communities. Krebs and Holley (2006) analyzed the construction of smart communities through network creation, claiming that the improvement in the community connections can result in better opportunities. In this case, communities have more possibilities to solve challenges or complex situations. Nevertheless, it is important to clarify the notion of 'better connections' and how they can drive communities to be more effective and productive. Connectivity is created through an iterative process (Krebs and Holley, 2006), becoming a key element that stimulates social learning through collaboration (Jacobi, 2013), opening the network to broader communication by establishing trust and cooperation. These attitudes allow members to approach conflicts and promote the search of solutions.

c) Dialogue and negotiation

One of the first challenges in participatory environmental management is to involve interested actors (government, academy, enterprises, communities and interest groups) in the learning process and to know how to create favorable conditions for negotiation. A key element in

[3] Will Allen and associates, "Learning for sustainability" available at: http://learningforsustainability.net/ where the reader will find a wide variety of online resources for those who work with the social learning approach and constructive action.

these processes is to be able to build frameworks for the dialogue and the negotiations between different groups of interest, aimed at building a common perception or agreements on the situation at stake.

According to Cernesson et al. (2005), in this context, social learning becomes crucial for participatory social-environmental management and other related processes as the dialogue it promotes is guides by different principles:

- Interdependency between individuals and groups.
- Interaction between the interested groups.
- A minimal degree of openness and trust between the participants.
- Critical self-reflection by the participants regarding the goals and interests, the assumptions about the system or resource to manage, and the impact of the initiative's actions done by other participants.
- Development of a shared perception of the problems. It does not imply they have to agree on everything, but they must share a minimal common understanding or perception of the problem.
- Development and critical analysis of the possible solution.
- Joint decision making, based on reciprocity (give and take) and commitment.
- Agreements on action implementation.

Dialogue and negotiation can be created based on these elements towards the solution of complex situations, where the diversity of interests, opinions, and perceptions regarding a problem or resource to manage might be an obstacle to collective decision making and action implementation.

d) Knowledge management

Learning to use the information to manage knowledge allows us to take different actions or to make choices in a more assertive way towards the sustainable management of resources. In this way, the assertive management of information and knowledge resources transform information into knowledge systems to assist in the decision-making process. These knowledge systems focus on processes and lead to the creation, harnessing and exchange of knowledge forms from science, communities, resources managers and policy makers.

e) Reflexive practice

Humans have the capacity to reflect upon situations and self-reflect in a continuous learning process. In its simplest way, it implies thinking or reflecting on what we do. The difference between "casual thought" and "reflexive practice" is related to the conscientious effort required by the latter to think about the events and develop ideas about them or based on them. Reflexive practices are metacognitive processes in which we think on the practice, we reflect upon what was done or not done, why it was done, etc. and create questions that help us to learn from our experience. It is about the conscientious analysis of choices and actions, relating theory and practice.

Reflexive practices are important in learning environments where stakeholders - including organizations and communities - learn from their professional and life experiences, instead of learning only from formal learning processes or knowledge transfer. It is connected with planning, follow up and evaluation of our processes, and it is strengthened by approaches such as participator action research, experiences systemization, and adaptive management.

In spite of the lack of recipes to guide participatory processes with a social learning approach, the principles proposed by Wals et. al (2009) and the elements described by Allen (2018) represent a start point for our practices. Based on these five elements we can create conditions not just to learn from and with others, but also to construct frameworks for multiactoral dialogue and negotiation. Nevertheless, it is important to also learn how to manage the knowledge which is collectively created so that it supports decision making and the implementation of actions, creating new environments to reflect upon our practices.

Which social learning approaches prevail in the literature on participatory environmental management?

In recent years, the interest to know more about how to use and study social learning processes that are oriented to participatory environmental management has increased. Rodela (2011) describes, for example, three perspectives of social learning applied to this field. To characterize them, the author decided to use three analytic items: 1) important characteristics, which explore the aspects related to the learning process; 2) level of analysis, which clarifies how the search is done; and 3) operational measures, to know how operative the social learning process

is. The results of this analysis are based on 116 publications, out of which 97 met the requirements of inclusivity. The results of this study are summarized and presented in table1.

Table 1: Synthesis of the research perspective around social learning presented by Rodela (2011).[4]

[4] RODELA, Romina. Social Learning and Natural Resource Management: The Emergence of Three Research Perspectives. *Ecology and Society* 16(4): 30, 2011.

Perspective	Focus on the individual	Focus on the network	Focus on the system
Context	Different people relate to each other (e.g. a participatory workshop). Social learning (SL) occurs when there is a change in cognitive, moral, relational and confidence dimensions between the actors.	Interest in scenarios as groups, nets, associations. It focuses on the changes that result from the participants' practices.	Interest in social-ecological systems (SSE). Focus on learnings as emergent properties with implications to the SSE.
Influence focus	Participatory democracy	Community practices	Systems thinking and ecology
Highlight characteristics	Interest in participatory process. SL occurs when people taking part on the course of a discussion are attentively involved with each other. Early attempt to conceptualize SL as related to natural resource management.	Focuses on activities more than on participatory workshops. Participation is recognized but it is not limited to workshops. It includes network participation, user groups, associations, communities, etc. These activities included a higher number of participants, cover longer durations and involve individuals with specific interests. It focuses on the kind of dynamics of the group that drives changes in the ways things are done.	More explicit approach in relation to SSE. Supports the idea that SL is a process that involves changes in the system. Interest rests in the changes that affect the SSE. Focus on governance and structural change.
Level of analysis	Attention to processes of change which people can experiment through direct participation. Observation and analysis units are the individual and her/his experience. Research aims at determining if learning has occurred and if the result was the assumed type of change (transformative process).	Attention to change process associated with collaborative multi-actor activities and description of the learnings experimented by activity's participants. There is an advance in the potential from the multiactorial platforms to encourage social learning. The observation unit is still the individual, but the analysis level includes higher levels of aggregation (nets, multiactorales platforms)	Interest resides in the environmental answers that follow the human intervention, or any change about how things are done. More than one observation unit is used: wildlife populations, multiactorial platforms.
Operative measures	Learning is associated with change in one or more dimensions (cognitive, moral, relational, and confidence)	Learning is identified with change in the resources management practices or how things are being done.	It has diverse interests: institutional changes, environmental answers, etc. Some are interested in actors-oriented process and operationalization of SL for institutional change.
Assumptions	Learning occurs as a result of one's involvement in participatory processes, when one learns about an issue in the discussion, and understands how their interests relate with those of others.	Learning in networks is rooted in the experience and it becomes significant when it is share with others.	

With Rodela's study (2011), we can see how social learning is conceptualized and used in diverse ways by researchers. In some cases, social learning appears as a phenomenon that emerges spontaneously in interactive processes, where the individual is involved with each other. In other cases, it is used as an instrument or strategy previously designed to evaluate participaory processes

or to determine changes and prove if they create transformative social processes at wider levels, beyond the individual or the community. Additionally, some researchers explore the possibility of using social learning processes to reach results in networks.

In regards to the level of analysis and operation, some studies focus on the individual and their experience, and others focus on the network through multiple collaborations of actors while others center their attention in social-ecologicas systems as a whole.

Considering that one of the objectives of participatory environmental management is to promote social transformations that lead to changes at the SSE level, Rodela (2011) shows the need to work on a perspective that focuses on the system, with the aim of knowing and tracking environmnental changes. The previous notes guide our reflection on how the implementation of participatory processes with a social learning focus can contribute to individual and/or network changes, thus leading social-ecological systems to more substantial pathways.

What can we recover from our analysis of participatory processes with a social learning perspective?

The desing of participatory environmental management processes can greatly benefit from social learning principles as they foster collective decision-making practices and collective actions. Knowing what needs to be promoted from a social learning perspective can enhance opportunities to reach more effective results. Considering the principles proposed by Wals et al. (2009), the key aspects suggested by Allen (2018) and the social learning perspectives identified by Rodela (2011), we have created an analytic framework that allows us to identify and evaluate different aspects related to social learning in participatory processes.

We applied this analytic framework to four cases (chart 2) selected by the application of two criteria: 1) the use of participatory environmental management, preferably in protected natural areas, and 2) the explicit inclusion of a social learning perspective. We do not intend to carry out an exhaustive analysis of the cases but to show how social learning is approached, understood and evaluated in different participatory environmental management processes.

Table 2: Comparison between cases with a focus on social learning in participatory processes.

Cases		#1 Collaborative monitoring in forestry organizations5	#2 Social learning in deliberative processes of collaborative management of natural resources6	#3 Monitoring of social learning processes in adaptive co-management7	#4 Social learning and its application in relation to science and environmental governance8
Country		United States	United States	South Africa	Brazil
Type of participatory process		Ecological monitoring based on the community.	Deliberative processes	Collaborative monitoring.	Management shared processes
Actors involved		Multiple individuals with different interests and experiences.	Environmental protection department, University, technical experts and participants from different communities.	Provincial and local government, ONGs, community institutions and villages of the representants.	Public bodies representants, from civil society organs and the resident population.
Main approach		Participatory democracy	Participatory democracy	Participatory democracy	Systems thinking and ecology
SL research perspective		Focus on the individual	Focus on the individual and the network	Focus on the individual and the network	Focus on the system
Principles and social learning key elements	Systems thinking	Achieve a better comprehension of the issues related to the management and the possible community benefits of the management.	Clarify the conflicting ecological assumptions held by the different parts, as well as the system functions.	Transcend social standards, values and traditional thinking about the issues and face socio-ecological change.	Create shared spaces and changes in perceptions and values, acting toward complex thinking.
	Collective knowledge construction	Improve the available knowledge between the participants in favor of building a co-management model based on the community.	The knowledge acquired was used in different ways during the process: improved, expanded or applied to modify the design of future projects; conflict resolutions.	Knowledge building, creating networks between multiple actors and encourage effective leadership.	Training and reinforcement of identities, making the process easier for basic consensus between the social actors involved.
	Mutual learning	About facts, worries, agreements and disagreements, problems opportunities, and actions.	Organizational learning was promoted and critical self-reflection.	It was manifested through two parallel processes: formal designed interactions and through the experience over time.	About how to work with diversity (interests, arguments, and knowledge), and how complex issues can be solved.
	Social cohesion and trust	Mutual respect, listening and open mind related to work relations that increase trust.	Confidence was developed, or at least a higher level of respect and knowledge between different members through the joint participation.	Confidence development through dialogue between the actors to deal with misunderstandings that can drive to conflicts.	Building and encouraging the collaboration and the interconnection between the people to start from trust and cooperation.
	Collective sense	It was possible to identify a common purpose from shared concerns and to see beyond one's own primary interest in the management.	Direct and tangible forms of "reconnection" betweem people and the earth were improved. Increase in collective awareness.	Existence of common interest in the groups.	Protection and maintenance of local identities, in favor of the restoration of the social structure, promoting meetings and recovering trust and interaction between people and their environment.
Identified challenges		To keep the key participants involved and to maintain a long-term commitment. Keep balance and equal participation.	Spaces to evaluate the quality of the shared information and deal with misunderstandings. Co-opting interests. Monitoring the processes. Keeping participants involving. Lack of commitment.	Listening to different perspectives and respecting ideas. Complete the agreements. Sharing power and participation. Effective facilitation.	Dissemination of the methodologies and activities that encourage collaborative diagnostics. Guarantee condensed solutions to solve socio-environmental conflicts. Strengthen social participation.

[5] FERNANDEZ-GIMENEZ, María E; *et al.* Adaptive management and social learning in collaborative and community-based monitoring: a study of five community-based forestry organizations in the western USA. *Ecology and Society* 13, (2): 4, 2008.
[6] SCHUSLER, Tania; *et al.* Social learning for collaborative natural resource management. *Society and Natural Resources* 15, 2003.
[7] CUNDILL, Georgina. Monitoring social learning processes in adaptive comanagement: three case studies from South Africa. *Ecology and Society* 15(3): 28, 2010.
[8] JACOBI, Pedro R. Aprendizagem social e unidades de conservação: aprender juntos para cuidar dos recursos naturais. São Paulo: IEE/PROCAM, 2013.

The cases previously described include environmental management processes with a specific emphasis on collaborative monitoring (1 and 3) or deliberative processes with a focus on the shared management of natural resources (2 and 4). In all of the cases, there is multiactoral participation with individuals and organizations with different interests and experiences, antagonistic groups (in some cases) and communities. According to Wals et al. (2009), we can take advantage of this diversity if we manage to work with its inherent tensions orienting the processes towards dialogue and negotiation, searching common interests out of the identification of agreements and disagreements between the participants. It is key to search for situations and opportunities that can be transformed into a common fertile field to work collectively on the protection and conservation of natural resources.

In three out of the four cases, we perceive a participatory democracy focus; and in one of them, we found elements of a wider focus on systems thinking, with the intention of achieving changes at a social-ecological systems level. In regards to the research perspectives, in three out of four cases change processes are identified at the individual level, and in two of the cases change processes are reported in relation to collaborative activities by multiple actors who participated in monitoring activities centering their interest at a network level. In one of the cases, changes were associated to a more systemic level.

Building from the principles by Wals et al. (2009) and the five elements presented by Allen (2018), we defined five categories that allowed us to make a comparative analysis of the selected cases. We identified the existence of aspects that point to the need of a systems thinking approach that allows the participants to understand and visualize links and interactions at a systemic level, thus improving their comprehension of the system's functions and enabling them to transcend norms and values towards broader change.

In all of the cases, we found some aspects that point to the *joint construction* of knowledge and its application in participatory environmental management processes to improve, expand or apply the acquired knowledge in other processes. or to solve conflicts, create networks, build basic consensus between social actors and implement collective actions.

Mutual learning was another category presented in the cases. It is worth mentioning that according to the results of one of the cases, these learnings are a result of two parallel processes: one is related directly to the activities as part of the participatory processes, while the second one is the result of the acquired experience through time. A relevant aspect to point out in relation to mutual learning is the fact that is favors the work with the diversity of interests, arguments and knowledge.

Trust and social cohesion were also identified as relevant features that take part in participatory processes' social learning. Mutual respect, listening and open thinking are perceived as qualities that assist in the development of collaborative work relationships and the increase of trust between the different parts involved through the joint participation. The development of trust encourages the dialogue between the participants and allows members to deal with misunderstandings that can result in conflict.

Finally, the development of a collective sense or purpose is also identified as a key feature. In all of the cases, there is acknowledgement of the need to work with a focus on social learning as a means to "reconnect" people with the place they inhabit, enhancing the interconnection of humans and non-humans. This type of connection allows the collective consciousness to be fostered, letting the group take decisions and actions from a common interest. In this way, it is considered that implementing participatory processes with a focus on social learning is possible to strengthen local identities, promoting social bonds and recovering trust, and fostering strong connections between people and their surroundings.

In the analyzed cases, some challenges related to social learning in participatory processes invite us to reflect on methodologies and actions that can be implemented in order to overcome difficulties. Some challenges that are inherent to participatory processes include: the co-optation of interests, following-up an evaluating processes, promoting participation and commitment, generating conditions for active listening and respect, converting agreements into actions, power-sharing and effective facilitation. Other challenges that are directly related to environmental management and the possible common benefits that can result from this type of process include: 1) the application of participatory methodologies and activities to encourage collaborative diagnostics; 2) collaboration to reach common solutions to socio-environmental conflicts; 3) enhancing civil society participation in natural resources management processes with a social learning focus.

Conclusions

Social learning theories and practices can contribute significantly to participatory environmental management processes. The results shown in the study cases indicate how social learning strengthens collective decision making and collective action through dialogue and negotiation. In these processes people can improve their decision-making capacities, and convert them into actions with results that benefit the broader community.

Nevertheless, the study cases also indicate that to achieve the expected results we need to create mechanisms of communication and by which stakeholders can consider the perceptions, feelings, and concerns of one another. These mechanisms allow the collective construction of knowledge, based on the coexistence between different groups of interest. They become spaces that promote perception and value changes, fostering complex thought, open to uncertainty, changes, and innovation.

Despite the expectations posed on social learning, research in this field is still scarce. Little is known about this type of process and its results. We also identify a lack of systematic research that evaluates the results of social learning in terms of social transformation at the level of social-ecological systems. From a practical perspective, it is necessary to deepen our understanding of the methods and activities that accompany and facilitate these processes. These gaps, which characterise the emergent nature of this research field, also set the basis for future research of great relevance for the construction of participatory environmental management processes towards sustainability.

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