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A new environmental governance

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Abstract

At present, there is no unified theoretical framework to deal with environmental governance issues. Consequently, there is a diversity of interpretations of the concept at the public-political arena both nationally and internationally. Recent Latin American efforts have given a step forward conceptualizing environmental governance from the South and systematizing experiences to illustrate a diverse contemporaneous reality. At a regional scale, within the last decades, discursive turns in national policies such as the introduction of the sustainable development concept, have triggered an increase in studies and applications of environmental governance (e.g. forest's governance, climate change, marine coastal zones) including the use of the ecosystem services concept. The instrumentation of public actions in relation to environmental governance derives from the states. However, if analyzed with a beyond-the-States view, governance can be understood as a process involving the participation of governmental and non-governmental actors reaching decisions, for mutual benefits, through negotiation processes. However, there is not, still, within the countries of the region, inclusive and participative governance oriented toward the sustainable use of natural resources. Although there are many challenges, in this chapter we discuss two of them: 1) to build an analytical framework to understand the environmental governance modes currently available in Latin America, and 2) to generate a new socio-political interdisciplinary framework involving both natural and sociopolitical systems as a contribution to a new analytical framework for environmental governance. In other words, new environmental governance for Latin America.

1 Introduction

1.1 The dawn of environmental concerns in Latin America.

The concept of environmental governance has increased its relevance in the XXI Century, associated with the need for the sustainable management of social-ecological systems. Indeed, a literature search (conducted on February 2019) by means of the Web of Science between the years 2005 and 2019 and using the terms "environmental governance" and "Latin America" as keywords, generated 75 articles. Articles included countries such as Paraguay, Argentina, Peru, Mexico, Costa Rica, Bolivia, Chile and Guatemala among others. This development has been perceived as a new democratic, participative and collaborative challenge among social, economic and political actors of the region (Castro *et al*. 2015). Environmental governance is today used for the management of social, political, economic and ecological problems and to deconcentrate power, implementing more efficient and transparent public actions as key elements for equity and wellbeing (Calame

2009, Arnouts *et al*. 2012). In Latin America, it has also been associated with local-territorial movements related to environmental, social and ecological problems affecting local populations and, in some cases, tightly related to historical and novel ecosystem's goods and services used for economic subsistence and at times playing important cultural roles (Álvarez and Ther 2016).

Since the end of the 1980s and beginning of the 1990s, there has been a shift in environmental political discourses. These changes have incorporated modifications in the definition of what constitutes a complex social-ecological problem, its definition and structure and the way to approach it. Examples are the ever-growing use of concepts such as sustainability, biodiversity, integrated evaluation, environmental quality among others. Environmental problems now are defined as associated with social, economic and technological issues and, therefore, their solution involves fields such as public policies, agriculture, infrastructure, technology, etc. The main result of these changes is that solving these problems is not the exclusive resort of institutions and agencies related to environmental policies (Leroy and Arts 2014).

This change in public discourses was spread and popularized after the Rio de Janeiro Earth Summit of 1992 when the world generated the bases for a new vision of regional development: sustainable development. This concept can be conceived as a new paradigm that put human beings in the center of modernity, considering economic development as a mean and not as the end in itself, protecting the life of present-day and future generations and recognizing that the integrity of the natural systems is the basis of life on planet Earth. This event opened, both at national and regional levels, discussions on the likelihood of compatibility between development models and the sustainability of social and ecological systems (Calix 2016). Thus, starting in the 1990s the environmental legislation gradually became a multisectoral field, appealing to shared responsibilities among different domains of public policies and posing questions about their coordination and integration. It also represented an opportunity for the civil society to start questioning the role of the public institutions regarding the ecological systems as a debt to be solved.

Environmental governance issues acquired relevance in Latin America only at the beginning of the XXI Century, mostly due to the advent of social-environmental conflicts. Also, science starts playing an important role in openly discussing environmental issues reaching society at large through reports such as those generated by the Millennium Ecosystem Assessment (MEA 2005).

Castro *et al*. (2015) conducted a detailed analysis of the different action spheres of public policies and social organizations in Latin America in relation to natural resources and other social issues (e.g. dictatorships). The book describes how civil society develops an environmental awareness through processes of self-empowerment, addressing issues such as culture, life, and endangered environments.

Thus, in the dawn of the new millennium, an inflection point is reached; environmental territorial demands become citizen's concern, including social manifestations on Latin American cities with environmental problems appearing on mass media. One example is the "social-environmental crisis of the Rio Cruces wetland" in southern Chile. This crisis

mobilized local-national and international civil society, academia, political and judicial actors participating in environmental governance issues (Delgado *et al*. 2009, Marín *et al*. 2018, Delgado *et al*. 2019).

1.2 Environmental governance

Environmental governance research focus on the ways in which society organizes to solve dilemmas and to create new opportunities, analyzing the conditions and capacities involved, as well as the intervening social actors and their interactions (Calame 2009). Lately, Latin American countries have occupied key roles in global debates over the causes and solutions of environmental problems such as climate change, biodiversity conservation and others (Castro *et al*. 2015). Our region has transformed into an innovation space searching for new alternatives for environmental governance where social movements, governments and firms may have agreements and disagreements. Inter and transdisciplinary research, as applied to environmental governance, offers a perspective that connects social and environmental changes with governance issues involving public policies and civil learning (Lemos and Agrawal, 2006). Furthermore, even disciplinary science has changed its ontology embracing systemic worldviews and postnormal approaches (see Chapter 1).

Although the contemporary environmental governance concept may have emerged as a neoliberal proposal for non-state management of natural resources and environmental issues, it has been shaped by several disciplines to incorporate new perspectives (Hogenboom and Castro, 2012). Swyngedouw (2005) points out that changes in government, from closed to open (modern), is associated with the use of new technologies and a re-structuring of democracy parameters. Still, he argues that governance-beyond-the state may be Janus-faced.

Currently, environmental governance takes into consideration the capacities within each country, its constitutional structure, the type of political regime and government, market conditions, science and civil society with the goal of understanding collective problems and to provide solutions that can even be modified through time (Kooinman *et al*., 2003). Thus, environmental governance is understood as the establishment, confirmation or change of institutions to solve conflicts of environmental issues (Paavola 2007, Eakin and Lemos 2006). This perspective is related with the environmental justice concept, that put in the center of the debate the distribution of environmental costs and benefits, and the empowerment of the people that depends only on ecosystem's goods and services (Delgado and Marín 2016).

Castro *et al*. (2015) define environmental governance as the process of formulating, designing and executing procedures and practices to configure the access, use and control of natural resources among several actors. Lemos and Agrawal (2006) define it as the set of regulatory procedures, mechanisms and organizations through which actors influence the actions related to environmental issues.

Sarkki (2017) proposes that environmental governance should consider all structures and processes, political and social, of a given country with sustainable development as its main common goal. McGinnis and Ostrom (2014) and Delgado *et al*. (2019) further propose that

complex and nested social-ecological systems are affected by many forms of governance, that may develop on different scales of time and space, and where those larger constrain the responses at smaller scales. Calame (2009) mentions that one of the important requirements to achieve a common objective (e.g. sustainability), is to consider the participation of all social actors, also sharing the responsibilities of the negative effects of human actions over the environment. Under these conditions, multi-scale environmental management becomes relevant. From the local scale, with collective and territorial learning, up to the national scale where government responses get coupled to develop strategies for the people.

Thus, the new environmental governance describes and defines a desired social future, representing values of human coexistence as the main objectives of social action (social agenda) such as environmental sustainability (Aguilar 2007). Still, accepting the social valuation of ecosystems implies that social actors may perceive and judge negatively their social condition if they are conscious of their local and global environmental risks. Hence, several experts define our present environmental governance condition as a problem to solve; we may arrive at a solution soon, but we are not there yet (Aguilar 2007, Castro *et al*. 2015).

2 Structures and typologies of the environmental governance

There are few studies on the typologies and/or structures of environmental governance, including the processes and relationships between social and political actors. The most frequent analysis deal with political changes and the essence of governability in itself.

Arts *et al*. (2000, page 54), proposed the concept of policy arrangement, defined as "the temporary stabilization of the content and organization of a particular policy domain". Represented as a flexible and interlinked tetrahedron, the arrangement is composed of four dimensions: actors and their coalitions, power and resources, the rules of the game, and discourses (Arts *et al*. 2006). Empirical applications have shown that the policy arrangement framework provides a suitable tool to analyze environmental policy change (Contesse *et al*. 2018). Afterward, Arnoust *et al*. (2012) proposed four fundamental elements influencing the ways in which environmental governance will develop in a given country: 1) socio-political trends, 2) shock events, 3) adjacent arrangements and 4) policy entrepreneurs (i.e. those with the capability to generate changes). If we then add elements for good governance, as proposed by the United Nations (Córdova Montúfar 2018), we arrive at a conceptual framework that describes the complexity associated with environmental governance (Fig. 1).

Arnoust *et al*. (2012) proposed two analytical categories: a) hierarchical governance and b) closed co-governance. These two governance typologies consider traditional governmental structures and they belong to the first steps of modernity in our region, during the decades of the 1970s and the 1980s (i.e. old governance). The other stage (new governance) can be characterized by investment in the innovation of public policies, with a renewed interest in environmental issues in the region at large. This new perspective, that started near the end of the 1980s, is known as "good governance". It propitiates the development of self-government to overcome poverty based on a) small states, b) market incentives (e.g. privatization and liberation of resources), and c) participation (decentralization and NGOs).

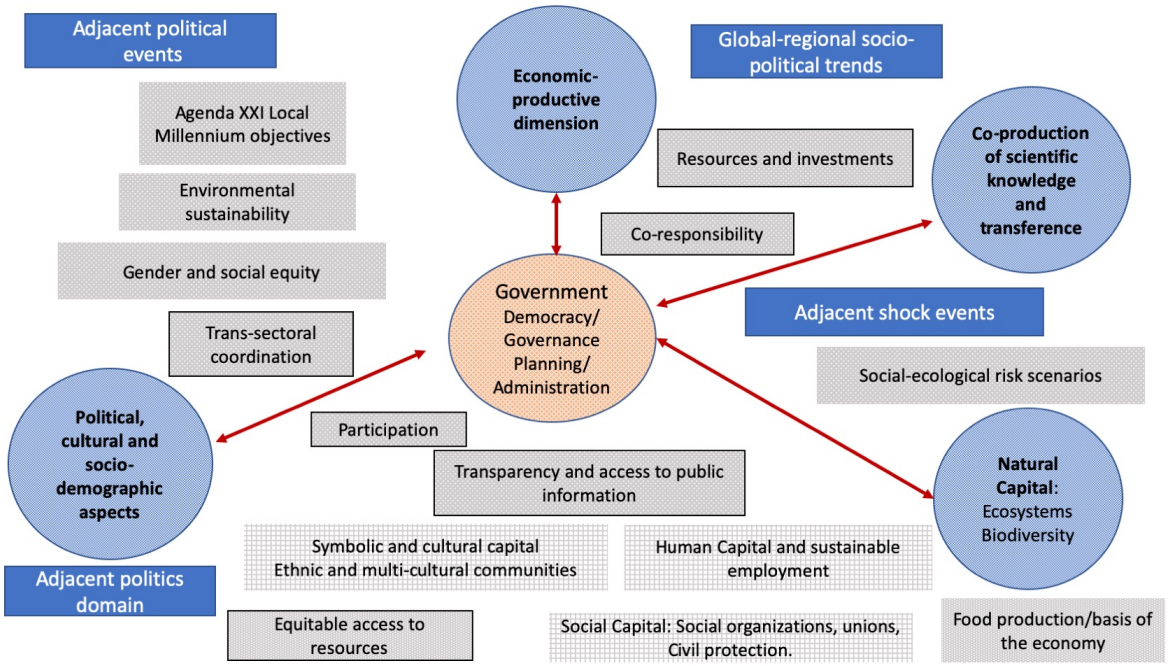

Figure 1. Pillars, fundamental principles and capitals for the development of an environmental governance (Modified from Arnouts *et al*. 2012).

Thus, changes in governance can be understood as a historical-relational revolution, both inside and outside a given country, where the necessary elements for a contemporaneous, territorial, environmental governance have been generated. A contemporaneous typology of environmental governance has been proposed by Primer *et al*. (2015), where they classified it into four types: a) *hierarchical*, corresponding to a structure where ideas are transferred from higher to lower political levels, b) *scientific-technical*, that emphasizes the transference of knowledge from scientists to local social actors, with the associated uncertainty, c) *adaptive-collaborative*, where the main emphasis is on the participation of local social actors and d) *strategic*, with self-organized networks within the civil society with the common good as main objective.

The currently dominant governance type in Latin America is hierarchical, where most of the control lies on state actors. As a result, it has been difficult to incorporate the participation of non-state actors and the civil society, given its top-down dynamic. Yet, states seem to be losing control over the effectiveness of public policies oriented to the management of natural systems, where vulnerable people that depend on the quality of those systems, fight to "to keep the resources they need for livelihood" (Martínez-Alier 2014: 241).

Thus, environmental governance modes or types, imply understanding public policies beyond pragmatism, since they are the result of the type of institutional system (Córdova-

Montúfar 2018), the balance of forces among the different social actors and the capacity of the state to generate contingent policies oriented to the contemporaneous reality.

3 Environmental governance in Latin America: a democratic construction process.

The environmental governance from governmental institutions and their procedures (e.g. law systems, policies, programs and competencies) are currently highly discussed issues in Latin America. However, the main issues still relate to hierarchical modes of governance (see also Chapter 4). In the case studies analyzed in this section, we show that there already exist the mechanisms and structures, as well as the necessary social processes to check, from time to time, the governance modes within the region. Still, we propose that Latin America should move toward adaptive strategies including continuous improvements and co-learning (Córdova-Montúfar 2018, Perevochtchikova 2014).

3.1 Case studies

The National Environmental System of Paraguay: an attempt to move toward a new environmental governance.

Governance, according to Calame (2009), can be understood as a legitimation mechanism, not only of institutions and their rules but also of the actions oriented to common benefits. Thus, a segmented view of reality is no longer possible. The author suggests that it is necessary to change the focus trying to see the interrelationships between the different components since the main challenge is to articulate competencies through networks with a systemic approach (Calame 2009: 37). This is called new governance, governance revolution and active and/or open governance.

In the year 2000, Paraguay, through the Law Nº 1561, reorganizes the public institutions in charge of the environmental management, creating the National Environmental System (SISNAM), The National Council for the Environment (CONAM) and the Secretariat for the Environment (SEAM). The main goal was to manage environmental issues more operationally at the different government levels: central, departments, municipalities. SEAM, an autonomous institution, was created in 2005 with the objectives of formulating, coordinating, executing and supervising the national environmental policy. CONAM was integrated by several actors from the public domain, businesses and civil society being open to participative governance. Thus, it became the main defining group for the national environmental policy of Paraguay, the operational structure of SISNAM. However, although it was conceived with a systemic view, CONAM operated more like a machine, where environmental issues were attended as linear cause-effect chain structures. Yet, the systemic view (related to the idea of new governance) appeals rather to an "organismic" behavior, including growth, cyclical information guidelines, non-linear interconnections, self-correction and renovation (Duffield 2001).

Despite its overall behavior, CONAM represented an attempt to include most social actors in environmental issues. Thus, its suppression in 2018, when SEAM acquired a ministry status (Law Nº 6123) represents a retrogression in Paraguayan environmental governance.

Environmental governance in Argentina: a multi-level design.

The 1994 Argentinian constitutional reform introduced a series of new rights to the original (1853) constitution, including the right to live in a healthy environment. The new Article 41 establishes, among other things, that the Nation is in charge of dictating the norms to provide the minimum protection on issues such as the rational utilization of natural resources, environmental conservation, preservation of natural and cultural patrimony and the necessary information for environmental education.

Therefore, although the reformed constitution maintains the original domain on the natural resources in the hands of provinces, it also gives power to the National State to dictate the rules on minimum protection throughout the territory. Under these circumstances, it obliges both national and provincial governments to guarantee a healthy environment. The General Law for the Environment (Law Nº 25.675 from 2002) defined the concept of minimum environmental protection. This includes political and management instruments such as spatial planning, environmental impact assessment, a control system for the development of anthropic activities and so on. In particular, it establishes mechanisms for the participation of citizens in environmental impact assessment and territorial ordering procedures.

Finally, the law generates the Federal Environmental System, appointing the preexisting Federal Council for the Environment (COFEMA) as its maximum authority. In this way, the law for the environment generated a complex network of public organizations in charge of protecting the right for a healthy environment and the implementation of environmental policies.

Among the many specific environmental laws, the Law for the Native Forests is the only minimum protection law that applies and combines territorial ordering and citizen's participation mechanisms. Furthermore, it incorporates the ecosystem services concept as criteria for territorial ordering and schemes for the payment of those services (Laterra *et al*. 2017). Thus, it can be stated that it is the first and only law that establishes environmental governance in the whole country (Aguiar *et al*. 2018).

When analyzed in terms of institutional governance, the Native Forests Law and its regulation distribute competences and responsibilities between COFEMA, the National State and the provinces. This governance scheme is then combined with three levels for the participation of social organizations, economic actors and experts generating the conditions for true environmental governance. If we now center on the processes for the formulation of the Territorial Orderings of Native Forests (OTBN), the law, in practical terms, has worked as a space for the participation and confrontation of social and community organizations, small and large economic actors and experts of different disciplines and institutions.

Studies conducted in some provinces show that approved OTBN contents and their subsequent regulations can be explained as the result of struggles between production and protection-oriented actors within participation spaces (commissions, fora, etc.) and also within the legislatures (Figueroa and Gutiérrez 2018). OTBNs in those provinces do not fully satisfy social actors and they are even resisted by production-oriented groups. Moreover, people in some provinces have mobilized against OTBN that they did not consider adequate from their points of view. All these issues show that institutional environmental governance does not leave aside the contentious participation of civil society; quite the contrary, it seems to strengthen it and complement it.

Hence, we can state that the Law for the Native Forests suffers from a series of limitations that go beyond citizen's participation mechanisms. Still, official data show that the deforestation rate has been reduced notoriously in Argentina after the implementation, and as a consequence, of this law (Figueroa and Gutiérrez 2018). If that is the case, it means that the established environmental governance arrangement has generated positive results despite its limitations.

Forest institutions in Chile

In this case study, we analyze the institutional roles related to the forest's management of rural zones. Institutions would determine the process of making decisions, how power is exercised, and how responsibilities are distributed among all stakeholders and social structures in rural communities (Brondizio *et al*. 2009, Ostrom 2005). Institutions would also define the people's opportunities of access, control, allocation, and distribution of the benefits from ecosystems (Diaz *et al*. 2015). However, their effectiveness to ensure the sustainable use of ecosystem services depends upon their relationships with rural people, the existence of a decentralized government and the local ways of life (see Chapter 5). As institutions would influence positively and negatively the opportunities to satisfy human wellbeing, the valuation of people over institutions strongly determines the level of effectiveness to manage nature in a sustainable way. Positive perceptions of institutions among rural people would increase their effectiveness, and consequently it would increase the opportunity to maximize both wellbeing satisfaction and sustainable uses (Basurto *et al*. 2013, Brondizio *et al*. 2009, Ostrom 2005, Sayer *et al*. 2013)

Let us consider the valuation of a forest institution in Chile as a study case. The Chilean Forestry Department (CONAF) is the Chilean environmental institution whose duties include overseeing the Native Forest Act obedience, protection of forest ecosystems and managing the national system of protected areas. The Native Forest Act (MINAGRI 2009) regulates landowners' native forest management (Pellet *et al*. 2005), and it was created to protect the natural forest that had been replaced and degraded by agricultural use, cattle raising, fires, forestry, urbanization, and an increasing demand for firewood (Pellet *et al*. 2005). This act includes three types of management plans: (i) Forest Management Plans, (ii) Forest Management Plans under order criteria; and (iii) Preservation Management Plans. While the act considers economic benefits, these management plans and their benefits are difficult to obtain due to complex application processes, where the amount of money that the owners can receive is smaller than other benefits of the forestry sector, such as for planting exotic species (Reyes *et al*. 2014). The act also sets monetary penalties

depending on the extent of the damage and which species have been affected by an unauthorized cut of native forest. Also, if a landowner does not follow the management plan, they will be fined for noncompliance, losing the benefits obtained and being obliged to return the subsidy received (Reyes *et al*. 2014).

Forest fragments under management plans would keep a greater natural capital and would offer a larger range of ecosystem services than those forests without plans (Nahuelhual *et al*. 2007). Therefore, greater social support of forest institutions would facilitate the implementation of management plans in more fragments located outside protected areas or private lands. The establishment of management plans in more forest fragments is a key issue to assure the conservation and protection of highly threatened forest ecosystems. Nevertheless, one of the big gaps that still remain in our knowledge about forest management is identifying the biophysical limits for extraction of forest products in order to achieve the sustainable use of ecosystem services. The biophysical limits should be also defined as a function of the characteristics of the socio-ecological system, where social expectations, perceived costs and benefits, and social beliefs in the institutions should be considered. Unfortunately, the costs, benefits, and social support for forest institutions still do not appear to be reflected in decision-making regarding forest management and conservation in Chile (Nahuelhual *et al*. 2007).

4 The multiple levels of the environmental governance

Several sustainability initiatives are generated at multiple levels, from global (e.g. conferences, intergovernmental agreements and actions) to regional and local (Fig. 1). If we add the millennium objectives[1], wanted in many regions, and national/local initiatives then it becomes a rather complex social-ecological process (see also Chapter 3). These initiatives, according to Ostrom (2009), should be constantly evaluated to monitor their long-term actions and to gradually integrate changes in dominant management paradigms and the types of natural resources governance under an integrated-transdisciplinary approach (Perevochtchikova 2014).

We should also remember that there are several conditions that should be met for reaching sustainability objectives, related to the characteristics of the time and space levels (or dimensions) where contemporaneous environmental governance operates (top-down, bottom-up, inside-out). On the one hand, global institution's initiatives utilize a unifying approach, that at times resembles interventionism, where the objective is to palliate sustainability problems that, according to them, countries cannot face. On the other, several initiatives are not implemented due to the lack of local capacities and proficiencies (e.g. Aguilar 2007). Thus, except for some virtuous examples, it has not been possible to complement and generate synergies between these two levels (global and local). Therefore, the challenge for Latin America is to overcome the inter-levels conflicts in relation to sustainability and its implementation, always paying due consideration to national realities. In other words, implement global objectives with a contextual approach (see also Chapter 5).

[1] https://www.who.int/topics/millennium_development_goals/about/en/

Environmental governance deals with global environmental problems and their local expressions, where risks are distributed between and within the countries of the region (Martinez Alier 2014). Some of them will be more or less vulnerable depending on the state of the ecosystems, the causal structure of the human population and how much their wellbeing depends on the direct use of nature's goods and services (Natenzon and Ríos 2015, Delgado *et al*. 2015). This global risk scenario is where environmental governance for Latin America should act, coordinating actions, agents and actors in several spatial and temporal scales through integrated and sustainable measures.

If social-ecological models are applied only at some spatial scales, the result for environmental governance modes is of partial views with erroneous perspectives of the complex problems of our contemporary world (Delgado *et al*. 2019). This approach does not allow seeing social-ecological systems as interconnected structures affecting each other. Environmental management should consider social-ecological analyses at several scales so the relationships individual-environment may fit into one another like Russian dolls. In the words of Latour (2005: 180): "There are two different ways of envisaging the macro-micro relationship: the first one builds a series of Russian Matryoshka dolls – the small is being enclosed, the big is enclosing; and the second deploy connections – the small is being unconnected, the big one is to be attached".

In each level (global, national, regional, local) individuals relate with its environment in its multiple dimensions (i.e. biophysical, social, economic and political; Delgado *et al*. 2019). The practical application of this concept is known as multi-level governance, currently used in the design of policies in the European Union (Calame 2009). Applying this governance design, which includes indicators and qualitative/quantitative measurements of action, could shed light on how to deal with missing links (i.e. the connexion) between levels. Furthermore, this design is supported by the nested, hierarchical, condition of social-ecological systems, where processes operating al large scales restrict those operating at smaller scales (Delgado *et al*. 2019).

One example is the perception of different groups of social actors in different governance levels in relation to environmental catastrophes and the associated social-ecological resilience. A social group may show good skills to cope with changes, adapting to the point of reaching wellbeing if operating only with social dimensions at a local scale. Meanwhile, regional governmental responses, operating at different levels and speeds may still be discussing programs and approaches while the local social-ecological system has already adapted (Delgado *et al*. 2019). Still, the partial functionality of each level, if others are not considered, may generate tight conclusions and environmental unsustainability (Cruz-García *et al*. 2017) or generate partial explanations for problems containing several scales.

Dietz *et al*. (2003) describe multi-level adaptive governance as a strategy to mediate social management conflicts. The author relates governance with the resilience of social-ecological systems mentioning that learning, knowledge generation, learning to organize, cooperation, power, participation, a flexible organization, trust, leadership, social memory and the formation of groups are key elements to generate adaptive co-management. Brunner *et al*. (2005) base their adaptive governance proposal in co-management experiences where the local is coordinated and organized with larger scale governance so a

desirable social-ecological state may be reached through adaptation or transformation (Chaffin *et al*. 2014). In summary, when it comes to environmental governance understanding it from multiple levels or scales is vital.

5 Polycentric and adaptive governance: examples of connections between levels.

Polycentric governance can be used as an example of multi-level governance, especially if we refer to resources and ecosystems commonly used by several people such as coastal zones. The main idea beyond this governance scheme is the implementation of multiple decision centers at different scales over a single resource in a given territory (Schöder 2018). However, its polycentrism can be defined in terms of structures and processes, the autonomy of the decision centers, the diversity of organizations, scales and the overlap of functions.

The literature on polycentric governance and the conservation of natural resources cover several systems such as water governance (Baldwin *et al*. 2018, Schróder 2018), land-ocean interaction (Pittman and Armitage 2019) and fisheries (Carlisle and Gruby 2018). Baldwin *et al.* (2018) argue that this type of governance promotes collective actions between different scales. However, collective actions within each scale generated by social capitals allow communities the capacity to organize themselves generating structures for decision making (Buciega and Esparcia, 2013).

On the other hand, polycentric governance is considered as an element that promotes resilience within social-ecological systems, associated with overlapping territorial areas and their interdependent decision-making (Schróder 2018, Biggs *et al*. 2012). The main proposed basis for this resilience is the diversity of social actors who generate multiple responses to deal with an adverse event (either social or ecological). If on top of these characteristics, we add redundancy and participation then conditions are met to generate co-learning allowing the implementation of adaptive governance.

Chaffin *et al*. (2014) define adaptive governance as the interactions between actors, networks, organizations and institutions arising in the common search for a desirable state of a social-ecological system. Such state will then depend upon the social actors and their working mechanisms and strategies (e.g. participative modeling, identification of local sustainability objectives). This bottom-up strategy is built from understanding and knowing the perceptions and valuations of local social actors and their ecosystem knowledge. Furthermore, social-ecological adaptation capacities related, for example, to situations such as fishing closures, the extinction of natural components or the scarcity of provisioning ecosystem services play an important role.

Adaptive governance, as mentioned by Schultz *et al*. (2015), is based on flexible collaborations, based, in turn, on knowledge and the decision-making processes involving governmental and non-governmental actors with the objective of negotiating and coordinating the management of social-ecological systems. This strategy provides the opportunity to incorporate traditional ways of life to public programs and policies, incorporating local learning to contribute to the sustainability of these ecosystems (Yu Iwama and Delgado 2018, Álvarez and Ther 2016).

There is a consensus that the success of community resource's management depends on several factors such as the institutional environment, the social cohesion of the involved communities (i.e. social capital), local ecological knowledge and the degree of interactions between communities and the local markets (e.g. chain values) among others. In the case of complex fisheries in particular (e.g. multiple species, multiple users and communities), the argument is that it is very difficult that an institution based on self-governance and managed exclusively by the users may be a real option. This is mostly due to the market's pressures and potential lack of integration of local social actors with the rest of society that may mine collective management. Still, geographically isolated areas, such as Isla Grande de Chiloé in southern Chile, may be ideal for this type of management processes (Paredes 2019).

6 New environmental governance for the south: a proposal

Latin America, as we have discussed at length in this chapter, seems to be in an inflection point, where the possibility of advancing toward a renewed environmental governance is clearer. In this process it is important that research may be action-oriented; that is, not only analyzing problems conceptually or from a disciplinary scientific perspective but also considering virtuous practices as gears for adaptive and strategic learning. One virtuous example is the project "Integrating biodiversity conservation and land sustainable management in all bio-regions and biomes from Paraguay- Green commodities" leaded by the United Nations Development Program-Paraguay[2]. We are convinced that before proposing types of interactions, communication channels and indicators or multiple-levels actions it is necessary to characterize the diversity of governance modes (structures and processes) in relation to the social-ecological system to be managed and the components of each subsystem (social and ecological) targeted for sustainability. This is a way to make visible the different levels if they exist, and the potential strategies (see Chapter 21).

We propose that a new or revitalized environmental governance in the region will require giving due consideration to the following, minimal, aspects with the purpose of consolidating an adaptive, strategic and participative social-ecological process:

1. *A world in constant change*. It should be clear to all of us that we live in a changing world where technology, communication and real-time learning are tools that can be used for cooperation (i.e. globalization). On the other hand, ecosystems and their functions that maintain live on Earth are also changing, being transformed in some cases into novel ecosystems (see Chapter 9) with a clear adaptation necessity. Under these conditions (i.e. high uncertainty, self-generated threats, global risk), governance should adopt an adaptive strategy to cope with social and natural context at a local-regional level.
2. *Changes in the relationships between actors and their structures*. It is rather important when developing environmental governance, that interacting social actors or agents may change their roles. The market should be an agent of change, the government should incorporate interdisciplinary visions, science should accept the co-production of knowledge with other actors, NGOs should be more inclusive and

[2] https://greencomoditiesparaguay.org

social actors should incorporate learning, cooperation and solidarity. In other words, environmental governance means redefining values and objectives. Improving communication, among all proposed changes, is the most important by far. Multi-level environmental governance (i.e. strategic) requires the plural participation of actors, each bringing several value dimensions (e.g. teleological and factual, anthropocentric and ecocentric,) including ways to value ecosystem's components such as intrinsic, relational or instrumental among others (Piccolo 2017). This improved communication should trigger changes in the actor's roles, generating a co-responsibility view regarding environmental damages and how to face them together.

3. *Considering different spatial and temporal scales of the social and ecological processes*. Social-ecological systems are hierarchical and nested where processes occurring at smaller scales are constrained by those at larger scales (Fig. 2). Ecological changes, visible to social actors (e.g. decrease in biodiversity), occur when previous un-noticed damages had already occurred (Delgado *et al*. 2014). Furthermore, since ecosystems are historical systems and their responses to triggers depend on previous conditions or states (i.e. hysteresis), the development and continuation of systemic, long-term, studies and monitoring is vital. Furthermore, incorporating spatial analyses may help to identify the heterogeneity on which social-ecological processes operate in their different scales.
4. *Decentralizing decision-making*. If we asked social actors about environmental problems, their first responses will most of the time refer to their local systems. That is, a contextual-territorial response. Therefore, environmental governance should incorporate this territorial dimension and its fundamental principle, active subsidiarity (Calame 2009). In this way, local social actors will gain protagonism both during learning as in decision-making.

7 Final reflections

The more knowledge advances, based on new theories and experiences, the more our perception of the real world evolves. In the case of environmental governance, advances have been almost revolutionary (*sensu* Kuhn 1962). The environmental awareness generated by the ecological crises at the end of the XX century, made mankind shake and re-evaluate our self-generated risks and threats. It also generated a need to change our perspectives regarding the analysis of public policies and their implementation, their functions and actors, and the need to incorporate contextual, and complex, social-ecological dynamics.

The sustainable development concept is associated with intergenerational justice, which according to economic theory corresponds to a social good function that describes social transactions between the wellbeing of different social actors. Beyond the fact that social good is difficult to define (depending on time-space scales), the consideration of future generations requires expanding the focus to include issues such as the uncertainty on desirable conditions for development and the environment. The environmental governance organizes the relationships between humans with sustainability as its common end, reshaping collective responsibility and impact of human actions over the environment. Thus, governance for sustainability generates social empowerment to the local communities

together with public and economic actors where the latter two do not have exclusivity over the speech.

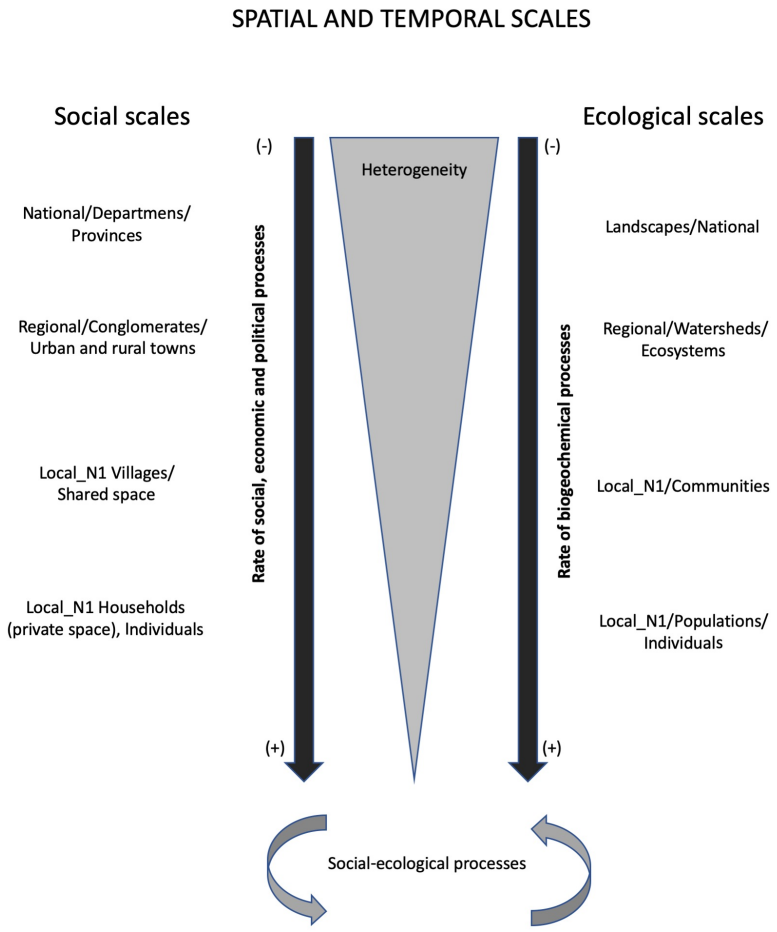

Figure 2. A scale-dependent conceptual diagram of social-ecological processes.

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