

"The Institutional Levels for Sustainable Development: Exploring Trans-Boundary Governance on Climate Change"

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Abstract

The central purpose of this research is the exploration of the main models of governance emerging from the complex and multidimensional nature of sustainable development. From this perspective, the ineffectiveness of the agendas of the environment and sustainable development stems from the divergent nature of institutional and ecological scales. The most urgent task is to search for new governance systems to improve the interactions between institutional and ecological scales, beyond supported governance systems only in the jurisdiction of national states. In the case of climate change new trans-border governance systems begin to emerge, such as polycentric and multilevel governance. So while in the global ambit transnational networks composed primarily for the urban local governments emerge, simultaneously, they also start the consolidation of supranational policy networks in the European Union.

Keywords: sustainable development, scales, multilevel governance, polycentric governance, agenda, environment, policies.

1. Introduction

As Termeer, Dewulf and Lieshout (2010) uphold, the conceptual clarification of the various approaches to the governance of social-ecological systems can facilitate effective dialogue between various scientific fields which are busy and concerned in the research of the governance for sustainability. This research tests the central hypothesis that a social problem of sustainable development is the lack of integration of the respective agendas at various scales of institutional action. Thus, we secondarily hypothesize: These systemic integration problems of sustainable development agendas are closely linked with the limits for governance systems whose natural territorial matrix approaches are national jurisdictions. As such, the first thematic area analyzes the relevance of spatial scales in response to the complex and multidimensional nature of sustainable development. Consequently, the construction of new systems of governance for sustainability should be considered central to the multidimensional nature of that paradigm; therefore, spatial scales performance of the agents involved in the processes of sustainability are particularly relevant.

From the aforementioned theoretical framework, the exploration of the literature related to the main focuses to governance continues. From this perspective, the emerging models are emphasized in order to highlight the features that better support the search for those mechanisms to increase the effectiveness of existing institutional arrangements, starting at the complex and multidimensional nature of sustainability, particularly in its environmental dimension. In this context, we provide some evidence on the current institutional arrangements in the field of environment and sustainable development in order to establish some relevant elements that come down to the weakness, dysfunction and ineffectiveness of the major international institutions and their interactions with other institutions in national and supranational matters. In this situation, another focus of analysis aims to explore some tensions between these formal arrangements, referred to mainly in various international agreements, and a variety of informal arrangements that begin to take shape with the emergence of several actors, including government networks for local climate governance.

2. The Spatial Scales of Sustainable Development and Supranational Governance

Today the concept of sustainable development has widespread appeal because of their immediate and long term goals. Nowadays it is a bit difficult to find critics of the model, because a large consensus in the political, academic and institutional discourse is usually generated in this paradigm. Its strength lies here precisely.

However it is also important to recognize the challenges related to the possibilities of its implementation in the various institutional levels, whose pitfalls are related to operational difficulties which are characteristic of a complex, dynamic and polysemic concept. The complex nature of that paradigm is linked to its multiple dimensions: time, material and space. The interactions of these dimensions determine the possibilities of the successful transition to sustainable development on global, national and local levels, including the intermediate spatial scales such as the supranational regional level.

From the time dimension, the operational challenges of sustainable development have to do with, for example, the difficulty of reconciling the interests of present and future generations regarding the use of resources and environmental goods that form the basis of a good quality of life and, to that extent, affects the possibilities for sustainable human development. In turn, the complexity of sustainability determines the possibilities for systemic integration of the sustainable development agenda in its main dimensions: environmental, social, economic and political. According to Loorbach (2007) in the international arena there is a broad consensus to move towards sustainable development. The multitude of approaches also affects the diversity of strategies regarding the implementation of the sustainability agenda at national, regional and global levels. "In this context, sustainable development has been represented as the intersection of economic, social and environmental agendas and the need to integrate (predominantly) environmental concerns into regular policies." (2007:24). Thus, from this perspective, the regime for the transition to sustainability requires governance systems supported by the principles of sustainability and the complex nature of social-ecological systems. In this vein, a key challenge for the above paradigm are the spatial scales of action, namely those problems arising from the fact that sustainable development agendas are designed, developed and implemented from different institutional levels: local, national and international. From this point of view, the less developed institutional levels for the implementation of sustainability are the intermediate scales relating to the supranational and subnational levels.

The Millennium Ecosystem Assessment (MA) indicates two main reasons regarding the importance of sustained approaches at multiple scales: The first one lies within the fact that the systems and ecological and social processes go beyond a variety of scales, the second is that interactions between the various scales exert a crucial influence on the results obtained in some other scale. So while human rules and standards of behavior are integrated on a scale that is dependent of institutional structures, such as political jurisdictions, many ecological processes go beyond these political boundaries, as a consequence one of the central problems lies in the mismatch between the scale of ecological and social processes, this dislocation between jurisdictional boundaries and ecological boundaries raises the need to redesign institutional scales (MA 2003:110 and 111; Berkes 2002:316).

In other words, the temporal and spatial scales of ecological processes and systems and humans are very different. So while the main feature of the spatial scale of ecological systems is influenced by many factors, such as the range of organisms and population, as well as their interactions and geographical distribution, the spatial scale of the social, political and economic systems is influenced by various institutional and social organization levels, namely, they are processes that are integrated and are permeated by cultural processes operating at different institutional levels. This means that the time scale of ecological systems is influenced by the life of organisms, the volume and rate of movement of materials through biogeochemical cycles and the average period changes in an ecosystem, while the time cycle's socioeconomic scales are largely determined by the response times of humans and their institutions (MA 2003:119 and 120).

This causes an initial mismatch between the management of socioeconomic and natural systems. So one of the big questions is related to the understanding of the interactions between the macro-scale and micro-scale phenomena and processes related to the main long term and short term dimensions and interactions that occur during implementation of the sustainability agenda in the various organizational and institutional levels (MA 2003:114 and 115). Interactions can occur within a scale or through a variety of scales, which leads to considerable complexity in the dynamics of socio-ecological systems. These transversal interactions can occur between different levels located on the same scale (space), or may refer to those occurring across different scales (space/time/organization). Thus, while "multilevel" refers to the presence of a problem on more than one level, "multi-scale" presupposes the presence of the identified problem in more than one scale. The cross-scale interactions and cross-levels can change in direction and intensity, consequently socio-ecological changes may arise as a result of the alterations produced by these interactions or other variables (Cash 2006: 2 and 4). Then, the transversal sphere concerns both horizontal (through space) and vertical (through organizational levels) interactions.

This implies the need for the adoption of analytical approaches focused primarily on the interactions between various scales and not on the scales that are considered to be in isolation. From this perspective, institutional arrangements need to be linked horizontally across geographic space and vertically through organizational levels (Berkes 2002:293). In this vein, a fundamental aspect is an institutional arrangement related to the regime of natural resources and environmental services. This institutional framework comprises a set of levels in the spatial scale (local, regional, sub-national and international). Thus, the transversal interactions between the different regimes of resources and environmental services occur when there is vertical interaction between arrangements located at various levels of the jurisdictional scale, namely from the global to the local level (Young 2006:2).

Starting this essential course, Young turns his attention primarily to those institutional interactions which comprise micro-scale or local system to the macro-scale or global system, analyzing mainly the following types of interactions: 1) local institutions and subnational institutions, and 2) national institutions and international institutions (2002: 265). Stemming from this framework the same author continues with the analysis of institutional interdependencies related to resource management and environmental functions, which occur "when the substantive problems or activities that two or more institutions address are linked to in biogeophysical or socioeconomic terms" (Young 2002: 264). Upon recognition of these institutional interactions, we agree with the aforementioned author about a strategic question to guide research in this field that can be formulated as follows: To what extent cross interactions between different institutional arrangements can minimize conflicts of interests or maximize the effective integration of sustainability agendas? (2002:265). Based on this analytical angle, Young mentions the following hypothesis:

" [...]The effectiveness of international environmental regimes—measured in terms of efficiency and equity as well as sustainability—is determined, in considerable measure, by the interplay between rules and decision-making procedures articulated at the international level and the political, economic, and social systems prevailing within individual member states."(2002: 276).

Seen this way, the functionality of institutional arrangements regarding environment and sustainable development depends on the quality of these interactions. Thus, it can be effective to the extent that there is a good match international regime provisions and the political and socioeconomic system in national states, namely, when the interactions between those systems are problematic, these institutional arrangements can become quite dysfunctional and ineffective (Young 2002:276). In this line of thought, the issue of providing a higher degree of efficacy to existing institutional arrangements passes through the review of existing governance systems with emphasis on the areas of interaction among the national, international and supranational institutions.

3. Scrutinizing the Governance Approaches for Sustainability

3.1 In search of democratic and effective governance systems

Overall we agree with Peters' appreciation regarding the governance as an alternative approach in contemporary public administration," [...]it is an attempt to involve society in the task of governing and to reduce system hierarchical elements "(2005:590). In this context, in the words of that author, networks are often considered an essential component in the ability to govern, so that networks provide a link between the state and society. Given the diversity of approaches to governance, one way to approach it from our object of study is the governance approach focused on the interactions. This socio-political governance or interactive governance model is based on broad and systemic interactions among the public, private and social stakeholders related with the processes and structures of contemporary societies.

From this perspective, the focus of the question lies precisely in the interactions among processes and structures of the current social, economic and natural systems. While the process shows the action of the interactions, as a result of the ability of the stakeholders, the structural aspect shows the socio-cultural and natural frames of these interactions. Thus, the governance from an interactive perspective will attempt to cross the boundaries between scales and levels, focusing on trans-boundary interactions amongst them (Kooiman 2004:175 and 176). Under this line of argument, institutional capacity is directly related to the quality of institutional arrangements and governance systems, both the degree of correspondence among different systems, especially from the mechanisms to facilitate the interaction between the different scales and performance levels of the agendas of environment and sustainable development. A paradox of our time " [...] refers to the fact that the collective issues we must grapple with are of growing cross-border extensity and intensity, but the means for addressing these are state-based, weak and incomplete (Held and Hervey 2009:9).

While there are a variety of reasons for the existence of these problems, at the most basic level the persistence of the paradox remains a problem of governance. The abilities of states to address critical issues at the regional and global level are handicapped by a number of structural difficulties, domestic and international, which compound the problems of generating and implementing urgent policies with respect to global good and bad actions" (Held and Hervey 2009:9). Indeed, the authors we reference put the finger on the environmental "wound" by revealing the not-so-obvious contradictions between the nature of the Earth system, the various ecosystems, and more specifically the resources and environmental goods and political institutions supported in the principle of national sovereignty and territorial jurisdictions matrix. Within this context, a key issue has to do with the relationship between governance approaches and the goals of sustainable development based on the recognition of the complex and multidimensional nature of that model. Thus, the content of this section seeks to answer the following question: Which are the most appropriate models of governance for sustainable development purposes?

The complex nature of sustainability (spatial, temporal and material scales) raises the need for the approach to be made from governance systems anchored in the complex, dynamic and interactive social-ecological systems. Seen this way, the multi-scale character of contemporary environmental problems implies the need for a governance model designed structurally and functionally from the diversity of institutional levels that affect this problem. Within this vein, the implications of the diversity of spatial scales of governance systems for sustainability can be approached from two basic angles of analysis: The first is in respect to the decoupling of the scales corresponding to the causes and consequences of environmental problems, which introduces concerns about the unequal distribution of costs and benefits of these environmental issues, secondly, cross-scale environmental problems are also affected by decisions in different institutional scopes, such as the local, sub-national, national and transnational ones (Lemos and Agrawal 2006:308).

If conventional responses are insufficient to address the governance problems that arise in areas such as environment and sustainable development, in a world with ever larger and more complex institutional interactions as a result of increased connectivity within and between socio-ecological systems, Which are the alternatives for an effective and democratic governance? It is clear that we are not able to answer this question with enough scientific evidence. The issue of institutional interaction is an important frontier of governance research. Within this context, we have a set of emerging models, but there is a paradigm that has achieved dominance in this ambit. Alternative approaches include multilevel governance, polycentric governance and adaptive governance, among other alternative models (Brondizio, Ostrom and Young 2009:269). It is therefore clear that the multidimensional nature of contemporary environmental issues and sustainable development opportunities are conditioned largely by the integration of the various natural scales, which are social and political systems of environmental governance and sustainability. As such, the need to advance the exploration emerges from new governance arrangements to include interactions of social systems, natural and institutional arrangements in this area.

3.2 Exploring the new systems of governance for sustainability

Through this order of ideas, the following sections will proceed to the analysis of some of the most representative governance approaches:

a) The mono-centric governance refers to an approach in which the state is the center of political power and the central authority exercises control over the society, economy and resources. The newest governance perspectives have been developed largely as a reaction to the limits of a mono-centric model facing the challenges associated linked to sustainable development. The basic assumptions mono-centric governance is mainly based on are the "jurisdictional scales" with the definition and organization of territorial matrix political units (cities, counties, states or provinces, and nations), with intergovernmental relations created through the respective constitutional and statutory arrangements. Ideally, this system consists of jurisdictions on a limited number of hierarchical levels of government without duplication in government functions. Based on this principle, many contemporary states have a system of three levels or spheres of government (national, state, provincial and municipal), through a hierarchical system, lower-level governments are limited and conditioned by higher-level governments in the jurisdictional and territorial scale (Termeer, Dewulf and Lieshout 2010:3). The mono-centric governance has three congenital limitations to address contemporary environmental issues: (1) The first problem is one of scale, that is among other things, to define what is the most appropriate scale to solve this kind of problem, therefore, the crucial question is whether one level of government is too big or too small to successfully deal with environmental issues and sustainable development,

(2) the other case concerns the existence of gaps between the various levels of government, that arise as a result of tensions among the dynamics of the social issues and constitutional rigidity of government systems, and (3) finally, the third question arises when the system of powers and responsibilities between levels of government encourages conflict due to overlapping jurisdictions, so there is a need to have a clear distinction between levels of government and a clear division of tasks and responsibilities. These problems are compounded when environmental issues such as climate change, jurisdictional boundaries blur, propitiating overlapping authority, the duplication of functions and increased conflicting responsibilities among the various levels of government (Termeer, Dewulf and Lieshout 2010:3 and 4).

b) The polycentric governance. The concept of polycentric governance systems is based on the idea of systems of "autonomous and self-managed" governance regarding the management of environmental and natural resources. "The argument here is straightforward. Smaller systems are easier to manipulate than larger ones." (Brondizio, Ostrom and Young 2009:270). According to those authors, the existence of many small systems (for example, the state or municipal governments) opens opportunities for effective governance based on quasi experiments to explore the consequences of different institutional arrangements in the area of environmental sustainability. According to Ostrom: "The advantage of a polycentric approach is that it encourages experimental efforts at multiple levels, as well as the development of methods for assessing the benefits and costs of particular strategies adopted in one type of ecosystem and comparing these with results obtained in other ecosystems." (2009:39).

c) Multilevel governance. - This model is a starting point for understanding how (national, sub - national and local) governments and other public and private stakeholders interact to design and implement policies on the international, national and local (Corfee - Morlot et al 2009:25).

For Lemos and Agrawal multilevel governance is intended to counter the fragmentation on the decision making based in both the sectorial approach and organized based on territorial division, social and political order (2006:308). Following the authors of reference, the participation of public-private networks in multilevel governance can improve the representation of the diversity of interests affected by environmental problems. This model can be represented by a triangle that connects the state, market and community. Thus three strategic mechanisms to improve environmental governance of public goods related to the resources, services and environmental processes are identified: Co-administration (networks between state agencies and communities), public-private partnerships (networks of state agencies and the market) and social -private partnerships (networking between the market and communities), with these, capability increases to attend to environmental issues through state jurisdiction, human mobilization through market incentives and the development of relations of solidarity in time and space determined by means of the knowledge generated in the communities (2006:310 and 311).

It should also be noted on the negative effects of multilevel governance. These relate to the "denationalization" of the contemporary state and the "hollowing out" of its institutional capabilities, through its territorial and functional reorganization. It is clear that the national state loses power both "up" and "down". Thus, while the impact of globalization on the fact that, to a greater or lesser extent, the national government transferred power to supranational institutions or agencies; parallel to the political and social subnational changes that encourage this process decentralization of various state functions at a regional and local level (Lemos and Agrawal 2006:313).

The most empirical evidence on polycentric and multilevel governance is found in most contemporary political experiment: The European Union.

Europe has a very particular governance system: while it is true that there are community institutions that have the authority to take imperative actions upon society in forms of public policies, so is that there is no European government strictly. In this context, while national governments continue to exert a decisive influence on the political process, the growing influence of a variety of transnational and multinational expert groups in the decision process is also perceived, which leads to a polycentric decisional system, characterized by the absence of clear hierarchies. The network metaphor seems pretty accurate to the decision-making process, so that policy networks have been defined as hybrid mixtures of actors and of national, supranational, intergovernmental, transnational and trans-governmental systems (Morata 2002:1 and 2). Within this matter, Joanne Scott gives us an overview of some key aspects of the legislation and policies of the European Union in relation to climate change, through analysis and evaluation of laws and policies in the context of multilevel governance.

For this author, this institutional framework is particularly well adapted to climate governance change in view of the irrefutable global nature of the phenomenon reference. Thus, in terms of the evolution of EU environmental law, Scott highlights two key trends: conjunction with the shift to a legislative approach based on a the market (emissions trading), perhaps the most relevant newness about climate change is the "externalization " of responsibility for achieving emissions reduction by the European Union and its Member States (2011:2).The European Union has adopted a variety of policies towards reducing GHG emissions. Along with emissions trading and renewable energy policies, the EU has also adopted a number of important measures concerning transport and energy demand through the introduction of sustainability criteria for biofuels. In this context, Scott examines three key aspects of environmental sustainability, which raises interesting and important questions about the distribution of regulatory power in a system of multilevel governance and community legal pluralism, a system that includes not only the EU and its Member States but also to the international organizations and the international law about environmental and sustainability development (2011:3). This trend of EU environmental law is relevant in the field of environmental governance and sustainability because of the "outsourcing" of EU regulation since this course of action is a kind of trans-boundary control on the sustainability of the processes related to the products imported by the European Union countries.

d) Adaptive Governance

Traditionally, theories and approaches to the management of environmental goods focus largely on specific issues or partially on resources and are based on the perception of environmental equilibrium state, interpreting the change as a gradual and incremental thing, without taking into account the interactions between the natural, social and economic scales. Such partial approaches are less useful in the current situation in which the capacity of many ecosystems to generate resources and environmental services for development has become vulnerable to environmental changes. As such, science and policy for sustainability need to address the interaction among the periods of gradual and abrupt change, as well as interactions across spatial and temporal scales in relation to the resilience and adaption of socio-ecological systems. In this context, the approach based of recognition of ecosystems emerges as complex adaptive systems and the need to address beyond the conventional approach. Additionally, this new approach recognizes the human dimension in the configuration of the processes and dynamics of ecosystems, emphasizing as a property of complex adaptive systems, the diversity in the set of institutions and behaviors, interactions among stakeholders and processes that shape future structures and social dynamics. (Folke et al 2005: 442 and 443).

Thus, adaptive governance is based on the collaboration of a diverse set of stakeholders, operating at different levels, often through networks ranging from users, municipalities, regional and national organizations as well as international agencies. From this point of view, adaptive governance is defined as a polycentric form of coordination in which the actions are coordinated voluntarily by individuals and organizations capable of self-organization and self-regulation. The adaptive governance of social-ecological systems requires polycentric institutional arrangements, based on semi-autonomous units of decision-making, operating at multiple scales (Folke et al 2005:448 and 449).From the above we conclude the need for progress in the construction of alternative approaches to environmental governance and sustainability with a common denominator supported by the integration of mechanisms that allow maximum flexibility in the processes of integration of various spatial and material ambits of the sustainable development agenda, particularly its environmental dimension.

4. The Emergence of Transnational Networks on Climate Change

For the sake of simplicity, are often used the national and local interactions to denote two different levels of the organization, although in reality the interactions are much more complex such as those that occur across multiple spatial and temporal scales, as evidenced in the case of climate change (Duit and Galaz 2008:327). In the context of the marked failure of existing institutional arrangements to promote sustainable development purposes, particularly those related to the formal mechanisms in the international system, in the global arena begin to take shape a number of transnational actors that begin to influence the configuration of a new system of governance, with less support in international conventions and more prone to those governance systems anchored on the interests and possibilities of governmental and non-governmental actors in the various policy areas of sustainable development, a situation that is more evident in the most iconic and controversial issue of contemporary environmental issues: climate change.The result of recent international conferences is the marked failure of the traditional multilateral arrangements, despite the multiple international political statements otherwise stated. If anything is clear is the fact that to date there is no legal framework on climate change in the post-Kyoto era.

In this context, an international scenario that must be considered is that in which, once the Kyoto Protocol was expired, to date has not yet been adopted any other legal instrument linked to the Convention United Nations Framework on Climate Change (UNFCCC). Now, in this scenario, the differences between science (whose evidence indicates the need for immediate action) and the international policy process are evident (Peel, Godden and Keenan 2012:247). This gap between the available scientific evidence provided, for example, for the Intergovernmental Panel on Climate Change (IPCC), and due to the lack of a clear political will in the scope of national governments, those trends associated with the emergence of actors that assume unprecedented importance begin to be outlined on the ground that they operate within more flexible institutional networks and with a degree of impact which can be crucial to change the international arena in this environmental problem.

As already noted, multilevel governance also provides a flexible framework to understand the relationships between countries, cities and regions, as well as facilitate interactions between international and regional organizations with national governments and subnational governments, through design and implementation of mitigation and adaptation policies to climate change, with increasing participation from a variety of organizations and non-governmental actors. Therefore, there is increasing evidence of multiple patterns of governance and transnational networks on climate change and other global environmental problems, where the actors work through cross-border organizations. Within this framework, through learning, the transmission of information and various forms of cooperation there are increasingly strong links between cities, regions, national and local governments (Corfee-Morlot et al 2009:25 and 26). In sum, climate change is an international problem, but this is not exclusively addressed in the conventional way, with unitary national actors cooperating by means of the formal treaties. The wide range of effects of climate change at the national, regional and sub-national level, requires the broad participation of authorities, challenging traditional notions of cooperation; a situation that cries out for urgent theoretical clarification in this area (Etty et al 2012: 237).

To this date, serious disagreements regarding the scope of future legal framework on climate change remain. This poses formidable challenges for governance systems, because these cannot continue to be based primarily on international treaties. These problems raise serious doubts about the appropriateness of relying predominantly on climate governance model based on an international system of vertical cut that translates into national regulatory schemes such as emissions trading. At the same time, is emerging the approach of "bottom-up" based on voluntary national commitments to advance the goal of limiting global warming to below 2 ° C (Peel, Godden and Keenan 2012:247). This process is characterized by the emergence of new players that start to outline a new governance system, which exceed the national jurisdictions system and undermines the foundations of the ancient nation state. Indeed, regional and local governments are beginning to play a key role in shaping a new system of governance on climate change. Within this context, horizontal coordination at the local level begins to take shape in different regions of the world, through the integration of various transnational organizations of local governments, comprised mainly of urban governments.¹

Given the difficulties and limitations of both the climate governance model based on the traditional scheme of "top down" basic scaffolding of the current international architecture on climate change, the alternative model supported in the scheme of "bottom up", adopted in the Copenhagen Accord and the Cancun Agreements emerges.² This opens a number of possibilities for the integration of alternative climate governance and international legal engineering with the idea to avoid and minimize adverse effects of climate change (Peel, Godden and Keenan 2012:248).

¹ We refer to transnational organizations like the World Mayors Council on Climate Change, established in 2005, whose main result is the signing of the Global Cities Covenant on "Mexico City Pact". One can also mention other organizations such as ICLEI-Local Governments for Sustainability, created in 1991, and the C40 Cities Climate Leadership Group, formed in 2005.

² Although the United Nations Conference on Climate Change in Copenhagen (UNFCCC, 2009) established significant mechanisms of mitigation, such as reducing emissions from deforestation and forest degradation (REDD-plus), is an international agreement that remains essentially in the line of an climate governance based in an irreducible sovereignty. Instead, the Cancun Agreements (UNFCCC, 2010) outlined a new route in the fight against climate change, noting the need for a new paradigm for the construction of a society with low carbon emissions, recognizes the importance of including participation of a broad spectrum of stakeholders at global, regional, national and local, whether governmental, including subnational governments and local, or private enterprise and civil society.

In this context, perhaps, more than talking about a new model of "bottom-up" it would be more appropriate to establish some trends associated with the emergence of polycentric governance systems of transversal nature, conformed by a variety of networks and actors in this arena of policies. The debate on post-Kyoto route offers a number of new and old paths. This is evidenced by the growing literature on the subject. The current discursive spectrum ranges from the traditional models based on international law on climate change (specifically the UNFCCC and the Kyoto Protocol) to the approaches related with governance models of polycentric nature, supported by the multiple scales developed by theorists such as Eleanor Ostrom. Given that public recognition of the danger of climate change is relatively recent, and also taking into consideration the endless debates about responsibility in this issue, the construction of a polycentric system is an unavoidable task in the near future.

However, given the slowness and conflict involved in achieving a global solution, the recognizing of potential of the building of more effective and plural governance systems is an important step (Ostrom, 2010:38). Thus, the need arises for new governance systems to the limited effectiveness of international environmental law, particularly in the case of climate change. In fact, in this field, in recent legal arrangements and international policies some trends are emerging that are related to fragmentation, decentralization and the empowerment of communities, which is the prelude to the emergence of multiple governance systems, where they can participate in both national states, local governments, international institutions, including the private sector and NGOs, among other relevant actors in this area (Peel, Godden and Keenan 2012:251).

Thus, the emergence of new systems of governance, beyond the classical paradigm of the national and international levels, raises important implications for the international regime centralized and supported by the UNFCCC. In addition, we must also consider the high ranges of uncertainty arising from the fact that there is no clear international commitment to the extension or replacement of the Kyoto Protocol (Peel, Godden and Keenan, 2012:279). This situation encourages the search for alternative systems of environmental governance and sustainability, particularly in the areas related to climate change.

5. Conclusions

The transition to sustainable societies demands the construction of new models of governance, from the complex nature and multidimensional of that paradigm and the transversal nature of spatial, temporal and social scale of sustainable development. Judging from this perspective, there are two central elements related to the integration of agenda in this area: the systemic interaction in its economic, social and environmental dimension, as well as the interaction in spatial scale that goes from the local to the global, going through national and regional levels. The current environmental governance architecture involves the institutional duplicity and rigidity, which stems from the diversity of scales of action in this field, a situation exacerbated by the few and ineffective interactions that occur in the main dimensions of sustainable development.

In this sense, the analysis of the current institutional framework also provides evidence suggesting that there are key issues of sustainability that take refuge in the cracks or areas where institutional interaction is null or weak. This interregnum fosters lack of integration of diverse and conflicting agendas for sustainability in different areas of institutional performance, so it is necessary to advance through a "reengineering" of governance systems to improve the efficiency of the interactions of two or more scales of sustainability. Consequently, a fundamental task is to search for new governance systems that facilitate the spatial, social and temporal interaction of sustainable development agendas. This implies the design of governance systems that allow, on one hand, to harmonize, to complement and to re-articulate the various jurisdictions within the system of national states, and on the other hand, the integration of cross-border governance systems that give greater functionality to the existing international arrangements supported by international conventions.

The theoretical and empirical evidence available also allows establishing some trends on the future configuration of a variety of systems in environmental governance and sustainable development. At the international level, on par with the existence of the governance system supported by the United Nations system, based on international treaties, those governance systems identified with the polycentric models begin to emerge, but whose limits and possibilities, have to do with the lack of appropriate international institutional arrangements that encourage and empower these new systems of governance.

In this emerging system, the international institutions, supranational regional organizations, national governments, sub-national governments and local governments play an important role. Within this line of thought, the greatest opportunities for sustainable development seem glimpsed at in the institutions associated with cross-border governance systems, which can improve the interaction between the different levels of institutional action: global, supranational regional, national and local. In the case of climate change, transnational networks of governmental and non-governmental actors are also starting to set up new systems of governance closest to polycentric and multilevel models, a trend that could be speeded up in the coming decades, which would affect the reconfiguration of ancient environmental and sustainable development international system.

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