# CHAPTER 11

# Uncoupled public policies and institutions: persistent challenges for management of altered ecosystems

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## Abstract

This chapter addresses in an essay manner how the institutional dimension can enhance the promotion of public policy leading to sustainability. It aims to address how, in the conditions of the territory of a coastal developing country (Mexico as reference), development may be redirected towards sustainability. What are the key barriers that inhibit this development and on which we would have to have a bearing on, so that this occurs sooner rather than later? It explores methodological challenges, primarily associated with mismatches (therefore related to scale) and particularly to the institutional implications derived from it. It addresses the apparent and imperfect dialogue that exists between knowledge and policy makers; another apparent divorce, conceptual and disciplinary associated to land use planning, where urban and rural domains seem to be two different countries in terms of their management; finally it looks at the emerging issues associated to ecosystems restoration and the need for academics to recognize and propose, without further delay, the thresholds of resilience, both for populations and for ecosystems.
*Keywords: public policy, mismatch, institutional implications, coastal management, knowledge and policy makers, ecosystem, resilience threshold.*

## 1 Introduction

Given that it is acknowledged that 'Sustainable development is a social, economics, biophysical, ecological, and legislative complex topic' and that 'the challenge is the integration of such complex towards a comprehensive understanding of

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ecological dimensions for both environmental and ecosystem based management' [1], this chapter addresses three thematic areas which, from our point of view, allow us to explore how the institutional dimension can enhance the promotion of public policy leading to sustainability. In essay fashion, it aims at responding to the following questions: How, in the conditions of the territory of a coastal country (Mexico as reference), can development be redirected towards sustainability? What are the key barriers that inhibit this development and on which we would have to have a bearing on, so that this occurs sooner rather than later?

It may be stated that any analytical effort addressing topics related to environmental problems, particularly if it is recent, faces a knowledge challenge that has to do with the 'scale'. Regardless of the discipline or the approach (biology, ecology, geography or complex systems), the central, generic problem to be confronted is linked to processes that reflect, transfer, cross or affect each other on different scales.

The issue of scale takes on importance especially because there are three phenomena at global scale which let visualize for the first time that humanity is facing a problem of sustainability: ozone layer depletion, loss of biodiversity and climate change. Independently of the size and scope of these phenomena, of their complexity, origin and implications, these facts have opened an unprecedented worldwide discussion where the reflections on scale are relatively new. Because of it, the definition of scale and the study of the effects associated to it are relevant.

Landscaping Ecology is perhaps the school pioneering an approach to the issues of management of disturbance, restoration, fragmentation and, of course, the problem and definition of the concept of scale [2]. However, from a perspective (as is our case) interested in proposing ways of intervention in the phenomena under study it is pertinent to annotate that 'scale' refers to any specific geographically or temporally bounded level at which a particular phenomenon is recognizable. 'Scale' can also – and sometimes simultaneously – imply a level of organization or a functional unit [3].

And for that reason it is relevant to recognize certain implications associated with scale, particularly because some efforts to promote local action face environmental deterioration forces or an inability to confront impacts, which requires for example to cite hierarchy theory, where the velocity at which phenomena are expressed increases in lower hierarchical levels, the same way that higher levels restrict and control lower levels [4, 5].

All of the above takes on highlighting relevance when consideration is given to the structural barriers that must be overcome in a desire to intervene in the problems studied, especially when social or political processes are involved, which generically could be denominated as mismatch problems between processes and scales.

The conceptual efforts of the Biology of Conservation [6] can be placed in this category, which analyzes thoroughly the relationships between phenomena and ecological processes in large ecosystems regarding changes or disturbances derived from human activities. Where, for example, the surface necessary to maintain such ecosystems is associated precisely to the risks and elements of this disturbance,

small protected areas are not enough to guarantee the functioning or conservation of the system. The most evident example of this is the surface required by large mammals or top predators. This circumstance has also influenced the type of institutional action required; organizations such as World Wildlife Foundation (WWF) have developed their own strategies and programs for the conservation of large ecosystems or biological corridors [6, 7].

In spite of the fact that the existence of connectivity of processes associated to environmental problems within and across different scales is known, generally, studies or public policy deal with only one problem and at only one scale. There exists enormous difficulty to link distinct levels or hierarchies, particularly in phenomena running across them, and where, to explain connectivity, methodological aspects and information requirements derived from changes in scale are ignored or oversimplified. For instance, the conservation of certain species or ecosystems requires the careful handling of the scales. It is the case of migratory birds or large mammals, for which a protected area policy that does not take into consideration the reproduction processes (nesting or feeding) and their respective territorial extensions, would lead good intentions to failure [6]. The same occurs with social phenomena, for instance migration from rural areas to urban areas, where public policy must consider large territories, which will surely imply several municipalities or even states. The specific challenge is how to integrate the generation of scientific knowledge with the generation of policy at the different scales.

Taken as a governmental program [8] or community program, coastal zone management necessarily goes through the discussion of governance [9]. As far as the environment is concerned, it requires a revision of methodological aspects unsolved such as scale problems associated to environmental solutions and institutional processes [3]. In both cases, environmental policy instruments encounter challenges.

In the near future, we will have to invest more time and learn from the public policy and particularly from public administration scholars. Nowadays there are, however, recent studies that analyze the successes and failures of institutional arrangements for natural resources management, seeing to *the commons* perspective (according to Elinor Ostrom's work), yet overcoming or pointing out the implications in particular cases [10, 11]. Recent efforts illustrate this necessity: 'Collaborative public management is a concept that describes the process of facilitating and operating in multi-organizational arrangements in order to remedy problems that cannot be solved – or solved easily – by single organizations. Government is responsible of policy making and of its execution, and thus it is the entity through which collaborative public management occurs and management activity is channeled' [12]. Another example from the new school of public administration refers to de-mystification of participation and proposes, as of now, a transition from the 'old governance' to the 'new governance' linked to a transition from hierarchical to heterarchical participation [13]. All this in turn shows how fast these concepts are evolving and the need to converge with these ideas.

This chapter addresses, in an essay manner, three great dimensions that we consider exemplify well this type of methodological challenges, primarily associated with mismatch (therefore to scale) and particularly to the institutional implications derived from it.

In the first part, we address the apparent and imperfect dialogue that exists between knowledge and policy makers, paying attention to the idea that there is an explicit acknowledgement that it should be guaranteed, improved or even created [14] in order to achieve for society a better transition towards sustainability.

In the second part, we explore another apparent divorce, conceptual and disciplinary (certainly instrumental, insofar as the tools for policy) associated to land use planning, where urban and rural domains seem to be two different countries in terms of their management.

And finally, the emerging issues associated to the restoration of ecosystems and their functions and the other side of the coin, the need for academics to recognize and propose, without further delay, the thresholds of resilience, both for populations and for ecosystems.

## 2 Integrated coastal zone management: an illustration of unsolved institutional design and the need for the dialogue academia-policy makers

The distinct proposals that have conformed the general model of Integrated Coastal Zone Management (ICZM) coincide in that it should be seen as a process where there are distinct cyclic phases or stages, whose main elements are the coordination and integration as much vertical as horizontal, majorly feasible: (a) through the regional management of economical sectors (fishery, agriculture); (b) among distinct agencies responsible for coastal management; (c) among authorities and institutions federal, state, regional and local; (d) within the management parties themselves; and (e) among management disciplines, including science, engineering, economics and law [15].

There is an explicit agreement [8] that ICZM includes: (1) it is a dynamic process continuous throughout time; (2) there is a governance arrangement for the setting of policy and implementing decision for distribution or allocation (we consider this to be a key factor rarely mentioned and thus, underestimated: any policy or governmental program that does not imply distribution or allocation of financial resources does not make sense); (3) it utilizes one or more management strategies to rationalize allocation decisions; (4) management strategies consider relationships between systems, and have a geographical boundary/frontier with limits to the sea and inland. Certainly in Mexico, where there is no legal border defining the coast, it can be said that it is a legally inexistent space, and therefore, absent from a planning effort [16].

In general, proposed for the ICZM, there is a series of principles that should guide the development of governmental programs. In all the different efforts by international institutions, the principles derived from Agenda 21 are followed; in

the case of the World Bank [17], the precautionary principle, the polluter pays accountability and transparency, cross-border responsibility and inter-generational equity.

The postulates and principles, the recommendations of sectorial integration, bottom up/top down approaches, are no more than normative proposals, a 'should be' that supposedly resolves what society experiences or leads to environmental deterioration. With distinct variations and emphasis on the components of the stages, the ICZM is generally visualized as a continuous process, where the program is developed and perfected cyclically which has also been denominated adaptive management [18]. However, the core of the problem remains, as Juda [18] points out, given that little progress has been achieved in the institutional design that resolves integration and cross-sectorial relations.

At the same time that a multilevel approach is proposed (from global to local) for coordinated action across sectors, Fig. 1, what is not quite accounted for, is the 'how to' or from which institutional design it should or could be done, which creates the impression that public management is still a 'mystery'. This may be interpreted as if the analysts have failed, and as if academic literature has failed not having approached institutional design as the means to solve the proposals for the ICZM.

Bottom line, in addition to the issue on how to approach the institutional design, there is a necessity we cannot continue to put off: the dialogue between those who produce or create knowledge and decision makers, a process which would allow using what is known in order to execute better the creation of public policy that leads society towards sustainable development models (in plural).

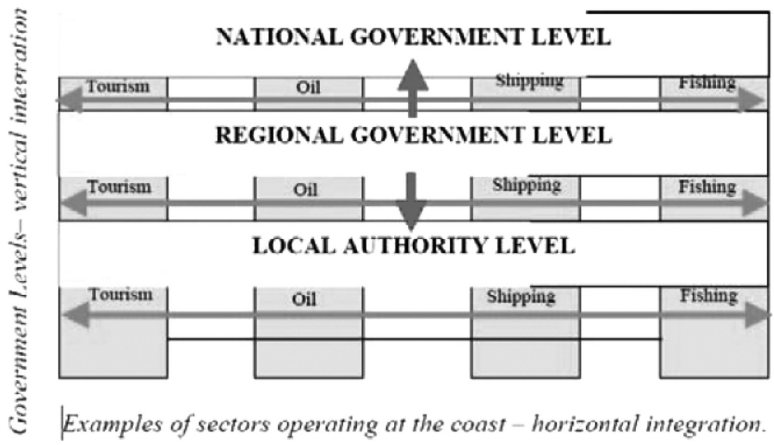


Figure 1: Multi-level program (from global to local) of coordinated and cross-sectorial actions taken from Juda [21]. 'Vertical integration' (across levels) and 'horizontal integration' (across sectors) are commonly used to describe two primary types of integration perceived as important for effective ICZM.

It could be said without risking too much that, considering what we know, it is apparently enough to regulate and to create better policy instruments, but there are barriers – institutional, logical or of socio-political dynamics that inhibit or stop this dialogue between scientific knowledge and policy. Without a doubt in this sense we will face a knowledge assimilation challenge (perhaps synthesis), its transformation, and availability for the decision makers.

This has been recognized previously: 'Science belongs at the heart of good government, but too often it is relegated to the political sidelines. The problem comes from both sides: scientists who do not know how to convey their expertise to a wider world and politicians who are not convinced that it is worth their while to listen' [19].

In the literature for health sciences the topic has been approached as *knowledge translation* (KT): 'the underutilization of evidence-based research in systems of care... often described as a gap between 'what is known' and 'what is currently done' in practice settings' [20]. There is a lot to be learned from these works. Some authors suggest a specific stage of knowledge synthesis as part of their models. They establish elements perfectly applicable to ecosystems management, among other reasons because they admit and identify institutional platforms associated to practice or to the application of knowledge: 'KT is a relatively new term that is increasing in importance and use. KT involves more than distribution of practical scientific information and reliance on academic publication as a primary mechanism for disseminating results' [20].

Ambassador Ong Keng [22] masterfully dissects this problem 'The connection between academic knowledge and policy work has often been equated as the relation between academics and civil servants. Academics are primarily interested in scholarly knowledge, while civil servants are tasked with the role of policy making. This same author highlights that the 'policy maker complain that academics are interested in general knowledge and wisdom, while practitioners are interested in specific instances in which what they do will change things'.

It is evident that not only interests and language operate to keep the distance and strengthen the gap between both universes, it is also the institutional context and certainly both parties' culture: 'academics thus not understand how policy is actually made. They over intellectualize or exaggerate the importance of analytic rationality as criterion for making policies. They think of policy making as a science, not an art, and underplay the role of judgment' [22]. Resolving this, goes through making differences explicit, there will no way for accumulated knowledge, more or less available, be utilized the process of decision making or better yet, converted into public policy, if we do not distinguish and explore this divorce. But once the differences have been established, what alternatives would we have?

Ong Keng himself dissects and attempts to respond this question, and he reaches institutionalize-able solutions, explicitly he concludes that much more than a personal or group effort is required. The core of the reflection points to the essential: 'Scholars need to know the kind of knowledge that policy makers need. They also need to know how to repurpose their research so that policy makers can see the

relevance to their work'. Concisely, he explains some alternatives that give way to his conclusion; needed are institutions that cover the function of translation, synthesis and creation of the dialogue between these two cultures [23]: '…there is a need to focus on the relationship between knowledge and action. Scholars need to know the kind of knowledge that policy makers need… there is some use in having people move between the two worlds, who go from academia to the civil service and vice-versa, or to increase linkages between the two worlds by having people fulfill two roles, for example, having scholars serve on government committees. The formation of think tanks, bodies explicitly created to bridge the gap between knowledge and policy is a third way'.

In developed countries, it is recognized that it is through think tanks that complex problems can be dealt with and also that this dialogue can be promoted, dialogue which, while imperfect, or slow, exemplary samples have happened: Landry *et al*. [24]. for Canada; CST [25] for Europe, or the UK Foresight program [19] (perhaps as a more relevant model to follow given its coastal implications). As far as we know, no institution related to research of the environment and in particular of the coasts can be denominated as such in Mexico.

Paradoxically, if in European countries there is an acknowledgement of the urgency to face the gap between knowledge and policy [26], in developing countries there is a double urgency. On the one hand to immediately and without delay begin strategies and actions to develop this type of institutions, considering that by the time there is a dialogue between academia and policy makers, at the rhythm of resources deterioration, the ecosystems will have such a deterioration, that investment and the need for new strategies will have a brand new and even more dramatic phase lag.

In reviewing the evolution of institutional development and coastal management policy in Canada, the United States and Australia, Juda [21] concludes that in all there exists a desire 'to develop approaches to the coastal and ocean environment that are 'systems' rather than particular use-based and proactive rather than post hoc and reactive in nature'. This author reviews legal and institutional strategies, that can turn out to be rather illustrational for legal development in the case of Mexico, and he points out: 'This is not to say that progress is not being made toward the development of a more integrated ocean and coastal policy, but it does seem apparent that despite growing awareness of the systemic nature of the ocean and coastal environment, efforts to move forward are meeting significant obstacles conceptually, institutionally, and politically' – in synthesis it can be said that even in the countries that take the vanguard position in the matter of coastal policy, the institutional modifications to implement the integration have not been successful. The inertia of sectorial treatment and its institutional counterpart requires profound changes.

Upon reviewing these processes and opinions it can be said that in the case of Mexico initiatives have been enlisted as primitive, timid and incomplete, among other reasons because they have not managed to get out of the environmental sector (the ministry of environment and academia itself), nor transcend executive branch (legislative and judicial powers have not been included), neither do they manage to include other orders of government (states and municipalities).

## 3 Planning in urban and rural domains: also a failure of dialogues and policy tools

Coastal management can be seen and evaluated from a border perspective. Coastal issues can be seen and modeled as a border. Border effects in the coast are obvious with respect to international disputes, but this is not clear within each country. We here consider border studies (and concepts) to explore solutions for ICZM.

Fawcett (1918) cited by Prescott [27] draws a clear distinction between their zonal characteristics and the linear nature of boundaries: Frontiers are distinct regions of transition; it is only when the transitional nature is the dominant characteristics that the region is a true frontier. He distinguished between frontiers of separation and frontiers of contact, and he considered that generally 'natural barrier frontiers' developed within frontiers of separation while artificial boundaries developed in frontiers of contact.

Can coastal zone policies be considered also as a reflection of the state sovereignty? Boundaries and frontiers are elements of the landscape which mark either the legal or actual limits of the state's political sovereignty. The position and character of any boundary of frontier are the result of interaction of many factors. Once any frontier or boundary is established, it is capable of influencing the landscape of which it is a part and the developments, regulations and policies of the separated states (hypothesis to be tested in the coast?). *Boundary* refers to a line, while *frontier* refers to a zone [27].

Allocation refers to the initial political division of territory between two states. Delimitation means the selection of a boundary site and its definition. Demarcation refers to the construction of the boundary in the landscape. Borderland refers to the transition zone within which the boundary lies. Political geographers use the term 'frontier' in two senses; it can either refer to the political division between two countries or the division between the settled and uninhabited parts of one country. In either sense the frontier is considered to be a zone [27].

The concept of frontier can help us to visualize that the coastal zone can have (or suffer) the overlapping of processes associated to its governance and definition. On one hand, when considered as a frontier, a zone, its legal un-definition, the inexistence of defined institutional structures, leaves it in a 'wild west' state, without government. A 'no-man's land', insofar as surveillance and definition, and a 'no-man's-land' insofar as the specialties or academic disciplines [28] that correspond and add themselves to the fragmented and non-complementary presence of government agencies.

Let us take a look at the case of urban space as a counterpart for rural space. Human settlements on the coasts, as well as inland, behave a nodes that are linked by communication means, terrestrial (highways and railways) or maritime. In geographical representations, the coasts are shown as a dividing line between sea and land, and the cities as dots or nodes along the coastline. The nodes on the coastline appear as in any borderline, along the line, and can represent the zones of economical or physical influence (fishing, contamination, commercial trade, water or food supply, employment, commuters, as tributary areas): cities/nodes and their tributary areas Fig. 2.

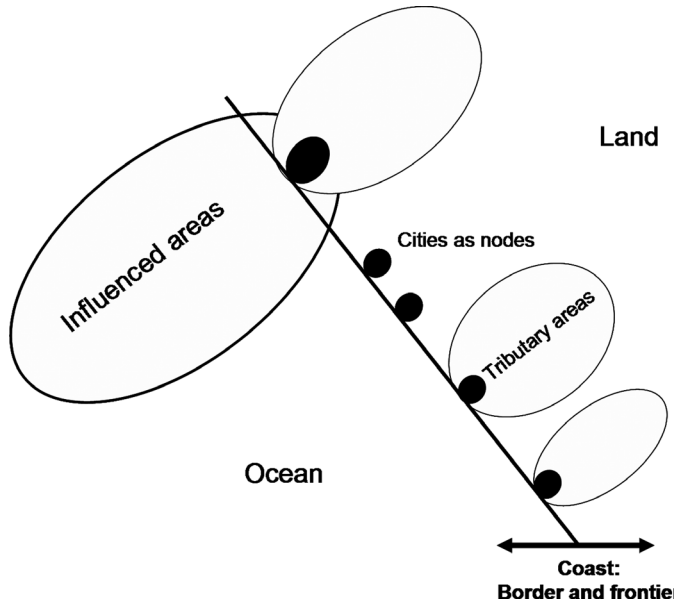


Figure 2: Conceptual sketch of the coastal zone in terms of lines and nodes.

Tributary areas from the socio-economical perspective have not been formally defined as zones, which require explicit policies; it is so then that considering coastal zone management more like urban management and areas of influence can give us an economic perspective and a new frontier/border analytical tool. The latter being important for at least two reasons: (1) because the influence of the cities-nodes is much greater than their geographical representation ('dots in a map') and (2) because, just as with any other borders, countries will have to create special programs and governmental institutions, as is the case of the terrestrial border México–USA.

Coastal cities, and the coasts themselves, can be seen as yet another border/frontier of the country, which also justifies special regional programs such as 'Frontera Norte' [29]. Classical planning instruments are not quite capable of reaching this distinction (land use planning, Environmental impact assessment, urban planning or watershed management).

Between them (nodes or cities), lie under populated spaces; rural areas, which is particularly true for Mexican coasts [30]. In the Mexican coasts and especially in those of the Gulf of Mexico, there is an increasing polarization between urban areas (ports, capital cities and cities) and rural areas. There are some regions poorer than others, the South Pacific is poorer in general than the North Pacific [31] but in all, without exception, it is possible to see a series nodes or dots on the maps (the cities) that are interconnected, either along or perpendicular to the coast, inland, highlighting their true economical or subsidiary nature. The nodes of the coasts and those inland, appear on a map linked in at least two ways: connected by

highways or railways (anthropic) or through a watershed with its rivers system or marine currents (natural).

Urban studies show that in this case the nodes (richer than surroundings) present a challenge: for urban municipalities (the cities) to distinguish themselves as local government and open a dialogue with the federation [32]. While the inter-nodal spaces are constituted mainly by rural areas (poorer), which in higher or lower degree are tributary as they provide natural resources (energy, water, food supply) and economical resources to the cities.

Management goes through making this distinction in the relationship and establishing the linking bonds or policies to moderate urban growth, supply or migration. In synthesis, asymmetry in public services or well being between what is rural and what is urban.

Tributary areas, generally rural, perform primary productive activities (agriculture, mining, agronomy or forestall exploitation activities). This is why the majority of the research related to coastal zones account for deforestation, change of land use, agrochemical contamination or mining products [33, 34]. Urban–rural links, deemed subtle or strong, as far as we know, have not been documented or contended with by public policies, as is the case of tourism and fishery, or regional supply to tourist cities.

In general the coasts of Mexico are not as poor as they seem, being slightly above the national media. However, coastal cities concentrate transformation activities and services. Regardless of their proximity to the coast, any river running by one of the coastal cities, and reaching the ocean, carries with it a high diversity and a large amount of contaminants to begin with. Coastal urban discharges, with very few exceptions, are not fully treated, and even when they are, have high levels of organic and inorganic compounds [35, 36].

All this contamination, be it classified as non-point source (e.g. agriculture) or point (the cities) is affecting and altering the marine-coastal conditions and processes, in most cases with immediate affectation in local economics and in the health of its inhabitants (as is the case of the contamination in beaches by coliform bacteria).

In any event, this differentiation between nodes and inter-nodal spaces, their connectivity and relationship, is also influenced by border dynamics pertaining to the coast, given that the effects or causes of deterioration are at the same time a differentiated responsibility of distinct government hierarchies that concur at the beach, be that in the federal port zone, river mouths, or the ocean itself [37, 38]. The beach is sort of a condensation of attributions and overlapped institutional frontiers, and as in any other frontier, like in a border municipality, states and countries come together with their amalgamation of institutions (state and federal).

The recent proposal 'National environmental Policy for the Sustainable Development of Oceans and Coasts of Mexico' [39] acknowledges cites and the existence of distinct coastal regions, but it does not propose a differentiation in policy for each region, as was suggested by Yáñez-Arancibia [34, 36]. Policies, be sectorial or tran-sectorial, need to be differentiated territorially, regionalized and even specialized for cities and for rural areas and hierarchically within themselves (group of states, watersheds, municipalities or seas).

## 4 From management to restoring: the need of establishing critical thresholds

In the context of adaptive strategies to climate change [40] or adaptive management [34, 41, 42], institutional changes that allow coupling the decision-making scheme with the generation of knowledge within a modeling and monitoring system are of great relevance. In the face of the serious deterioration of ecosystems that is putting at risk their resilience capacities, the restoration-thresholds couple is particularly important.

We would like to risk making a statement that is not necessarily true for all developed countries, but we do consider it true for most developing countries. It can be said that we have migrated from a concept where the environment is healthy, with stable ecosystems, and where integral or sustainable management is possible, towards an environment that has been gradually altered and where the ecosystems and landscapes are very fragmented. This is why an intervention is necessary in order to restore functions [43], recover productivity and rebuild the landscape. Paired with the fading idea of sustainable or integral 'management' of natural resources, the idea of ecosystems restoration has been consolidating. A slow but forceful transition has been taking place, characterized by the acknowledgement of the impossibility to talk about wholesome or healthy systems.

Parallel to this, another similar and correlated change is taking place. The environment has become a civil defense issue (in the sense of preventing and protecting against natural or man-made disasters) [44, 45], where the restoration of ecosystems makes sense mainly by focusing on maintaining the guarantees of the population insofar as their economical activities and their location, as derived from Day *et al*. [46]. and Gunderson [47].

In the same fashion, there begins to be an exploration of restoration markets and the conception of explicit policies to face the aging of the infrastructure in the United States, which allow for the intervention in systems and landscapes to be restored [48]. It is not only the difficulty for the restoration of environmental services and functions that is acknowledged but also *de facto* the issue of profound deterioration and alterations of the ecosystems [41].

This leads to a certain pessimism, yet at the same time, to the necessity for the instrumentation of bolder measures, which permit the recovery of functions, species, habitats, and the consequential recovery of economical attributions upon which ample sectors of society are dependent (as is the case of fisheries). There is strong acknowledgement of the need to identify and make explicit the rhythms of deterioration as well as the drivers [49], in an effort that undoubtedly speaks of a conceptual convergence to identify thresholds and new ways to communicate and to find solutions in public actions.

We need to establish thresholds that prevent us from altering ecosystems beyond their resilience capabilities. This is a new challenge for scholars working on ecosystems and our use of them. Only a few have foreseen the need for these thresholds and for their incorporation to public policy. An example is that of Mee [50], who proposed the concept of 'critical eutrophication' as the condition where the

combined action of both biological and physical processes cannot replenish the oxygen consumed within an aquatic system. Unfortunately, his early warning of a critical threshold was not widely assimilated into public policy and management plans, and as a result of eutrophication there are numerous aquatic ecosystems that nowadays need restoration throughout the world.

There is a kind of resistance to openly declare that we have gone beyond the thresholds of the ecosystems, of the species or populations, and that today there are new arrangements, imbalances and altered states in those landscapes. Caution from ecologists and managers, of those who study populations under exploitation, particularly fishery and forests, is worrisome. Only a few risk declaring that the recovery limit has been exceeded and that the threshold has been crossed. In this line of thought, Swartz *et al*. [51]. are at the avant-garde position.

In the face of the evidence of deterioration tendencies, whose synergies are dramatic, due to their complexity and the sum of their negative effects [52], and in light of climatic variability, it is imperative to speak of thresholds, of limits, of the necessity to not postpone strategic action to allow for the full recovery of the ecosystems and of some of their populations, whether or not they have evident economical value. Our capacity to revert the tendencies, even with explicit societal agreement, is at risk [53].

Worm *et al*. [54]. state 'Human-dominated marine ecosystems are experiencing accelerating loss of populations and species, with largely unknown consequences… Overall, rates of resource collapse increased and recovery potential, stability, and water quality decreased exponentially with declining diversity… We conclude that marine biodiversity loss is increasingly impairing the ocean's capacity to provide food, maintain water quality, and recover from perturbations'. However, in something that would seem a display of optimism and caution, the same author's state, 'Yet available data suggest that at this point, these trends are still reversible'.

Also, the analysis of tendencies cannot be deferred. It is perhaps what will allow the setting of these limits with greater certainty, Kahle [55] points out 'The Ocean is emptying… We have observed record-setting harvests over the last few years, and yet chronic hunger persists and has recently been increasing; the planet is experiencing the 6th great extinction; all of these are the result of human activity. This evidence illustrates that we have not responsibly managed, neither through governance nor technology, our environmental resources. In the absence of finding a sustainable relationship with our ecosystem, we might conclude that we have reached Earth's carrying capacity'.

## 5 Conclusions

From the mismatch phenomena listed here, we can visualize, particularly in developing countries, an agenda of challenges to be addressed in the way to sustainable development.

The apparent and imperfect (to say the least) dialogue that exists between knowledge/scholars and policy makers forces us to look for new institutional structures or associations that fill this functional gap; the development of think tanks or creative paths is urgent.

The apparent disciplinary divorce associated to land-use planning, where urban and rural domains seem to be two different countries in terms of their management should lead us to review and include the urban planning and regional economic knowledge as our assets. The asymmetric relationship between rural and urban areas, so much underestimated in coastal analyses, is restricting our scope of finding alternative policies and instrumental tools.

The fact of not having academic proposals, which set forth limits, thresholds for resilience, for recovery, for the restoration of biogeochemical cycles, for the recuperation of populations and for the reduction of negative synergies, places us at a crossroad to knock-down the barriers for dialogue between scholars and policy makers, practitioners and society as a whole.

The proposal of resilience thresholds and the improvement of dialogue can lead us to agreements similar to those of the IPCC regarding global change. Reaching agreements with the needed information will lead to agreements which, in turn, will allow for the mobilization of political forces which, upon understanding the implications, will be more receptive and can develop accountability before society. The delayed availability of well sustained thresholds and of effective dialogue holds us back; they make us vulnerable and inhibit the effective protection and sustainable use of our ecosystems.

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