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Advancing public policy assessment in global environmental assessments (GEAs)

From the GBA to the IPBES: A comparative analysis of science-policy interfaces for biodiversity

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Abstract

Science-policy interfaces are key structures in any effort to understand the issues and dynamics involved in today's global environmental negotiations. This article draws on the concept of knowledge selection regimes to compare the evolution of three milestones in the field of biodiversity: the Global Biodiversity Assessment (1993-1995), the Millennium Ecosystem Assessment (2001-2005), and the recent Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) created in 2012. We analyse governance structure and the position accorded to the integration of diverse knowledge in each of these interfaces, and compare these elements to the transformations seen in the Intergovernmental Platform on Climate Change (IPCC). This comparative analysis shows that the knowledge selection regime for biodiversity has evolved in favour of a broader integration of non-scientific actors and knowledge, and that this openness corresponds to the growing position of indigenous peoples and developing countries in global negotiations.

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Introduction

Since the early 1970s, environmental issues have occupied an increasingly important position in industrial societies and their governance. In view of the many uncertainties related to the complexity of these problems and their manifestation at various scales, these environmental issues have become part of the more general process of a transformation in policy making. This transformation is characterized, in part, by the proliferation of actors involved in the process and a growing attention to the procedural aspects rather than the substance of these policies[1]. In addition, the challenge of evaluating knowledge for policy making decisions is a large part of any attempt to reduce the numerous uncertainties.

At the international level, global environmental assessments have multiplied since the 1980s. Mitchell and his colleagues define global environmental assessments 'as formal efforts to assemble selected knowledge with a view toward making it publicly available in a form intended to be useful for decision making'[2]. Climate change has been a pioneering element of this trend since the 1988 implementation of a permanent assessment process, the IPCC[3], several years before the creation of a an intergovernmental convention (the UNFCCC[4]). In the biodiversity field, the creation of the CBD[5] in 1992 marked the first international recognition of questions linked to biological diversity, but the international biodiversity regime remained fragmented between several conventions (CBD, Ramsar[6], CITES[7]…)[8]. Contrary to the work on climate change, no assessments of knowledge on the questions of biodiversity were available.

Soon after the creation of the CBD, a beginning exercise in assessing knowledge in the field of biodiversity was completed: the Global Biodiversity Assessment (GBA) (1993-1995). However, this first assessment was poorly received by governmental representatives: holding to its qualifications as independent science without any particular political mandate, the GBA

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[1] Lascoumes (P.), *L'éco-pouvoir. Environnements et politiques*: La Découverte, 1994. Lascoumes (P.), Le Bourhis (J.-P), Le bien commun comme construit territorial. Identités d'action et procédures, *Politix, 11*(42), 1998.

[2] Mitchell, Ronald B., William C. Clark, David W. Cash, and Nancy M. Dickson (Eds.). 2006. *Global Environmental Assessments : information and influence*. Cambridge, Massachussets: MIT.

[3] The Intergovernmental Panel on Climate Change was created in November, 1988 at the demand of the G7 (now the G20) by two United Nations organizations: the World Meteorological Organization (WMO) and the United Nations Environment Program (UNEP). The IPCC presented its first assessment report in 1990, following reports appeared in 1995, 2001, 2007, and the fifth report was prepared in four parts presented between September 2013 and November 2014. Agrawala (S.), 'Context and early origins of the Intergovernmental Panel on Climate Change', *Climatic Change, 39*(4),1998.

[4] United Nations Framework Convention on Climate Change (Rio, 1992)

[5] Convention on Biological Diversity (Rio, 1992)

[6] The Convention on Wetlands of International Importance (1971).

[7] The Convention on International Trade in Endangered (1973).

[8] Biermann (F), Pattberg (P), Van Asselt (H), Zelli (F), 'The fragmentation of global governance architectures: A framework for analysis', *Global environmental politics, 9*(4), 2009.

was not included in the intergovernmental process that started with the CBD[9]. The failure of GBA recognition would contribute to the motivations for a second global assessment initiative for biodiversity, the Millennium Ecosystem Assessment (MEA) (2001-2005), which was careful to associate several international organizations at its conception and implementation, even while remaining an 'independent' exercise[10]. The MEA represents an essential milestone in the genesis of the Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services (IPBES) that was formally initiated in 2012[11]. Twenty years after the development of the CBD, the creation of the IPBES was the culmination of a long process putting biodiversity on the agenda of the international arena and institutionalizing a permanent process for knowledge assessment, representing an accomplishment often compared with the success of the IPCC in climate change. Thus, the objective of the IPBES is to 'strengthen the science-policy interface for biodiversity and ecosystem services for the conservation and sustainable use of biodiversity, long term human well-being and sustainable development'[12].

The concept of a science-policy interface (SPI) is very used in the environmental field to qualify hybrid institutions where scientists, experts and decision makers can interact to select and organize knowledge associated with the framing process for standards and public policy[13]. This conceptualization assumes the existence of two independent 'worlds', science and policy, separated by borders that give some organizations or authorities a key role in organizing the exchange between science and policy[14]. Dominique Pestre, however, appropriately underlines that 'the relationships and exchanges between knowledge and power are ancient, omnipresent, and complex', and questions the stability of this porosity between

[9] Cash (D), Clark (W. C), From science to policy: Assessing the assessment process, Cambridge, Harvard University, John F. Kennedy School of Government, 2009.

[10] Watson (R. T.), 'Turning science into policy: challenges and experiences from the science-policy interface', *Philosophical Transactions of the Royal Society B. Biological Sciences*, 2005.

[11] Granjou (C.), Mauz (I.), Louvel (S.), Tournay(V.), 'Assessing Nature? The Genesis of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)', *Science Technology & Society*, *18*(1), 2013 ; Pesche (D.), Oubenal (M.), Vandevelde (J.-C.), Hrabanski (M.), 'Le " consensus d'Antalya": les avancées de la plateforme science-société sur la biodiversité et les services écosystémiques (IPBES)', *Nature, Sciences et sociétés, 22*, 2014.

[12] UNEP. 2013. "Recommended conceptual framework of the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services." Pp. 10, edited by IPBES/2/4: United Nations.

[13] Koetz (T.), Bridgewater (P.), Van den Hove (S.), Siebenhüner (B), 'The Role of the Subsidiary Body on Scientific, Technical and Technological advice to the Convention on Biological Diversity as Science Policy interface', Environmental Science and Policy, 2008; Sarkki (S.), Niemelä (J.), Tinch (R.), Van den Hove (S.), Watt (A.), Young (J.), 'Balancing credibility, relevance and legitimacy: a critical assessment of trade-offs in science–policy interfaces', Science and Public Policy, 2013.

[14] Gieryn (T. F.), 'Boundary-work and the demarcation of science from non-science: Strains and interests in professional ideologies of scientists', *American sociological review*, 1983; Guston (D. H.), 'Boundary organizations in environmental policy and science: an introduction', *Science, technology, and human values*, 2001; Parker (J.), Crona (B.), 'On being all things to all people: Boundary organizations and the contemporary research university', *Social Studies of Science, 42*(2), 2012. Van Egmond (S.), Bal (R.), 'Boundary configurations in science policy: modeling practices in health care', *Science, Technology & Human Values, 36*(1), 2011.

the 'scientific world' and the rest of society[15], which is subject to continuous tension from the ambitions and efforts of the scientific community to remain independent[16]. Thus the relationships between science and society can be analysed in the long term as more or less stable dynamics combining the characteristics and tensions pertaining to either mode 1 or mode 2[17]. Pestre introduces the idea of regimes of production, regulation, and acquisition of knowledge to characterize the patterns of science/society relationships over the long term and through their socially constructed dimensions. The regime concept helps to avoid the naturalization of the transformations observed and to integrate a complex, dynamic dimension which does not essentialise these transformations with a sequential or Manichaean conceptualization.

In the field of global environmental assessments, the idea of regime appears to be useful as long as it doesn't prejudge the nature of the interactions between science and policy while underlining their close interaction[18]. The idea of a *knowledge production regime* encompasses the collection of regulations and institutional configurations that govern the relationships between science and society. In this paper, we prioritize the idea of a *regime of knowledge selection and assemblage*[19], recognizing that rather than producing new knowledge, these assessments rely on existing knowledge which is selected by virtue of its 'relevance' to the decision-making process and organized for the benefit of a diversified audience. Additionally, by recognizing the coexistence of a variety of norms, more or less under tension, the regime concept helps us avoid the trap of an evolutionary perspective suggested by the passage from one method to another[20]. The idea of regime can also help support comparative work if we define the concept with variables facilitating the comparisons between assessment exercises which can differ in content, scale, and duration.

With the creation of the IPBES, the knowledge selection regime in the field of biodiversity becomes a research subject. Will this new science-policy interface help to stabilize a global knowledge selection regime for decision-making in biodiversity? What are the emerging

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[15] This view is close to the conceptualization proposed by S. Jasanoff in which science and policy are closely intertwined, as suggested by the idea of co-production. Jasanoff (S.), *States of knowledge: the co-production of science and social order*, London New York, Routledge, 2004.

[16] Pestre (D.), *Introduction aux Science Studies*, Paris, La découverte, 2006.

[17] Simply stated, mode 1 represents science founded on theory, experimentation, scientific disciplines, and autonomy, while mode 2 represents a new paradigm based on the production of socially distributed knowledge, and transdisciplinary, oriented toward application, and subject to accountability. This change in the paradigm has occurred over the last decades in a context of the transformation in research methods towards the increasing commercialization of knowledge, and of mechanisms aimed at the accountability of research functions and performance. Nowotny (H.), Scott (P), Gibbons (M.), « Introduction: Mode 2 Revisited: The New Production of Knowledge », *Minerva*, 41**,** 2003.

[18] Marcovich (A.), Shinn (T.), 'Regimes of science production and diffusion: towards a transverse organization of knowledge', *Scientiae Studia, 10*, 2012 ; Pestre (D.), *Introduction aux Science Studies*, Paris, La découverte, 2006.

[19] In the balance of this paper we will use the expression 'knowledge selection regime' with the understanding the expression also includes the aspect of organizing and diffusing the 'assembled' knowledge.

[20] Lamy (J.), Saint-Martin (A.), 'Pratiques et collectifs de la science en régimes Note critique', *Revue d'histoire des sciences*, (2), 2012.

stages and characteristics of this regime? To what degree is it influenced by the IPCC's model for the process of knowledge selection in the struggle against climate change? Considering these questions, the literature oscillates between calling for a strong link[21] and the emphasizing the contrasts in the specificity between the two intergovernmental, science-policy interfaces represented by the IPBES and the IPCC[22].

1. Comparative analysis of the international biodiversity assessment exercises, in perspective with the IPCC

A more precise comparison of the dynamics among the three biodiversity assessment exercises presented by the GBA, the MEA, and the IPBES, placed in perspective with the dynamics of the IPCC should respond to the questions surrounding this science-policy interface. Jasanoff proposes several criteria for analysing the institutional design of these interfaces: the methods for assessing scientific evidences , the forms of knowledge validation, the forms of expert selection, the methods for organizing proofing procedures, and the forms of demarcation between scientific and policy institutions[23]. We have used this literature as inspiration to identify two variables for comparison among the three science-policy interfaces studied. These variables constitute the foundation of what we call a "knowledge selection regime". The first variable refers to the 'structure and governance' of the assessments, and includes several sub-variables that enable the identification of the formal links between science and policy, most notably through the size of the budget, the structure of the budget, the conducting authorities, and the structure and composition of the exercise. The second variable, 'integration of knowledge diversity', concerns the exercises' capacity for openness by analysing their recourse to interdisciplinary sources, the nature of knowledge included, and the framing of knowledge produced (see table 1 below). The analysis of the three assessment exercises and their placement in perspective with the ICPP allows us to identify a greater openness to the integration of the diverse knowledge that can be traced to two factors: (1)

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[21] Goerg (C.), Nesshöver (C.), Paulsch (A.), 'A New Link Between Biodiversity Science and Policy', *GAIA-Ecological Perspectives for Science and Society*, 19 (3), 2010; Koetz (T.), Farrell (K.), Bridgewater (P.), 'Building better science-policy interfaces for international environmental governance: assessing potential within the Intergovernmental Platform for Biodiversity and Ecosystem Services', *International Environmental Agreements: Politics, Law and Economics*, 12(1), 2012; Larigauderie (A.) Mooney (H.), 'The Intergovernmental science-policy Platform on Biodiversity and Ecosystem Services: moving a step closer to an IPCC-like mechanism for biodiversity', *Current Opinion in Environmental Sustainability*, 2**,** 2010.

[22] Beck (S.), Borie (M.), Chilvers (J.), Esguerra (A.), Heubach (K.), Hulme (M.), Lidskog (R.), Lövbrand (E.), Marquard (E.), Miller (C.), 'Towards a Reflexive Turn in the Governance of Global Environmental Expertise. The Cases of the IPCC and the IPBES'. *GAIA-Ecological Perspectives for Science and Society*, 23 (2)**,** 2014.

[23] Jasanoff (S.), *Science and public reason*, London New York, Routledge, 2012.

learning processes within the science-policy interfaces in the biodiversity and climate fields, particularly beginning with the IPCC, and (2) the pressures for change brought by 'marginalized' actors (environmental NGOs, indigenous groups, and non-OECD countries) that have influenced the evolution of the knowledge selection regime for biodiversity towards a larger integration of non-scientific knowledge and actors.

The methodology adopted is based on three types of data. We first conducted an ethnographic survey in Antalya (Turkey) during the second plenary session of the IPBES in December, 2013, which allowed us to identify first hand, the logics closely linking science and policy. We then studied the archives of the GBA and the MEA, and analysed the scientific and grey literature produced at the four interfaces (GBA, MEA, IPBES and IPCC). Finally, we organized more than fifteen semi-directive interviews with the key actors of the process (scientific experts and international organizations).

1. Governing structure	GBA	MEA	IPBES
Budget	US$3.3 M ($1.1/yr)	US$16 M ($3.2/yr)	US$8 M /yr
Budget structure	Narrow	Wide & diversified	Wide & homogeneous
Conducting authority	Uniquely scientific	Dual & hybrid (scientific & policy)	Uniquely policy (United Nations logic)
Architecture	scientific	Scientific & policy	Intergovernmental
Composition	Dominated by northern scientists	Mixed (scientific & policy) but no southern actors	Scientific consultation, validation by the State
2. Integration of knowledge diversity			
Interdisciplinarity	multidisciplinary	Limited interdisciplinarity	Extensive interdisciplinarity
Nature of knowledge included	Uniquely scientific	Scientific and occasionally others	Diverse knowledge (scientific, indigenous, business…)
Framework of knowledge produced	Narrow framework Ecology of populations and ecosystems)	Open framework (multi-scaled linking biodiversity & human well-being through the concept of 'ecosystem service'	Open framework (multi-scaled multi-actors, wide conception of biodiversity)

Table 1: Comparative analysis of the three science-policy interfaces of biodiversity

1.1 Structure and governance of the three science-policy interfaces of biodiversity

The governance of the exercises constitutes our first variable. Several elements allow the characterization of governance and reveal the evolution of science-policy relationships in these interfaces as well as their capacity to take into account a multiplicity of knowledge.

Financing structures, extent and legitimacy of the knowledge selection process

We have undertaken the analysis of the governance of an international assessment first through its budget, inasmuch as the budget more or less limits the consultation. The financing structure is also an indicator of the autonomy of the process (multiple and diversified financing), and the base of legitimacy depending on the nature of the financing organisms.

The GBA project began in 1993 with a budget of US$2 million that grew to $3.3 million by the end of the exercise[24]. The extension granted first by the UNEP, then by the GEF, underlines the difficulty organizers have in anticipating the expenses of this type of exercise. In addition, critics of the GBA pointed out dysfunctions due to weakness in the administrative teams. They criticized the number of non-paid hours that were provided by the scientific experts for administrative work, and claimed that too much importance was placed on sub-contracting to draft certain parts of the document.

The MEA's total expenditures for the duration of the assessment process (2001-2005) rose to US$16 million[25]. But the most significant difference was in the financing structure: while the GBA had a principal source of financing (the GEF), the MEA was able to mobilize diverse financial support ranging from the private sector to bilateral and multilateral donors. The principal contributors, in the order of importance, were the GEF (US$7 M), the United Nations Foundation ($4.2), the David and Lucile Packard Foundation ($2.4), the World Bank ($1.5), and the UNEP ($0.8). Numerous other private and governmental donors made financial or in-kind contributions of USD$20,000 to $400,000. This diversified financial structure, already in place during the preparation period of the MEA (1998-2000),

[24] Sandlund (O.T.), Review and evaluation of UNEP/GEF Global biodiversity assessment project, Norwegian lnstitute for Nature Research (NINA), 1996.

[25] The external evaluation completed after the MEA compares this amount to the second (1995) and third (2001) assessment report of the IPCC (US$30 million including $15 million in-kind), to the international report on Water - GIWA 2005 ($13 million), the International Assessment of Agricultural Knowledge, Science and Technology for Development - IIASTD 2005 ($11 million), and the FAO 2007 assessment of forests ($17 million). The GBA exercise (1993-1995) cost only $3 million from a single donor, the GEF.Wells (M.), Grossman (D.P.), Hugo (N.), Terminal Evaluation of the UNEP/GEF Project 'Millennium Ecosystem Assessment', UNEP, 2006.

demonstrates the diversity of support and reinforces the credibility and legitimacy of the evaluation process.

Contrary to the GBA and the MEA, the IPBES is a permanent, intergovernmental structure. At the end of 2013, the projected average annual budget for the IPBES in 2014 and 2015 was estimated to be US$8 million, compared to an average annual budget of $3.2 million for the MEA during its term. In 2013, the IPBES budget was supported by voluntary contributions by member countries. The largest contributors were Germany, Great Britain, Norway, and the USA, while average contributions came from the Netherlands, Sweden, Japan, and France. Additional but limited in-kind support was provided by international organizations such as UNESCO and the FAO[26].

Both the MEA and the IPBES, in contrast to the GBA, achieve part of their legitimacy through the diversification of their financing. The financing structure of the MEA allowed both strong autonomy and international recognition through the implication of several large international organisms. The intergovernmental character of the IPBES reinforces the legitimacy of the assessment process, however the involvement of UN organizations introduces a certain vulnerability to political mandates and power relationships between countries.

The duration of the exercise, either limited to a specific time frame or institutionalized as a permanent structure, also influences the governance of the assessment process. The GBA and the MEA were conducted over a set period of time, even if the MEA expressed an ambition to repeat the exercise after several years. The permanent platform of the IPBES could in some ways be seen as representing the successful outcome of the process initiated by the GBA.

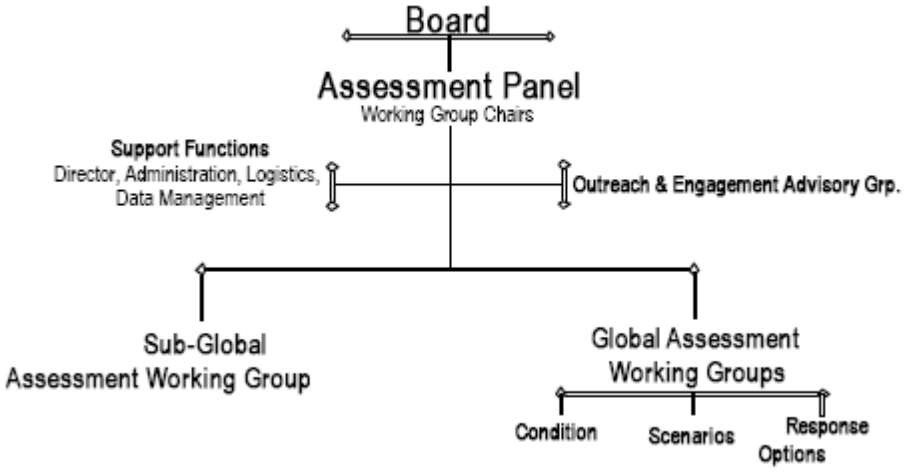
Architecture and composition the managing bodies: how is knowledge selection arbitrated and 'relevance' established?

The organizational architecture of a global environmental assessment says much about the distribution of power and the possible challenges and balancing acts in the process of the assessment exercise. The GBA was an organization directed almost exclusively by scientists: the management process and the functional organization in the GBA gave a preponderant position to the scientific teams (13), scientific coordinators (26), the president (Robert T. Watson), and to the chief editor (Veron H. Heywood). The only representation from international organizations and NGOs came in the form of a few individuals among the list of

[26] Décision IPBES-2/6 : État des contributions et des dépenses à ce jour et budget pour l'exercice biennal 2014-2015. http://www.ipbes.net/images/decisions/Decision_2_6_fr.pdf

honorary advisers and members of the steering group, and government representatives were only occasionally consulted during the proofreading phase of the reports created.

The organizational scheme of the MEA (see table 2) was established in two stages. At the beginning, an Exploratory Steering Committee met twice in 1999. It was composed of 33 individuals, approximately half of which came from the scientific community (universities, international research centres). There were a dozen representatives from international organizations (ONU, World Bank, FAO, etc.) or national administrations (Norway, China, Slovakia, Columbia), and one representative from the WRI[27], the IUCN[28] and the WBCSD[29] (private sector). This diverse institutional representation reflected the express intention to construct a multi-actor process that would permit regular exchanges between scientists and experts, and the decision-makers that are the 'users' of the knowledge assembled. The exploratory committee was then replaced by an administration Board that held its first meeting in July of 2000. This Board, considered to be the policy authority of the MEA, was composed of 49 individuals. The process's scientific dimension is embodied in another managing authority, the Assessment Panel, which would supervise the organization and direction of the working groups, charged with compiling the various reports. Reflecting the structure of the IPCC, the MEA was organized into three work groups: 'Condition', 'Scenarios', and 'Response Options'. The MEA added a fourth workgroup on sub-global assessment in order to produce assessments on various scales.



MEA organizational scheme (GEF, 2000)

[27] The World Resource Institute is a think tank created in 1982 through a donation from the McArthur Foundation. Since 1986 the WRI has published a report on World Resources in collaboration with the UNEP, the UNDP, and the World Bank.
[28] International Union for Conservation of Nature
[29] The World Business Council on Sustainable Development, created in 1995 on the eve of the Rio Summit, is an international association of businesses committed to sustainable development.

Despite the organizational schematics, the apparent separation between science (Assessment Panel) and policy (Board) only partially reflects the nature of the processes which actually overlapped with strong links between the scientists and the decision-makers, not only through the organizational mechanisms but also, and importantly, through the intertwining paths of the individuals closely implicated in the direction of the MEA. Invisible on the official organizational chart, an executive office was created during 2000 to ensure a close link between the MEA process, several conventions (Ramsar; CITES, UNCCD, CBD), and the international organizations (the GEF, the UNEP)[30].

Because of its intergovernmental structure, the IPBES is governed by the Plenary of the members States. Two complimentary authorities support the Plenary: a Bureau of ten persons that supervises the administrative functions and a panel of multidisciplinary experts (MEP) that oversees the technical and scientific functions of the IPBES. Although the policy-administrative and scientific work is managed separately, it is all governed in a more general sense by the classic rules for United Nations organizations which require the respect of equilibrium by United Nation regions. Additionally, the scientific candidates for inclusion in the MEP are submitted by country, thus reinforcing the dynamic of intergovernmental policy management on the scientific assessment process.

1.2 Knowledge integration

Our second variable represents the extent to which the diversity of knowledge is integrated into biodiversity assessment exercises. We show that the knowledge selection regime for decision-making in the field of biodiversity has evolved to become more inclusive and open to the different types of knowledge. The more or less pervasive use of an interdisciplinary approach, the types of knowledge included, and the framework of knowledge produced, reflect this openness.

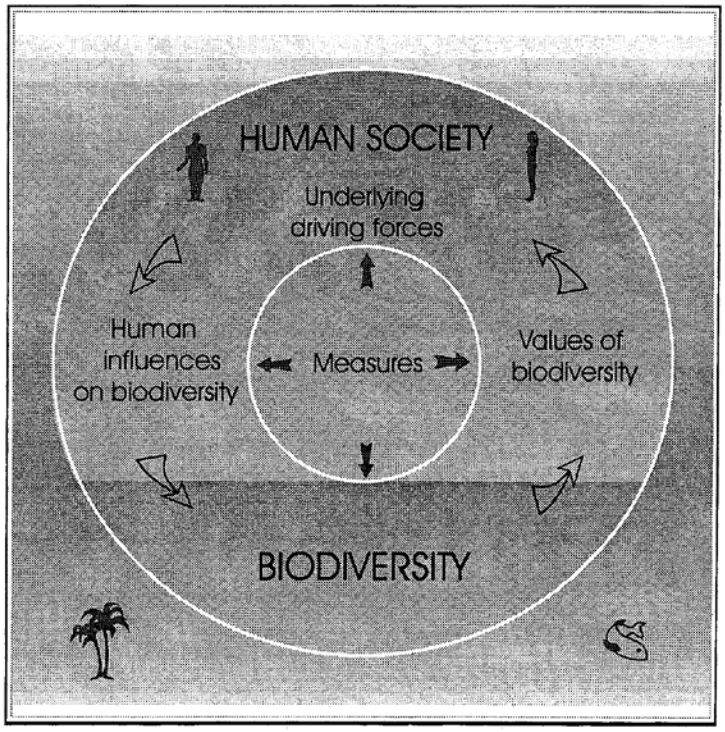


Fig. 1 The interaction between human society and biodiversity.

At the beginning of the 1990s, the organizers of the GBA, like those of the IPCC,

ment, Nairobi: UNEP/GC.22/INF/27,

expected to establish legitimacy uniquely on the basis of natural sciences which were judged to be less subject to criticism than the social sciences[31]. The exercise involved close to 300 scientific experts and was based exclusively on their contributions. The organizers did plan to mobilize several disciplines, especially the various biological sciences (population ecology, taxonomy, genetics, ecosystem ecology, etc.), socio-economic sciences, and applied management sciences. However, the limited presence of the latter two in the structure of the GBA report suggests that the exchange between these three disciplines never really took place. Out of the 13 chapters in the report, only 3 fall outside the field of biology: the first 10 chapters approach biodiversity uniquely from the perspective of evolutionary biology and population ecology (definition, functioning, monitoring, inventory, etc.); chapters 11 and 12 consider the question of human influence on biodiversity and the value of biodiversity from the perspective of economic sciences; and finally the 13th chapter looks at conservation measures through management sciences as applied to biodiversity. At the heart of the GBA, it is the above all the reflection on the diversity of species that determined the concentration on classic ecology, an aspect that was apparently not conducive to a dialogue between disciplines and the global approach planned for the GBA. The juxtaposition of the different scientific disciplines did not succeed in producing an interdisciplinary report; open to a variety of scientific analyses. As we see in the above diagram, it is finally, a rather 'simplistic' framework proposing to evaluate the interactions between humanity and biodiversity.

The MEA exercise was different from the GBA by virtue the organizers' intention to incorporate non-scientific knowledge, and also because they sought to expand the process to a variety of disciplines and encourage interaction between them. The MEA's mid-term assessment by Miller and Dublin in 2004 shows that ecologists, biologists, and economists are dominant in the process, however it does include a few sociologists, agronomists, physicists, geologists, hydrologists, etc.[32]. This interdisciplinary was facilitated by the mobilization of particular sub-disciplines. It appears that the predominance of functional ecology in the MEA, rather than GBA's population ecology, facilitated the interactions with economists. Similarly, the latter would be massively recruited from the network of ecological economics[33] which concentrates on biodiversity using monetary evaluation tools for the environment. Beyond scientific knowledge, the MEA also included expertise through the implication of experts from the development sector (World Bank, FAO. CGIAR, etc.) and think tanks (IIED[34], WRI, etc.). Although one of the MEA objectives was to incorporate 'knowledge held by the private sector, practitioners, local communities, and indigenous peoples' (MEA, 'Ecosystems And Human Well-Being: Synthesis', p. V), only a handful of the 1,360 experts involved

[31] Hulme (M.), Mahoney, (M.), « Climate change: What do we know about the IPCC? », *Progress in Physical Geography*, 34 (5), 2010.
[32] Miller (C.), Dublin (H.), Millennium Ecosystem Assessment, UNEP/GEF/UNFIP PROJECT - MP/FP/1010-04, Mid-term evaluation, Nairobi, UNEP/GEF, 2004.
[33] Ecological economics was developed primarily by ecologists and economists coming mainly from the Beijer Institute of Stockholm, the Stanford biology department, and the London school of economy.

[34] International Institute for Environment and Development

represented indigenous organizations and local knowledge, the private sector (Syngenta, BP), or environmental NGOs.

The interactions between different actors and the knowledge they brought with them would nevertheless encourage the emergence of a common conceptual framework in which Nature, through ecosystem functions, produces the ecosystem services necessary for human well-being. This concept of ecosystem service enables a more explicit connection between the loss of biodiversity and decision mechanisms[35]. Besides the interdisciplinary innovation evidenced through the concept of ecosystem services, the conceptual framework put forth by the MEA is ambitious in the sense that it proposes to analyse the interactions between biodiversity, ecosystem services, and human well-being, and the dynamics at the origin of the related changes as they manifest at different temporal and spatial scales (see below). The analytical framework has been criticized for analysing the ecosystem solely from the perspective of services that it delivers to mankind, the analysis rests on an anthropocentric image of the relationship between nature and humans, which is far from the social representation and the aspirations of the indigenous populations whose knowledge was largely overlooked by the analysis.

[35] Pesche (D.), Méral (P.), Hrabanski (M.), Bonnin (M.), 'Ecosystem services and payments for environmental services: two sides of the same coin?', in Muradian (R.), Rival (L.), dir., *Governing the provision of Ecosystem Services*, Studies in Ecological Economics 4, Dordrecht, Springer, 2013.

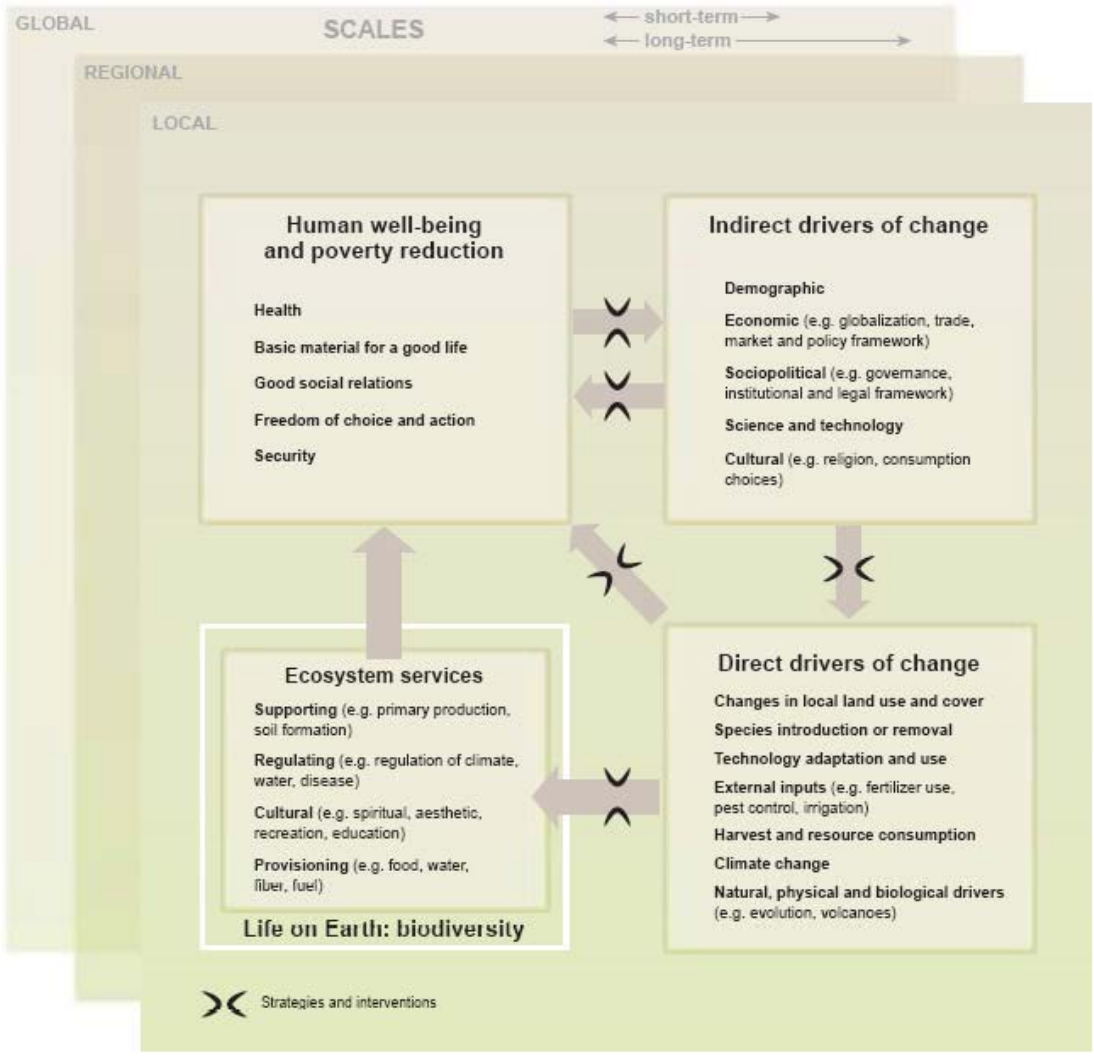


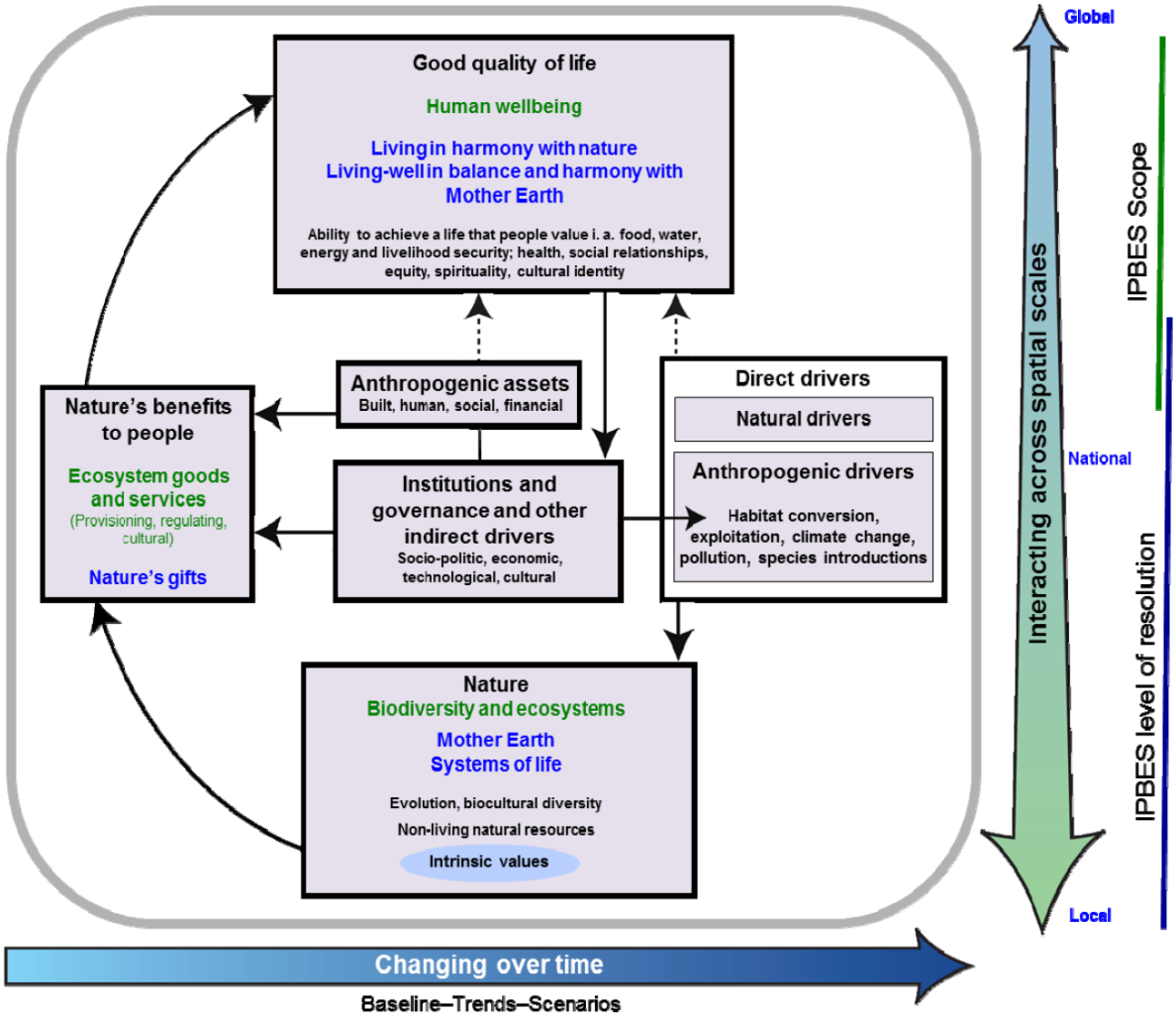
Figure : Millennium Ecosystem Assessment analytical framework

Following a long process, the MEA lead to a new initiative that was launched in 2012 with the official creation of the IPBES[36]. The new platform will attempt to integrate the different criticisms that emerged from the MEA, particularly those labelling the analytical framework with a too utilitarian vision. The experts involved in the process of IPBES framework tried to integrate the variety of perspectives on Nature and take into account not only ecosystem service approaches, but also the cultural and sacred dimensions that Nature "provides". This pluralistic vision of Nature calls for an IPBES that is resistant to dominance by natural sciences, and open to multiple disciplines and research in social sciences as well as sources of local and indigenous knowledge. The conceptual framework adopted by the governmental delegations present in Antalya during the second session of the IPBES in 2013 thus integrates the different perspectives of Nature and its links to societies. Notably included, are those

[36] Pesche (D.), Oubenal (M.), Vandevelde (J-C.), Hrabanski (M.), 'Le "consensus d'Antalya" : les avancées de la plateforme science-société sur la biodiversité et les services écosystémiques (IPBES)' *Nature, Sciences et sociétés*, 22**,** 2014.

linking ecosystems and ecosystem services as well as the vision of 'Mother Earth' and the gifts of Nature dear to representatives of indigenous knowledge and to ALBA countries (see Figure below);

Figure 1
Analytical conceptual framework



Although the participants and the followers of the IPBES often invoke an analogy with the Intergovernmental Panel on Climate Change (IPCC), the construction process of the IPBES and its specificities have resulted in a singular platform. Local and indigenous communities, through their knowledge in the management and conservation of biodiversity, occupy a strategic place in the CDB. Consequently, the new platform of the IPBES gives particular importance to the integration of knowledge originating from these groups, even if their formal place in the process is still subject to controversy among the scientific communities and governmental delegations. The differences between the IPCC and the IPBES also appear in the analyses. Where the analysis on the impact of climate change concentrates principally on the global warming of the planet, the erosion of the biodiversity is analysed at multiple scales (local, territorial, continental and global) and encourages regional and national research which

is coordinated by the IPBES through the methods permitting the articulation of these different scales.

2. The learning process and pressure from marginalized groups: two factors that encourage integrating the diversity of knowledge

The three Global Environmental Assessment for Biodiversity grant increasing importance to non-scientific actors and knowledge. This evolution is a result of both the process of learning from the science-policy interfaces of climate change and the pressure exercised by groups which have previously been marginalized.

21. Between learning and singularities: What are the links between the science-policy interfaces of biodiversity and the IPCC?

Since its creation in 1988, the IPCC has evolved significantly, and inspired the modalities of the science-policy interfaces in the field of biodiversity. Each initiative studied in the biodiversity field (GBA, MEA, and IPBES) exhibits a strong link with the IPCC, regardless of the time period. The IPBES is often presented on this basis as the 'IPCC of biodiversity', exploiting the visibility and the legitimacy of the IPCC to establish the credibility of the intergovernmental platform. Numerous interactions between actors in the IPCC and those in the science-policy interfaces of biodiversity have taken place and continue to take place, facilitating the learning process between the two exercises. Nevertheless, the analysis also shows that the IPBES has differentiated itself by progressively adopting a knowledge selection regime that is relatively different from the one found in the field of climate change that initially served as inspiration.

The first mechanism favouring the learning process between the interfaces of climate change and biodiversity is the relative ubiquity of certain actors, participating to various processes, which enables the direct transfer of experience. The second is the development of research programs focusing on the assessments and ensuring a rapid exploitation of the experience and diffusion of knowledge to experts.

Regarding transfer of experience, the example of Robert Watson is particularly illustrative of this involvement in multiple interfaces, a broad expression of scientific responsibilities and proximity with decision-makers.

Robert T. Watson is a British chemist, specialized in atmospheric science. He began his career at NASA where he was a director of research on the atmosphere in 1987. He became the Director of the Science Division and Chief Scientist for the Office of Mission to Planet Earth at NASA in 1990. Between 1991 and 1994 he presided over the Scientific and Technical

Advisory Panel of the GEF (Global Environment Facility). He co-chaired the Global Biodiversity Assessment (1993-1995), chaired the IPCC from 1997 to 2002, and was involved in the World Bank, where he directed the environmental department from 1996 to 2001, and then became Chief Scientific Advisor and Director for Environmental and Socially Sustainable Development from 2001 to 2007. Between 1998 and 2005, he co-chaired the Board of the MEA, and then the IIASTD (2005-2007). He was also an advisor to President Clinton in the late 1990s. In 2007 he returned to Great Britain where he occupies a post of Director of Strategic Development at the Tyndall Centre for Climate Change Research at the University of East Anglia. He was named vice-president of the IPBES at its creation in 2012.

Robert Watson clearly participated in bringing the IPCC's organizational model to the MEA, with scientific assessment work structured in three groups: conditions, scenarios, and response options. This illustrates the construction of an expertise in the conception and management of global environmental assessment.

The second mechanism fostering learning processes consists of research programs aimed at analysing global environmental assessments as such and establishing the place that scientific knowledge holds in the decision-making process. During the 1990s, a working group at MIT studied three established assessment processes (assessing acid rain, destruction of the ozone layer, and climate change) in an effort to analyse ways to manage global environmental risks[37]. During this same period, the Global Environmental Assessment (GEA) Project produced first a number of important working documents[38] and then publications[39] that were widely diffused in the scientific and policy fields[40]. Internal notes on the conception and the functioning methods of the MEA incorporate concepts taken directly from those forged by the GEA project to analyse the efficiency and relevancy of the global environmental assessments: their proponents use a very operational approach, concentrating on the procedural dimensions of these exercise[41], to exploit the knowledge produced by researchers at Harvard[42].

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[37] The Social Learning Group, Learning to Manage Global Environmental Risks, Volume 1: A Comparative History of Social Responses to Climate Change, Ozone Depletion, and Acid Rain, Cambridge, MIT Press, 2001a. ; The social Learning groupe, Learning to Manage Global Environmental Risks, Volume 2: A Functional Analysis of Social Responses to Climate Change, Ozone Depletion, and Acid Rain, Cambridge, MIT Press, 2001b.

[38] Cash (D.), Clark (W.C.), *From science to policy: Assessing the assessment process*, Harvard University, John F. Kennedy School of Government, 2001. Global Environmental Assessment Project, *A Critical Evaluation of Global Environmental Assessments: The Climate Experience*, Calverton, MD: CARE, 1997.

[39] Mitchell (R. B.), Clark (W.C.), Cash (D.W.), Dickson (N.M.), *Global Environmental Assessments: Information and Influence*, Cambridge, MIT Press, 2006.

[40] The project ended in 2006 but a large quantity of knowledge on the global environmental assessment process continues to be available. http://www.hks.harvard.edu/gea/

[41] The results of the GEA project show that the 'success' of a global environmental assessment rests not only on the scientific credibility, but also on two other important variables related to the questions formulated and the knowledge selected: their relevance and their legitimacy (partially tied to the diversity of actors associated with the assessment process). Mitchell (R. B.), Clark (W.C.), Cash (D.W.), Dickson (N.M.), *Global Environmental Assessments: Information and Influence*, Cambridge, MIT Press, 2006.

[42] Reid (W.), Ash (N.), Bennett (E.), Kumar (P.), Lee (M.), Lucas (N.), Simons (H.), Thompson (V.), Zurek (M)., *Millennium Ecosystem Assessment Methods*, Penang (Malaisia), Millennium Ecosystem Assessment, 2002.

In spite of strong similarities, there seems to be appreciable differences between the knowledge selection regime of the IPCC and the science-policy interfaces of biodiversity. Although the diachronic analysis suggests recognizing the role of the IPCC as a source of inspiration for the different biodiversity assessment exercises, we should note first that the structure of the IPCC has evolved over time. In addition, the implementation of the IPBES is the product of an historic and singular process and constitutes as such a unique experiment, maintaining a distinction from that of the IPCC in the different nature of the questions involved. Biodiversity assumes the inclusion of knowledge on different scales from a diverse set of actors (scientists, volunteer naturalists, indigenous peoples, experts, etc.). Since its creation, the IPCC has had difficulty integrating different forms of knowledge, particularly local knowledge, and as a consequence, limits the range of policy options available in the fight against climate changes. The compared analysis of the first four assessment exercises of the IPCC also shows that the inclusion of social sciences is late and limited, and the participants are found primarily in the countries of the OECD (approximately 80%) in spite of the recurrent criticism of this issue[43]. An external assessment of the IPCC[44] has resulted in the modification to some internal procedures in an effort to integrate grey literature into the knowledge base, and the IPCC began to explicitly seek out contributions from sources of traditional knowledge for the fifth assessment report (2104). Nevertheless, even if the science-policy interfaces of climate and those of biodiversity interact closely, they have not converged towards a single knowledge selection regime.

22. Growing pressure from marginalized groups

The evolution of science-policy interfaces towards more openness to non-scientific knowledge has also come about through the demands of actors that have been traditionally omitted from global governance, particularly in the field of biodiversity.

In the late 1980s the representatives of indigenous peoples rallied their forces to make their voices heard in international negotiations. The Rio Declaration and the Agenda 21 at the United Nations Conference on the Environment and Development in 1992 (UNCED) marked a first step in the recognition of indigenous knowledge[45], but more importantly this would

[43] Hulme (M.), Mahoney, (M.), 'Climate change: What do we know about the IPCC?', *Progress in Physical Geography*, 34 (5), 2010.
[44] InterAcademy Council. 2010. "Climate change assessments. Review of the processes and procedures of the IPCC." Pp. 123: IAC, Committee to Review the Intergovernmental Panel on Climate Change.
[45] Coombe (R.J.), 'Recognition of Indigenous Peoples' and Community Traditional Knowledge in International Law', *Thomas L. Rev.*, 14**,** 2001.

become one of the major issues in the talks at the centre of the CBD[46]. This would in effect become a determining event in the quest for indigenous rights, particularly with article 8(j):

> *'Each contracting Party shall, […] Subject to national legislation, respect, preserve and maintain knowledge, innovations and practices of indigenous and local communities embodying traditional lifestyles relevant for the conservation and sustainable use of biological diversity and promote their wider application with the approval and involvement of the holders of such knowledge, innovations and practices and encourage the equitable sharing of the benefits arising from the utilization of such knowledge innovations and practices.'*

Article 8(j) became the arena of the fight for interests and power between the different States and between indigenous groups and the decision-makers. The CBD may represent, above all, the reaffirmation of national sovereignty over natural resources[47], but paradoxically, the Convention also marks the will of local communities, whether indigenous or rural, to a better control of their areas. The representatives of communities (primarily in South America, but globally in all the countries where they are subject to conflict with their governments) would begin to seek the expansion of their rights in face of the State. Reinforced by the support of international NGOs and some scientific communities, the representative of indigenous peoples demanded their right to control the access and utilization of their knowledge, and seek a clarification of the informed agreement procedures for knowledge and authority, intellectual property rights, land, and cultural rights. They demanded the recognition of indigenous knowledge and the institutionalization of their participation in the negotiation process of the CBD through the creation of a special post in the secretariat (a request that was refused by the participants of the COP3)[48]. By the middle of the 1990s the links between the struggles for indigenous rights and for the ecology became evident through the participation of environmental NGOs at the heart of contemporary world governance and their denunciation of the biopiracy in public space[49]. Little by little, indigenous peoples have become an undeniable actor, and their interests and traditional knowledge are recognized in the CBD, even if the complex knowledge they carry are reduced to little more than their botanical contributions. At the same time, the problem the protection of 'local knowledge' became a transversal theme for militants working with Southern countries at the end of the 1990s[50]. These issues have become part of the dialogue in science-policy interfaces. This change is evidenced in the progression from the United Nations Framework Convention on Climate Change which lacks any reference to traditional knowledge, to the ICPP's explicit solicitation

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[46] Mauro (F.), Hardison (P. D.), 'Traditional knowledge of indigenous and local communities: international debate and policy initiatives', *Ecological Applications*, 10**,** 2000.
[47] Le Prestre (P.), 'La Convention sur la diversité biologique: vers un nouvel ordre biologique international ?', *Nature Sciences Sociétés*, 7**,** 1999.
[48] Op.Cit
[49] Dumoulin (D.), 'Les savoirs locaux dans le filet des réseaux transnationaux d'ong : perspectives mexicaines', *Revue internationale des sciences sociales*, 4**,** 2003.
[50] Roussel (B.), 'Savoirs locaux et conservation de la biodiversité: renforcer la représentation des communautés', *Mouvements***,** 41(4), 2005.

of their contribution for the fifth report of 2014, and its intention to establish communication that was previously almost non-existent between sources of traditional knowledge and academic circles. From the perspective of biodiversity issues, the inclusion of traditional knowledge is even more meaningful. Similarly, although the GBA failed to integrate this type of knowledge, by the time the MEA was launched in 2001, the organizers would make a direct effort to include indigenous people representatives among the policy authorities and scientists involved in the exercise. Today, the IPBES is also confronted with similar demands from indigenous NGOs that seek a specific status as partners rather than being considered in the same terms as other NGO stakeholders or the private sector.

Other actors would also influence the evolution of science-policy interfaces. Governments of emerging and developing countries with little previous influence on global environmental governance began to seek a presence in the negotiations and knowledge production process[51]. The consensus that countries would never accept analyses or recommendations coming out of a process from which they were excluded, lead the IPCC to seek a large geographic representation from the very beginning. Anticipating and responding to criticisms concerning the domination of Northern experts and developed countries, the IPCC progressively enlarged the participation of governments in the process: from 48 countries involved in 1990, it grew to include 96 countries in 1995, and today lists 192 countries. In 1993 it was stipulated that each chapter of a report would be the joint responsibility of at least one Southern and one Northern author, and soon afterwards, the chairmanship of three groups would also be conjoint. This decision was an particularly important element: arranging the structure so that countries would be largely represented at the heart of the IPCC while de-emphasizing the fact that there would be fewer scientists from emerging countries, contributed to the positive image of the IPCC in the Southern countries without weakening its scientific image among Northern countries[52], and similarly buffered the appearance of disagreements concerning the policy framework of the climate change regime[53].

The question of the balance between Northern and Southern countries also crosses the science-policy interfaces of biodiversity. Both the GBA and the MEA were strongly criticized for the over-representation of experts from Northern countries in the process. At the heart of the MEA, the large majority (between 60 and 70%) of the editing and proofreading of drafts documents was conducted by North Americans, Europeans, and Australians. In the framework of the IPBES, the question of the balance between North and South is already a tense subject. For example, most of the developed countries feel that the IPBES should be an inclusive authority, integrating scientific organizations and recognized NGOs, and focused on

[51] Biermann (F.), Pattberg (P.), Van Asselt (H.), Zelli (F.), 'The fragmentation of global governance architectures: A framework for analysis', *Global environmental politics,* 9**,** 2009.
[52] Hulme and Mahoney note however, that since its inception, only 20% of scientists involved in the IPPC are from countries outside of the OECD. See below, Hulme (M.), Mahoney, (M.), 'Climate change: What do we know about the IPCC?', *Progress in Physical Geography*, 34 (5), 2010.
[53] Dahan Dalmedico (A.), Guillemot (H.), 'Changement climatique: dynamiques scientifiques, expertise, enjeux géopolitiques', *Sociologie du Travail*, 48**,** 2006.

a goal of scientific independence and excellence guaranteeing the quality of work produced. By contrast, in the opinion of several countries of the G77, the United Nation's rules must be strictly applied, with only member States governing the process.

Conclusion

Science-policy interfaces are key structures in the effort to understand the issues and dynamics of international environmental negotiations. Instead of regarding these interfaces as meeting places between two closed and opposing worlds, science on one hand and policy/politics on the other, this paper contributes to the analysis of the construction of science-policy knowledge. Using the concept of a knowledge selection regime, we have analysed the evolution of three science-policy interfaces of biodiversity (GBA, MEA, and IPBES), and placed it in perspective with the IPCC, which is seen as a model in global environmental governance.

The comparative analysis allowed us to underline the transformation of governance structures and the methods of diverse knowledge integration. Whereas the GBA of the 1990s tried to base its legitimacy uniquely on science, the IPBES, since its creation in 2012, has sought to mobilize a diverse range of knowledge and respond to criticisms concerning the dominance of Northern scientists in science-policy interfaces. We have also underlined the importance of the learning process between the interfaces of biodiversity and the IPCC, including the singularities in each field. The knowledge selection regime in the biodiversity field has evolved in favour of a wider integration of actors and non-scientific knowledge. This openness particularly reflects the growing influence of indigenous peoples and Southern countries in global environmental governance. We have also shown that the science-policy interfaces are not immune to the issues and complexities of international environmental negotiations. Along with the integration of previously marginalized actors, the environmental NGOs and private sector representatives that have long established participation in these international negotiations will logically seek involvement in the science-policy interfaces of biodiversity.

The IPBES thus appears to be building a knowledge selection regime along two channels. One is based on the mobilization of scientific knowledge selected and controlled by scientific experts and then validated by the States. This first channel is typical of the long prevailing process at the heart of the IPCC. The second is based on the integration of different knowledge holders among indigenous peoples, environmental NGOs, and the private sector, and in this sense, the IPBES seems more advanced than the IPCC which still has difficulty opening the door to different sources of knowledge. The joint evolution of science-policy

interfaces in the fields of climate and biodiversity, however, doesn't really suggest a convergence of the knowledge selection regimes in the two fields. The specificities of the issues addressed as well as the historicity of the interfaces make the existence of a single model of knowledge selection unlikely, even if the close connections continue or intensify. In the future, other science-policy interfaces should emerge in fields such as food security, and could encourage further reflection on the likelihood of a convergence of knowledge selection regimes.