What is the nature of the links between science and policy while implementing a more sustainable development? How to conceptualise an expertise devoted to action?
Environmental policies have an ambivalent relationship with science. There is a wariness of the overvaluation of technical knowledge which, according to Descartes, would render humanity “masters and possessors of nature”; a criticism that we find among the inspirers of the ecological movement, such as Lewis Mumford or Jacques Ellul. Conversely, some profess a strong confidence in a science that could eventually be put to the service of the rational and sustainable management of ecosystems and the planet (see Quénet, APFL). This confidence is de facto expressed in the proliferation of interfaces between science and policy that we analyse in the first part of this text.

The organization of a relaxed and fruitful relationship between science and policies however requires a shift away from this ambivalence and the coherent organization of the contribution of science to political action. However, in doing so one cannot escape the classic questions about science/policy relationships.

John Dewey, among other authors, underlined the issue of the search for certainty and its possibilities and the confrontation between conceptual approaches and practical knowledge. “Certainty is a slumber that intelligence must never know”, wrote Patrick Savidan in his preface to Dewey’s aforementioned book. Past controversies regarding the work of the Intergovernmental Panel on Climate Change (IPCC) have provided opportunities to remind ourselves that, illusory or not, the search for certainty cannot in any way hinder public action in the field of climate, ecosystem health or the sustainability of development in general. Science is called upon to enlighten, to accompany action and to evaluate its results. But the search for certainty cannot be a prerequisite for the implementation of a more sustainable development. Action has to be taken in a complex and uncertain world, on the basis of scientific processes that are undergoing perpetual change.

From this perspective, the positions of John Dewey chime with those of Max Weber, for whom, according to Raymond Aron: “Modern science is in essence evolving... It tends towards an infinitely distant goal and is continually renewing the questions put to nature.” (Les étapes de la pensée sociologique, Gallimard – 1967.) Based on this approach, the precautionary principle was formulated, which is now enshrined in important texts of international and European law, and in the Environmental Charter backed by the French constitution.

In Essays on the Theory of Science, Max Weber, unlike Emile Durkheim, expressed the fundamental irreducibility of human and social sciences to natural sciences. “Standards of political action are within and not outside it,” wrote his translator, Julien Freund, who also wrote the introduction. Freund considered that

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1. The quest for certainty. A study of the relation of knowledge and action.
“political science (...) should not (...) make people believe that it might finally be possible to pursue policies that are innocent, pure and strictly compliant with ethical values.” In other words, science can inform policy but according to Weber, the relationship between science and politics is governed by the opposition between the “ethics of conviction and the ethics of responsibility” Max Weber. Politics as a vocation. Plon, 1965.; politics has its own stimuli and determinations. Our text wants to shed light on the recurrent debates on the reconciliation of natural sciences with human and social sciences within the science/policy interface and the difficulty of addressing the political issues in those arenas. This last issue is discussed in the second part of the text.

Science-policy interfaces, a historic role in setting the agenda of environmental issues

In terms of environmental issues, there are numerous, well-established and multifaceted opportunities for researchers and decision-makers to network and mutually influence each other, which occur in local, national or international arenas (see Figure Interfaces). In the international field, however, multilateral processes are increasingly mobilizing more formal models of institutions, with sectoral achievements that remain difficult to generalize. These so-called “science-policy interfaces” are expected to deliver knowledge syntheses that are authoritative in their respective fields, on which to base actions that we hope to be efficient, consensual and legitimate. (See Le Prestre and Taravella, APFL2009)

Defining the science-policy interface institutions and their roles

There are a wide variety of organizations according to the subject matter and institutional histories. Nevertheless, we can refer to a generic definition proposed by the United Nations Environment Programme (UNEP) in 2009 (UNEP/IPBES/2/INF/1):

“... science-policy interfaces can be defined as institutions that aim to improve the identification, formulation, implementation and evaluation of policy to render governance more effective by:
– which encompass interrelations between science and policy in a range of domains;
– to scientists, policy-makers and other relevant stake- and knowledge-holders within these processes;
– and guiding and coordinating their interactions”.

This definition emphasizes the desire for a constructive debate between scientists, decision makers and stakeholders. The collective structured work must enable, in particular, the production of knowledge syntheses on various issues, expressed in a relatively accessible and balanced language, and adapted if necessary to diplomatic constraints inherent in multilateral processes. Regarding the functions of these interfaces, the UNEP definition above emphasizes their role in supporting environmental governance, ranging from the identification of new avenues for action through to the assessment of public policies that have already been implemented.

In practice, however, the mobilization of knowledge has mainly been used to put environmental issues on the agenda, by warning about environmental degradation and/or by supporting its inclusion on the agenda. In France for example, the National Museum of Natural History and its local branches – local natural history museums and local natural history societies – have played an important historical role in raising awareness on the destruction of natural environments. However, scientific support may also serve to legitimize leaders involved in environmental issues, who traditionally – despite some progress – are still often contested by other actors. Thus, since its creation in 1971, the French Ministry of the Environment had to operate within governments that were uninterested or even hostile towards the environment. Devoid of human and financial resources, with only a very limited social and political base, this Ministry was constantly subjected to controversial questions about the reality and scale of environmental problems, as well as the relevance of the proposed solutions. The Ministry has sought to build its legitimacy on an alliance with those in the scientific community who have an interest in the issue of the environment and the protection of nature. These trends have been observed elsewhere in Europe and beyond.

In 1992 in Mexico, at a time when the Rio Earth Summit enshrined the concept of sustainable development, the Mexican Ministry of the Environment (SEMARNAT) created the National Institute of Ecology (Instituto Nacional de Ecología – INE) to coordinate and carry out science and technology research projects with academic and research institutions, public and private, Mexican and foreign, in the areas
of climate change, environmental conservation and restoration of the ecological balance. The INE must provide technical and scientific support to SEMARNAT for the formulation, implementation and evaluation of the national policy on environmental protection. More recently, the work of the Climate Change INE (INECC) has been crucial to the development of the Mexican contribution (INDC) to the Paris Agreement on Climate. Similarly, since 1985 the Instituto Nacional de Estadística y Geografía (INEGI) has been producing “satellite” economic accounting for the country, integrating environmental externalities. Unfortunately, the corresponding results are more often found on the shelves of libraries rather than on the desks of decision-makers.

Although rarely openly discussed or fully assimilated, this strategic dimension of knowledge is fundamental (Le Prestre and Taravella, 2009; Treyer et al., 2012), especially when considering implementation and all the antagonisms expressed within.

Following the work of Cash et al. (2003), the conventional approach has been to define three characteristics of science-policy interfaces that could help science and technology to support sustainability: salience, credibility and legitimacy. For these authors, salience refers to the relevance of the assessments produced in terms of meeting the needs of the decision-makers and the ease with which these evaluations can be seized. Credibility refers to the scientific quality of the results and the arguments contained within these assessments. Finally, legitimacy refers to the way in which the interface institution is perceived by the actors in its ability to consider, as impartially as possible, the differences in values and interests of the various stakeholders involved. As highlighted by Cash et al., these three characteristics are generally interdependent; a certain way to build an evaluation will be linked to the definition of a need for knowledge, with some consideration given to stakeholders. As discussed in this paper, the issue of implementation actually involves looking at these three dimensions, including the strategic angle that we highlight below.

A gradual structuring of “science-policy interfaces”

It is, however, important to firstly return to the path that has led to the science-policy interfaces as we know them today. In the environmental field and in others, as we have said, the relationship between scientific activity and political decisions has been characterized by an increasing structuration. Historically, a certain number of environmental degradation issues have been raised mainly by scientists and relayed, particularly by NGOs and the media, to political and economic powers (see interview with Mario Molina). Their successes have supported an increasingly structured organization of the science-policy interface. The European continent has particularly distinguished itself in the scientific support of its environmental policies, and in cross border matters. European intergovernmental organizations that take action in the environmental field have, to varying degrees, developed a number of science-policy interfaces.

For example, the Berne Convention for the protection of wildlife in Europe adopted under the Council of Europe in 1979, was based primarily on specialized expert groups (dealing with large carnivores, butterflies, birds, reptiles and amphibians, etc.) composed of scientific specialists and officials dedicated to the protection and management of the species concerned. The dynamics of these groups, whose opinions are often taken up at the level of the Convention, have initiated the protection of emblematic and problematic species, such as brown bears, the lynx and the wolf. For these species, following the implementation of protection or sometimes even reintroduction, then regulation – if not elimination – is carried out in countries such as Sweden, Switzerland and France.

Scientific activity has also informed decisions taken at the intergovernmental level in the field of atmospheric or marine pollution. Similarly, we can observe in these areas a structuration of the relationships between intergovernmental institutions and the scientific community, with the creation of scientific committees and expert groups with the objective to advise, assist and/or monitor the decision-making processes. We also sometimes observe the establishment of ad hoc monitoring systems and research programmes. An illustrative case is that of the Vienna Convention on Long-range Transboundary Air Pollution (CLRTAP) adopted in 1979 as part of the fight
against acid rain, conducted by the UN Economic Commission for Europe. The Convention is responsible for taking decisions on reducing emissions of major pollutants that can contribute to the formation of acid rain. The Convention was accompanied by the creation of a permanent observatory of pollutants (European Monitoring and Evaluation Programme - EMEP) consists of five centres and four “Task Forces” responsible in particular for the identification of the sources of air pollution and to assess their dynamics in the atmosphere (www.emep.int). Science-policy interaction has accompanied the adoption of protocols for the reduction of emissions of SO$_2$, NOx, VOCs and other pollutants and the requirement for vehicle manufactures to equip cars destined for Europe with catalytic converters. The SO$_2$ protocol was particularly well implemented. The results achieved for other pollutants, although not inconsequential, are slower to materialize.

Insert 1 | From alert raiser to expertise

“Historically, the ozone issue started with Sherwood Rowland and I exploring the fate of CFCs in the atmosphere. We were not in the environmental or the policy fields; we were fundamental scientists at that time, but decided we wanted to learn about the atmosphere by choosing an interesting problem in that field. Eventually, we came up with some worrisome ideas that we published in the journal Nature. We thought these issues were important enough to try and reach out beyond our scientific colleagues. So we decided to communicate with several congressmen in the US, as well as with some reporters. The first press release we produced took the opportunity of the annual meeting of the American Chemical Society, the largest professional organization there is, convening both scientists and industry. We were beginners; we didn’t know how to do this sort of thing, so we decided to proceed in a very orderly – and scientific – way. We thought that we should start by explaining that CFCs could be measured in the atmosphere, and at the end Sherry Rowland and I would explain that we were expecting a problem. As you can imagine, this was a mistake because reporters would only hear the beginning of the presentation. They all left before we could even talk about the problem. It took us a while, but we understood eventually how to do it. Especially we understood the usefulness of convincing several congressmen and senators in the US.”

The typical functioning of interfaces: a “composite picture”

Despite the great diversity of themes, to which the science-policy interfaces are dedicated, and the variety of institutional configurations that these interfaces have taken, a similar general rationale guides their work and can, in broad terms, be described by the following sequence:

– Firstly, synthesize observations regarding the phenomenon/phenomena of concern;
– Estimate the severity and associated risks;
– Then identify and quantify the direct, and sometimes indirect causes of these phenomena by distinguishing between natural causes and those of anthropogenic origin;
– If necessary, establish development scenarios;
– Finally, review the possible solutions.

So far, in relation to environmental issues, attention has been mainly focused on the demonstration of a causal link between one or more “drivers”, and the observed phenomenon/phenomena. In the case of the Intergovernmental Panel on Climate Change (IPCC), the negotiations regarding the various “summaries for policymakers” have often focused...
on the way the causal link between anthropogenic greenhouse gas emissions and climate change is expressed. The abovementioned strategic dimension of environmental debates should be considered at this juncture. The fact that the stakeholders of environmental issues have generally relied on the support of scientific works has its corollary here. For opponents of environmental policies, attacking the findings of experts and of institutions at the science-policy interface, in particular by challenging the credibility and/or the legitimacy of the processes followed, somehow becomes the natural objective. The attacks of climate sceptics are a typical example of this.

The difficulty in implementing the actions identified by experts varies according to the subjects and the recommendations do not receive, so to speak, the same acknowledgment. Governments will more easily address issues with technical solutions at costs acceptable to them – even if the causal mechanisms are not clearly understood – than if these issues lead to “transformation agendas” of the economic system or of land use and human activity planning in general. Resistance to change will be far greater in one case than in the other. Regarding acid rain, technical solutions (catalytic converters, desulphurization of heavy fuel oil, unleaded petrol, general improvement of combustion processes to reduce pollutant emissions) had already been developed by the industry and could be imposed at acceptable costs without major changes in the economy of the sectors concerned. Some rather audacious decisions have therefore been taken on this issue, particularly on SO\(_2\) that has been virtually eradicated in Europe over twenty years. Similarly, in the case of the Berne Convention, it has been possible to protect species and habitats by technical and legal measures of protection and management that have only marginally affected human activities. The situation is quite different for climate change, and for the greater development of biodiversity protection issues by starting to question agricultural models, for example. In the case of climate, even if the responsibility of human activities has been clearly identified, quantified and weighed, the implementation of solutions faces huge economic, social and political issues, particularly regarding energy policy.

This returns us to the issue of the major limitation regarding the way in which science-policy interfaces on environmental work have tended to be “framed”. As highlighted above, this framing has so far mainly focused expertise onto the issuing of warnings and on the precise and increasingly certain identification of the anthropogenic causes of environmental problems. This is often accompanied by the secret ambition that a convincing demonstration would support more ambitious action for the environment. However, following 2015, a year that saw the adoption of the 17 Sustainable Development Goals as well as the Paris Agreement on climate, the challenge more than ever is now less one of conviction, than one of the implementation of sustainable development trajectories (Treyer, 2016). Of course, research must retain its role of raising the alarm, but it must now be accompanied by an ambitious research agenda on implementation solutions.

At the time of implementation: towards a humble but ambitious environmental expertise?

What avenues can be identified to renew what is expected of expertise within the framework of implementation? Generally, the first step would be to recognize and to debate the normative and deterministic dimension (so far we have essentially searched for cause and effect relationships) of expertise and the political or even strategic/conflictual implications of its results. Similarly, a change in attitude is probably necessary to go from the search for control to that of experimentation and collective learning.

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that we are facing non-deterministic phenomena, for which our ability to predict the future will remain limited, and some uncertainties will always remain, regardless of the amount of available data or the advancement of models (Colombier, 2013). For example, long-term climate modelling are today converging well on the average changes in temperature and precipitation, but it is much more difficult to predict the evolution of extreme events such as droughts or floods, which are crucial in the design of action: how can a dam be designed without reliable data on 100-year-floods? Finally, in this big data era, the obsession with quantification should not prevent thought and reflection, nor should it remove our desire to increase our capacities for thought, to make long-term projections or to explore grey areas devoid of data.

Sociologists such as Edgar Morin have been hammering the message for decades: “We have acquired unprecedented knowledge about the world and yet everywhere there is error, ignorance, and blindness that progress alongside our knowledge. A radical awareness is necessary because these errors, ignorance, blindness and perils have a common character that results from a mutilating knowledge organization mode, unable to recognize and understand the complexity of reality.” We expect thought processes to “lift the fog and darkness to put reality in order and to reveal the laws that govern it.” This overly simplistic approach is akin to a “degraded use of reason”, unable to grasp the complexity of reality. A “blind intelligence” that destroys groups and total- ities, isolates all objects from their environment, and cannot conceive the inseparable connection between the observer and the observed.

There is probably no indisputable scientific framework for sustainable development. With a back- ground of increasingly nourished but still incomplete analysis, each individual or collective actor, with its system of values and interests, works towards a certain definition of the world or what it should be. Sustainable development thus looks like an invention that is under continual discussion, more or less guided by a vision and political will, with permanent trade- offs between local and global interests and between the short and long terms. This social, political and institutional process is as important as it is difficult to grasp. It calls for further reflection on the context in which each acts and for enriching and multiplying the ways of thinking and acting, pushing the traditional boundaries of reasoning, both in space (what happens here has an impact elsewhere, that we must learn to appreciate and integrate into all action) and in time (giving more consideration to the long term in decision making). New areas for debate can then be opened up, beyond the usual canons of expertise, to the necessary changes of models in all their environmental, economic and social dimensions.

Thus, instead of waiting for a scientific community to reach a mythical total consensus, to provide “cold” advice as a basis for a political agreement, it seems rather that we need to learn how to navigate together across landscapes where passionate controversies abound on what we know of the world, what we want to do, and on who has a say on these issues.

**Dealing with complexity and unpredictability: organizing the humility and reflexivity of expertise**

Jasanoff (2003) suggests that environmental expertise approaches still suffer from three major limitations. First, the orientation of expertise towards the production of a discourse of control tends to induce an aversion to ambiguity and uncertainty, inducing a bias in favour of assertions with a high-level of certainty. In the case of climate, Victor (2015) gives the example of the latest summary for policymakers of the IPCC Group III, which is responsible for assessing the climate change mitigation options. During the negotiation on the summary, for which states must unanimously agree on every sentence and figure, statements with low levels of certainty – which are however those most directly related to the implementation of climate policies – have tended not to be retained.

The creation of these blind spots in the debate is even more damaging due to the fact that the current organization of expertise is also characterized by a reluctance to discuss the way it originally framed the issues. This is the second limitation highlighted by Jasanoff (2003): the rigidity of the frameworks tends to limit the discussion around their normative characters and tends to exclude legitimate proposals that are not expressed in terms of the dominant discourse. In the case of climate change, the definition of issues in global terms has emerged in the 1980s, supported both by climatology work, increasingly adopting a definition of climate as a property of the Earth system (“Earth-system perspective”) and the willingness of international institutions to promote global governance (Miller, 2004). This
framework, while it can be justified on several levels, has nevertheless made it difficult to take into account the multiplicity of more “local” realities, and therefore of the distributive character, of the impacts of climate change. It also left relatively little room in the debates for the consideration of the polycentric nature of actions (Ostrom, 2010) that aim to limit greenhouse gases emissions and therefore, beyond state multilateralism, to the linking of different climate governance centres (sub-national governments, regional groupings, private sector and civil society initiatives, etc.). The third limitation highlighted by Jasanoff (2003) is that this has ultimately affected the ability of expertise to integrate emerging issues situated at the margins of its analytical frameworks.

To overcome these limitations, Jasanoff (2003, 2007) suggested adding “technologies of humility” to the tools of expertise, that is to say, to develop procedures to institutionalize a “humble” attitude towards the risks and to improve their management in collective action. The author proposes to start work on the identification of mandatory questions to be answered during the development of expertise and she suggests four such questions. Firstly, recalling the fact that the way in which problems are raised greatly influences the type of solutions proposed, she suggests that the framing of expertise should be regularly evaluated to allow redefinition when necessary. Secondly, she proposes that risk assessment starts primarily with an assessment of the socio-economic origins of the vulnerability of the most exposed individuals and systems. Then, questions of the distribution of action or inaction should be addressed. Finally, collective learning mechanisms, open to feedback from a wide range of stakeholders, could improve the robustness of knowledge. In a cross-cutting manner, we must also raise the issue of the participation of citizens, or at least of a greater number of actors and interests, in expertise and its governance, to strengthen its democratic legitimacy and political relevance.

These proposals concur with the observations of Beck et al. (2014), who suggest the need for a reflexive turn of international environmental expertise. The authors identify three challenges, which the IPCC and the Intergovernmental Science-Policy Platform on Biodiversity and Ecosystem Services (IPBES) are regularly confronted with: a growing demand for political relevance, the integration of different forms of knowledge and calls for a greater public participation and accountability. This reflexive turn refers to the need for regular and organized self-criticism of the expertise mechanisms in relation to these requirements.

**Diversifying perspectives: towards an environmental expertise that is more open to social sciences and citizen participation?**

Regarding mobilized knowledge, humanities and social sciences (HSS) are generally under-represented in environmental expertise, and very partially represented. In the case of the IPCC, only the economy has a significant presence, especially in Working Group III. Victor (2015) thus recalls that nearly two-thirds of the coordinators of the chapters of the Working Group III’s latest assessment report were economists (mainly environment and natural resources economists) and that other disciplines were almost absent. Only one political scientist, David Victor himself, was among the coordinating authors of chapters, even though Group III is supposed to identify credible options for reducing greenhouse gas emissions. In Group II, which is responsible for assessing the impacts of climate change and adaptation possibilities, less than a third of the 64 chapter coordinating authors came from HSS, among whom nearly half were economists (Victor, 2015). The same under-representation of HSS can be found within the IPBES. Montana & Borie (2015) studied the composition of the Multidisciplinary Expert Panel (MEP) of IPBES, in its interim version, and the current version designated in January 2015. The IPBES MEP is a group of 25 experts, nominated by states, with responsibility for the selection of authors, experts and reviewers, and for the supervision of the processes of framing, writing and editing of each IPBES deliverable; it therefore has an important role in the framing and production of IPBES works. In the intermediary MEP and the current MEP (2015-2018), the HSS have only accounted respectively for 16% and 24% of members, the current MEP having no HSS representatives from outside the European regions, the only nominated researchers in these disciplines coming from Europe. In the first
The limited place of social sciences at the IPBES

“There are still only very few representatives of the social sciences in the MEP. And if one excludes economics, there are even fewer of us. The current Chair of the MEP is Marie Stenseke, a Swedish geographer, but we are still in the minority. This trend is found among authors motivated by evaluations: there are very few social scientists among authors when they should number at least 30%, if not 50%. Without a critical mass of expertise in social sciences, the IPBES is not in a real position of interdisciplinarity, which is a barrier. Furthermore, in the debate between natural sciences and social sciences, we don’t take enough account of the researchers who have several decades of interdisciplinary practice. If you want to create interdisciplinarity, it’s not enough just to put a biologist, a sociologist, a philosopher, an anthropologist and a lawyer together in an office. You have to know the work and the literature, and be interested in contemporary practices. It’s not easy for researchers in the biological sciences to understand that in the social sciences there is already a body of interdisciplinary practitioners with decades of practices and fields. Many specialists in the natural sciences believe they are capable of establishing society’s position by themselves.” Read the full interview with Marie Roué.

Disciplines such as sociology, anthropology or political science are nevertheless essential to identify the underlying, or “indirect”, causes of environmental degradation and to understand how individuals and groups view and respond to environmental changes (Victor, 2015). Areas such as the evaluation of public policies and the sociology of electoral behaviour could provide valuable information on, for example, the effectiveness of the instruments implemented in the framework of national policies on climate or biodiversity, or for example the place of environmental issues in election results. Just as the social studies of sciences provide crucial insights into how and why societies organize the production of knowledge and technology, both throughout history and in the contemporary world. One of the difficulties in mobilizing HSS comes from the fact that controversies between schools of thought are acute, and more difficult to reconcile than in natural sciences (where they also exist). A process of expertise making a more extensive appeal to HSS would probably not be able to erase these differences and would lead, rather than to unequivocal conclusions, at best to a structured presentation of controversies between disciplines or schools of thought and to a discussion on the analysis and conclusions of each. Should environmental expertise provide unequivocal results or contribute in a structured way to “encouraging thought” by the greatest number of people?

Regarding the opening of expertise to participation, the challenge is at least twofold. The purpose is to ensure that a greater variety of stakeholders are able to participate in the framing of the issues addressed by the expertise and that a greater diversity of knowledge, beyond the academic literature, can be analysed and taken into account. As Turnhout et al. (2012) highlighted, experience gained by many important actors has not so far been well integrated into environmental assessments. Local communities, businesses, farmers, fishermen etc., have so far been relatively neglected, even though they hold valuable knowledge about the state of the environment, about practices influencing the environment and the potential transformation levers. Similarly, non-governmental organizations (NGOs) still have a relatively limited say on the organization of environmental expertise. The opening of expertise, beyond improving its democratic nature through more participation, is also important to allow expertise to benefit from the wealth of knowledge that is not included in the academic literature. Moreover, these two issues are important for the legitimacy of environmental expertise, and thus indirectly of environmental issues themselves, in the broader political debate.

The so-called “Climategate” case in 2009, when hackers gained access to thousands of emails on the computer network of the University of East Anglia’s Climatic Research Unit, in England, and the reaction that followed, is a particularly illustrative example. The emails made public by hackers revealed the uncertainty of climate research, full of doubts and passionate exchanges about data, their analysis and interpretation. This was no surprise to anyone who has spent some time (even just a few days!) in a research laboratory. However, the emails have been extensively used by climate sceptics to accuse climate...
researchers of bias and even falsification, with some resonance in the political debates. How can we interpret the Climategate aftermath? In particular, this case highlighted the fact that transparency regarding procedural quality was insufficient to establish the legitimacy of an expert process (Jasanoff, 2011; Beck et al., 2014; Dahan & Guillemot, 2015). A large proportion of the public regarded climate expertise (and climate debate more broadly) as a private elite club, and these “behind the scenes” revelations were like a juicy scandal. It therefore seems that on top of the quality requirement for academic procedures, there should be a greater inclusion of actors other than states and scientists, and a broadening of the circles of expertise accountability beyond governments (ibid.). For now, only states truly have the authority to frame the IPCC’s work (defining the working programme of evaluation reports, requesting special reports and appointing experts) and to validate its summaries for policymakers. The participation of a wider range of actors in this work could help make the expertise more legitimate and give it more authority, and allow a wider proportion of society to appropriate the global expertise and its results; and this would, perhaps, help to make the issue a little more like “our” problem.

These issues have inspired discussions at an early stage during the establishment of IPBES, which was officially launched in 2012 under the auspices of UNEP. From the outset, the opinion was expressed that IPBES should not be seen as an “IPCC for biodiversity” (see for example, Hulme et al., 2011; Turnhout et al., 2012), and indeed the IPBES has a structure and functioning that are different to those of the IPCC (Beck et al., 2014). Regarding IPBES framing, there has been much debate on how to problematize the issues of biodiversity protection, corresponding to different normative standards (e.g. biodiversity protection as a legitimate objective in itself or justified in terms of providing ecosystem services) and more broadly, cultural ones. For example, Borie & Hulme (2015) explained how the chosen framework for the work of IPBES attempts to link and make explicit in its work these different visions of the issue of biodiversity. IPBES is also open to the inclusion of traditional knowledge and more generally of non-academic knowledge on biodiversity and has carried out several works on how to effectively organize this inclusion. A major difficulty relating to this opening is to manage to consistently link this set of information and contributions, and to enable this diversity to be useful to identify avenues for action (Beck et al., 2014; interview with Marie Roué). This echoes the observation made previously on the potential difficulty of representing the contributions from different HSS schools.

But is this really damaging? In any case, it is far from the most common model of expertise, from which we expect unequivocal results, and refers more fundamentally to questioning what is expected of bodies of expertise.

**Accompanying and monitoring change: the transformational ambition of expertise**

The implementation of sustainable development policies requires radical change in all sectors of societies, their functioning and individual as well as collective behaviour. In this context, expertise should develop a greater focus on monitoring the implementation (what do we know about efforts to implement a more sustainable development by different actors? and what is the effectiveness of these actions?) rather than on “indirect factors” or “underlying causes” of environmental degradation. These are related to the functioning of human societies and are often disregarded in environmental expertise as it is currently framed. Yet, these are key issues since it is on these causes that action will need to be taken to achieve the desired transformations. In addition, expertise needs to be more inclusive so that during the course of change, minority actors are able to express their views, particularly if they are in a situation that threatens their existence. Knowledge synthesis to accompany the action will, inevitably, be controversial, if only regarding different world views and different alternative projects, which underlie the various implementation projects.

It therefore appears increasingly necessary to accept controversy and hold constructive discussions around it. Science-policy interface institutions may, increasingly, be trapped in a tension between different models of expertise. As Koetz et al. (2012) showed to be the case for IPBES (but is to a large extent valid for subjects other than biodiversity), since its inception this institution has been caught in a tension between what they call a linear vision and a collaborative vision of its functioning. The former describes IPBES operations that are close to the above-mentioned “composite picture”, aiming to produce summaries of the scientific literature for governments, which also commission evaluations.
The latter mode of operation is more inclusive, involving a wide range of stakeholders and aims to more explicitly debate the way the problems should be framed, with a greater symmetry of influence of different categories of actors. These debates illustrate two quite different theories of action. In the first model, states are the main, if not the exclusive, guarantors of environmental action; in the second model, the responsibility for environmental action is more collective and mobilizes all actors of society; their inclusion in the expertise is intended to facilitate its appropriation "by all". While, as raised above, the development of alternative models that are more inclusive, seems desirable on different levels, this will likely involve finding new balances between actors. These new arrangements, taking into account the strategic perspective raised above (Treyer et al., 2012), will have to be assessed on what they imply in terms of salience, credibility and legitimacy of the expertise produced.

For the organization of research, paying close attention to implementation is also an opportunity to develop innovative interdisciplinary devices (Treyer, 2016), which could be used to make a critical analysis of the implementation efforts and their effects. For example, a more iterative approach of interactions between research and implementation of policies could enable the assessment of the environmental effects of certain orientations during collective action, and even to anticipate the effects of future policy measures. An ambitious interdisciplinary work would then need to be developed to project "en route" these social choices on climate or ecosystems and, if appropriate, propose to redirect action towards more sustainable trajectories (Rankovic et al., 2012). A recent example of this approach can be found in Magnan et al. (2016) in relation to the implications of the Paris Agreement on climate in terms of the future impacts of climate change on oceans.

Conclusion: “Everything remains to be done, finally!”

We are therefore facing very ambitious projects to ensure that the future direction of expertise is able to provide the best support for transformational ambitions of sustainable development policies. How can this work be initiated? Internationally, the avenues mentioned in this article will have to deal with the constraints of the multilateral context, which remain very real. For institutions such as the IPCC or IPBES, states are the main parties: all decisions taken by these institutions are therefore, essentially, derived from complex multilateral processes. In addition, these institutions, even if they involve many volunteer researchers, however depend on government funding. The future guidelines of “organized” international expertise depend, in many respects, on initiatives taken by states, but why not also by coalitions of non-state actors to drive innovation.

In the near future it may be desirable to structure a dialogue, cross-cutting the sustainable development fields, on new forms of expertise. These could be more participatory and more willing to present the controversies in a structured and synthesized way, facilitating a greater shared understanding of issues and of different world views and their complexity, able to inform decisions in uncertain contexts and encouraging thought on the co-construction and co-implementation of solutions. This expertise that potentially carries a new philosophy of action, given the complexity of the issues and the uncertainty, animated by “a permanent tension between the aspirations for a knowledge that is undivided and not isolated or reduced, and the identification of all knowledge as always unfinished and incomplete” (Morin, 2005).

To what extent should and could this new type of expertise be organized? How can we intersect this expertise with the social responsibility of organizations, public and private? How can we integrate the fact that the implementation of this expertise and its actors are holders of expertise per se? After 2015 and its succession of embodiments in terms of commitments, it would be a shame not to mobilize knowledge to support implementation, which will have a great need for expertise. Indeed, as noted by Treyer (2016): “Everything remains to be done, finally!”.

11 – A Planet for Life – Basing public policy on science and knowledge
**BIBLIOGRAPHY**


Your name is associated with the discovery of the ozone layer problem and the negotiation of the Montreal Protocol regulating damaging CFCs emissions. Can you tell us what engineered such a successful political solution? How different is it today with the climate issue?

Mario Molina: There are number of analogies between the Montreal Protocol and the climate change debate, but there are also some important differences. Historically, the ozone issue starts with Sherwood Rowland and I exploring the fate of the CFCs' in the atmosphere. We were not in the environmental or the policy fields; we were fundamental scientists at that time, but decided we wanted to learn about the atmosphere by picking an interesting problem in that field. Eventually, we came up with some worrisome ideas that we published in the journal Nature. We thought it was something important enough to try and communicate beyond our scientific colleagues. We decided that we had to do something to communicate both with people in government and with some politicians starting in the United States, but also wherever it would be needed. We decided to communicate with the media as well, in order to reinforce our message, because usually politicians respond more to media pressure than to scientific results. We also realized it was something we had to do ourselves. It was not obvious because at that time, in the 1970s, it was not generally accepted in the scientific community to directly communicate with the media. We had a few colleagues who went regularly to major newspapers such as the New York Times, but they were not very well regarded and thought to be merely seeking publicity. We decided nevertheless that it was our social responsibility, because there was no clear reporting mechanism at that time for environmental problems. At present there are many environmental organizations that could conceivably take the job, but at that time there were only some that were beginning to emerge; this was a new problem and most of the environmental issues that those organizations were dealing with were local issues.

We set up to do the job with some Congressmen in the US, as well as with some reporters. It was a slow process but some writers became interested enough to even publish a couple of books. The first press release we produced took the opportunity of the annual meeting of the American Chemical Society, the largest professional organization there is, convening both scientists and the industry. We were beginners; we didn’t know how to do that, so we decided to do it very orderly – the scientific way. One should start by explaining...
the CFCs could be measured in the atmosphere, and at the end Sherry Rowland and I would talk to explain that we were expecting a problem. As you can imagine it was a mistake because reporters only hear the beginning of the presentation. They all left before we could even talk about the problem. It took us a while, but we understood eventually how to do it. Especially we understood the usefulness of convincing several congressmen and senators in the US.

There were a few skeptics since the beginning – people from industry refusing the idea that the government should regulate on such “theoretical” matters. It was alright because what we had were only hypotheses and we needed time to test them. But then in order to destroy our credibility a journal accused us of being members of the KGB – and this is one of the similarities I see with the climate debate today. Another journal said that we produced only “crazy science”. We had to be very persistent as the climatologists today have to be. Some of the “scientists” that opposed our results back then are interestingly enough the same that question the reality of climate change today. But the fundamental opposition was political, not scientific: “Government should not tell us what to do”. This is a dogma, not something you can easily discuss. Public decisions are sometimes poorly made, but you cannot expect voluntary actions alone to deal effectively with environmental problems. Even if public action is more largely accepted today in the US, it is still the way that most Republicans currently in Congress think: it is just not appropriate for the government to regulate on this, even if the science is very clear on the problem.

What was the turning point allowing a political answer at the international level?

M. Molina: The first stage was to assure the science was correct. It was not just convincing the media or the politicians that Sherwood Rowland and myself were right. We realized it had to be something more objective. There the crucial event was a US National Academy publication: it gave a lot more scientific weight to our ideas. Then with that scientific weight behind, the next important step was to work with the UN, and especially the World Meteorological Organization – which in a way preceded what we have now with the UNFCCC. This is a very important precedent because climate change just follows the same pattern. We became familiar with the UN processes as they started to meet. Scientists participated to the meetings just to explain the science, but the main objective of the meetings was political: what could be done and how?

For example, the developed nations were the ones causing the problem, very similar to climate change, and had thus to provide funds to help the developing nations. So the multilateral fund was created, arousing at first a lot of worries in the US. I remember the media were afraid of a precedent being set for the rich countries to pay for global damages. And they were right! Looking back, I see how important it was: it turns out it a very minor cost for the economy, but a very powerful political tool to create cooperation. Of course, there were voices predicting the destruction of jobs and so on – again very similar to the climate change issue now, but nothing of that kind happened. And what we didn’t have at that time was very good economists able to evaluate the cost of change and inaction. Nicholas Stern, for example, has powerfully demonstrated the case for climate action in his report. It is important that some stages of the politics/science connection involve economists, so as not to rely only on the good will of industries. In a way, the main difference between the two issues is that for the ozone layer, only a very small group of actors was affected – the large chemicals industries – whereas climate change involves a much larger share of economic resources and many of the largest economic actors.

In the ozone debate, the stronger fight was not with the chemical industries. The opposition came initially mostly from small spray can manufacturers and some dogma-minded politicians. We were in some sense lucky to have most large chemical industries worried to preserve their good name. Particularly the DuPont company, the largest one: they were initially very much opposed, but they were also financing research – applied, not fundamental, but with impressive results such as Teflon. They made the commitment that if the science is proven to be correct they would stop producing CFCs. This happened clearly at the second scientific stage – when the ozone hole appeared, because at first we only had a theory that something may happen. In
between, DuPont had hired a scientist from our community who helped us have access to the CEO and to have them stop the production of the CFCs. One can hope the current commitment of European oil companies to stop climate change will go as far. The chemical companies were able to develop quite rapidly chemicals to replace the CFCs. In the end, they didn’t end up losing much and it became a much friendlier process with the affected industries. With the international fund, the international meetings became very positive and smooth and continue to expand to these days!

**Do you think the way the climate expertise is organized explains also partly its difficulties to convince politicians of the necessity to act now at the required scale?**

**M. Molina:** The scientific meetings in the two processes are quite similar with the idea to keep science apart from political debate. The first difference with the IPCC is that eventually the reports have to be approved by the governments. After the scientists write them, the language has to be approved. It opens the door to non-scientific formulation and interpretation. Some requirements – neutral and easy-to-understand language, no policy recommendations – are in my view exaggerated, if not counterproductive. The divergence between processes grow with the subsequent steps, especially in the US. The fact that the Congress is Republican-dominated explains that at present there cannot be any international agreement ratified by the US. If the US doesn’t ratify a price on emissions, it doesn’t make sense to have any price on emissions. The stratospheric ozone issue was not so politicized. The Montreal Protocol was recommended and approved in the US with a Republican administration. Today some former Republican Congressmen who believe in climate change cannot convince their colleagues to cooperate on this issue because it has become their dogma not to accept public action on climate change.

**Naomi Oreskes,** a historian working on climate, has documented how some of the public relations on climate were made with important funding from interested groups. They sympathized among others with the Tea-Party Group, and the public relations companies involved were the same that have worked for tobacco companies to counter smoking regulation. This underlines again how we, scientists, are very poor at communicating with the public. It is new for us to try and change that, to learn to better communicate.

In the United States, I led a group of 14 climate scientists coordinated by the American Association for the Advancement of Science to write a summary of what is known about climate change science. Surveys find a stable 10% of true deniers, who take climate change to be, for example, a communist plot. What is surprising is that this 10% becomes 52% in the US Congress. Our group wants to introduce more rationality in the US public debate. The next step is to test different ways of explaining climate change to the general public, and to measure results. We want to be able to give them key messages and to dissipate some of the myths. For example, some public relation companies emphasize the fact that some scientists think one way and some others another way concluding thus that there is no certainty. We answer them that even if we may not know everything, what we know, which includes the basic science, we know very well. And we emphasize that most scientists who oppose climate change are not doing proper science or are not even climate specialists. They are often doing what you call in English “cherry-picking”: they arbitrarily select some data to prove their point. The problem is mainly the US: there are skeptics in other countries as well, but they are not quite as involved in policy issues.

Despite the influence of climate change deniers, climate change policies have been developed both on mitigation and adaptation. **Shouldn’t the science change also, doing less alerting and more policy counseling on implementing climate policies?**

**M. Molina:** I don’t agree with that. The IPPC is by design meant not to give policy advice. This doesn’t mean they are only warning; it means that they won’t tell you what to do. What they tell you is what will happen if we don’t change the way we are doing things, if we change somewhat or if we change totally. The economists tell us the cost of every likely action. They give a whole list of possible actions but refrain to use the word “should”.
Taking their language only for a warning is a misconception of what they mean.

When here in Paris everyone is talking about the way not to exceed 2°C warming, it is not really science: it is science plus economics, because doing much more would be too costly, and doing less would be too risky. The most important message contained in the IPCC reports according to me and to several of my colleagues is: if you don’t reduce emissions, if you continue like the Republicans currently in the US Congress would like to – then by the end of century, models tell us that there is about a one in five chance that the average surface temperature of the planet will increase above 5 or 6 degrees. This is not the most likely course, but it is the most serious worry. And this would be very likely above any sustainable threshold for humanity: heatwaves, tremendous upheavals with huge number of people having to move, food scarcity, large parts of the planet becoming unlivable. And one in five is a tremendous risk. You don’t climb in an airplane if you have a one in ten chance not to make a safe journey. One in five is absolutely unacceptable. This probability takes into account what we don’t know, because of the complexity of the climate system. But we are used to probabilities. They are part of biological and medical sciences. If there is a one in five chance that your tumor is cancerous, you will take it out, no questions asked. Thus it is unacceptable not to act on climate because of uncertainties of that magnitude.

We can’t wait until the end of the century to verify what will happen. We have to stop now if we want things not to happen by the end of the century, because of the very long times that carbon dioxide remains in the atmosphere. And we are in fact already being affected ourselves by changes. But the main reason is not only science and economics: it is ethics as well. We inherited from previous generations a lot of scientific knowledge, means to achieve good standards of living, etc.; among other things life expectancy has doubled. It is fundamental ethics to give our children at least the same chance as we have to achieve an acceptable standard of living.

When I mention ethical issues I am not anymore talking as a scientist. Let us be clear on that: when I am making such statements I am talking as a person. Scientists alone will not solve the problem, but society as a whole can do it. What to do or not to do is not science – science alone could as well drop atomic bombs as cure cancer. We have to understand we are working with some kind of universal human values. It is reasonable for some to say scientists shouldn’t tell us what to do. As a scientist, I can only give facts, but I can also talk as human being. My ethical point of view is being affected ourselves by climate change, we have to stop it now. We have to stop now if we want things not to happen by the end of the century, because of the very long times that carbon dioxide remains in the atmosphere. And we are in fact already being affected ourselves by changes. But the main reason is not only science and economics: it is ethics as well. We inherited from previous generations a lot of scientific knowledge, means to achieve good standards of living, etc.; among other things life expectancy has doubled. It is fundamental ethics to give our children at least the same chance as we have to achieve an acceptable standard of living.

Unexperienced scientists often mislead making statements about actions society “should” undertake, as if science tells us what we “should” do. Such statements can be counterproductive and can be used, for example, by deniers of climate change science to strengthen their case. On the other hand, scientists often avoid making statements about things society should or should not do, in order not to appear exaggerated or pessimistic, and yet they also have values, and expressing their value-based opinions as individuals could be very helpful when addressing societal problems, as long as they clarify that those personal opinions are not based on science.

Coming to climate and adaptation policies, we observe that the lack of certainty seems to hamper decision-making. Science seems expected to bring more certainty, and uncertainties are often used to justify delaying decisions.

M. Molina: There is a misconception when we expect climate science to be deprived of uncertainty. We accept the complexity of results with the human body, the human brain, and should accept it as well with the climate. We have to communicate with the right analogies to make the nature of climate science and therefore climate risk more generally understood. The best analogies in my opinion are those with human health. If a one-month baby has high fever in Europe, in the US, and in most countries, you bring the baby to the hospital. The doctor won’t take the risk not to give him antibiotics even if the probability is higher that the baby has a viral infection, against
which antibiotics won’t work. In fact, there is roughly a one in twenty chance that antibiotics will be useful, but it makes sense anyhow to go to the hospital and give the baby antibiotics. This type of uncertainty is socially accepted.

In the same way, it is nonsense to argue that the end of century is too far for people to act now. People everywhere on this planet invest every day in elementary education, which will yield results in ten or twenty years from now. It is a long term investment everyone understands. Scientists must learn to tell their stories to a larger public using this kind of analogy.

The IPCC is constrained not to talk about policies, i.e. about what society should or should not do. This is all right as long as this constraint is properly expressed to the public. Furthermore, the IPCC could arrange press releases without the constraint in question, explaining clearly to society the consequences of their findings, the consequences of not talking the proper actions to prevent damage to society, etc. It is with this sort of responsible and effective communication efforts that the IPCC could work best with participation of civil society.
Making room for social sciences in global expertise in biodiversity

Marie Roué, anthropologist and member of the IPBES.

INTERVIEW WITH ALEKSANDAR RANKOVIC (IDDRI) AND ISABELLE BIAGIOTTI (REGARDS SUR LA TERRE AND AIDA)

As an anthropologist, how do you tackle environmental issues, and how did you become a member of the permanent team of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES)?

Marie Roué: 47 years ago, working with the reindeer herders of northern Norway, «les Lapons» as we called them at the time in French, or the Sami people as they are now called, — and influenced by anglophone researchers, I became interested in the flexibility of social organization in response to a naturally difficult environment. Sami are a bilateral society – in which the kinship relationships of both sides count – and a nomadic one – with a group which is bigger in summer than in winter. I’ve also worked on livestock farming, on their clothing and its technical aspects: adapting to customs and to the weather conditions, and also competitive innovation among the women to follow fashion. This work took me to the Museum of Natural History, where I joined Jacques Barrau’s CNRS/MNHN team of ethnoecologists, APSONAT, which was later led by Claudine Friedberg and then by myself. During the 1980s, I began working with the Inuit in Canada, particularly on the hunting of caribou which are of the same species as reindeer (Rangifer tarandus). I then worked on the Cree Indians, strongly influenced by American anthropology, which was already much more environmental and political than its French counterpart: there was already an indigenous issue, followed by the issue of local knowledge, which was rapidly formalized in Canada, long before the 1992 Earth Summit in Rio. For example, I took part in the major surveys conducted at the time on the way land is used and the conflicts surrounding it. Thanks to a project initiated with the support of CNRS, I started working on major dam projects and their consequences for the Inuit and the Cree. I then co-directed the Canadian study on the environmental and social impacts of the two James Bay dam sites, Great Whale and Chisasibi, emphasizing not only the expertise of the local populations on environmental degradation, but also their relationship with the territory which they consider they have a responsibility for which was handed down to them by their ancestors. In 1991, I added the Cevennes in the South of France to these different fields – specifically to compare the Swedish Sami sites and those in the Cevennes which belong to the UNESCO list of World Heritage Sites. In all these subjects, there is the same governmental lack of understanding of questions of rights of use, and the complexity of traditional practices. One of our current research projects in Sweden seeks to establish a mapping of the seasonal movement patterns of the Samis, with all their uncertainties, because many of the decisions and journeys depend on weather conditions which are impossible to anticipate, and which they have
to adapt to. Other stakeholders deny this complexity and prefer to see the potential for the economic development of an immense territory; a development which threatens the ways in which it is already used. Currently, in the Arctic as in many other places, the indigenous people are being pushed out of potential new zones of economic development. Roads, aeroplanes and global warming are doing away with the last factors which limit the expansion of other methods of exploiting resources: oil, mining, wind turbines, tourism, secondary housing, etc. The notion of cumulative impact is very rarely taken into account.

So I work on a form of anthropology which is environmental and relatively political: addressing contemporary issues and indigenous populations means that we have to understand both the complexity of the exchange of scientific and local knowledge and that of conflict management and the management of regulatory mechanisms. In my opinion, it is impossible to be totally neutral in these lands which are affected by conflict. For the stakeholders, it seems to be impossible to understand and, in these circumstances, we work with one side or the other. I work with and for the indigenous populations with the other. I work with and for the indigenous people are being pushed out of potential new zones of economic development. Roads, aeroplanes and global warming are doing away with the last factors which limit the expansion of other methods of exploiting resources: oil, mining, wind turbines, tourism, secondary housing, etc. The notion of cumulative impact is very rarely taken into account.

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It was actually quite logical for me to take an interest in the IPBES process through the work of the Indigenous and local knowledge taskforce. I made my application on the IPBES site. You have to understand that, unlike in other countries, all valid applications are presented to the IPBES in France. I was then chosen by the MEP (Multidisciplinary Expert Panel) to become a member of the Working Group. I then applied to the MEP itself without actually believing I’d be successful, mainly because France was more directed towards a biological vision of biodiversity. But what happened was that a Maori biologist, chairman of the taskforce on local knowledge – and, as a New Zealander, related to the WEOG group which comprises Europe, Canada, the United States, Australia and New Zealand – was leaving the WEOG to focus on his research work. So that’s how I was recruited, especially for my skills in local knowledge, which was considered to be a major issue for a certain number of countries including Scandinavia, Australia and New Zealand.

From the moment it was created, IPBES has been intent on integrating more of the human and social sciences into its work than was previously the case on biodiversity topics, and more generally in the main systems of intergovernmental expertise on the environment. What place do the social sciences currently hold at the IPBES, and does their integration create difficulties?

Marie Roué: There are still only very few representatives of the social sciences in the MEP. And if you rule out economics, there are even fewer of us. The current Chair of the MEP is Marie Stenseke, a Swedish geographer, but we are still in the minority. This trend is found among authors mobilised for evaluations: there are very few social scientists among the authors when we probably need 30%, if not 50%. Without a critical mass of expertise in social sciences, the IPBES is not in a real position of interdisciplinarity, and this is actually one of its first limitations. Furthermore, in the debate between natural sciences and social sciences, we do not take the researchers who have several decades of interdisciplinary practice sufficiently into consideration. If you want to create interdisciplinarity, it takes more than just putting a biologist, a sociologist, a philosopher, an anthropologist and a lawyer in a box. You have to know the work and the literature, and be interested in contemporary practices. It’s not easy for researchers in the biological sciences to understand that there is already a body of interdisciplinary practitioners with decades of practices and fields on the social science side. Many specialists in natural sciences believe they are capable of establishing society’s position by themselves.

The second difficulty stems from its status as an intergovernmental platform: the governments make the decisions – with a wide range of national positions; a complex process aimed at selecting an equal number of men and women in each geographical and disciplinary group… It’s difficult to put into practice. It’s clear that there is more research carried out in WEOG than in other places – so there are plenty of potential candidates – while in other regions it’s sometimes difficult to find candidates. Respecting
balance, finding available people, mobilising focal points in the countries to relay the proposals – the difficulties are many and it takes time to overcome them.

And lastly, as it’s difficult to co-opt people who are different from yourself when you are a group made up mostly of ecologists, many of my social science colleagues still don’t see what role they could play in an institution dedicated to biodiversity. They don’t feel comfortable there, and there’s also the time it takes to participate, or the barrier of English which makes it difficult to understand the subtleties of the debate. The researchers who approach environmental questions in a completely multidisciplinary way are not necessarily recognized in a programme centred on biodiversity – they themselves talk of the management of natural resources by populations, for example. I try and get them to understand that they are more than qualified and particularly with the IPBES focus on ecosystem services since Antalya in December 2013. This focus favours a more multidisciplinary approach defended by certain African, Asian and Latin American countries – such as Bolivia, which recognizes local knowledge in its legislation. But as most of the social sciences, and especially the most social, have been highly critical of the notion of ecosystem services, researchers in these disciplines are still reluctant to work in this domain.

In this context, where does local knowledge relative to biodiversity fit in with the work of the IPBES? What does it contribute?

Marie Roué: The IPBES is responding to the timetable set by politicians and is trying to make very rapid headway, especially on the regional summaries, on the degradation and restoration of lands and on invasive species. All at the same time. It’s all moving at an incredible speed which sometimes has a tendency to crush the participants. The first report on the state of pollinators was published for the meeting in Kuala Lumpur in March 2016. The Task Force on Indigenous and Local Knowledge Systems did its best to keep up, but there again, the pervading systems favour the participation of highly specialized experts to the detriment of pluridisciplinary approaches: specialists in pollination itself rather than the traditional bee management practices of an African tribe. The labelling of work therefore directs the choice of candidates, and it’s actually difficult to reverse the trend. The predominance of ecologists means that the contributors in the social sciences often find themselves not named as chapter authors, whatever their experience, and only listed as contributors.

Strategically, the local knowledge group has decided to concentrate on two zones for the regional reports – Europe-Central Asia and Africa – for this first year [2016] and to catch up with the other reports next year – on Asia/Pacific and the Americas. The question of local knowledge is in fact well represented in the last two regional groups. Whatever the case, these are huge regions, and there will only be one report for each of them. To be able to consider the importance of biodiversity means considering lifestyles, and what protects natural resources and creates the foundations of a possibly sustainable development – or at least one that is less destructive than an extractive operating method which immediately produces material wealth – and that means taking local knowledge into consideration.

The procedure followed by our taskforce has been budgeted and adopted by the assembly. We are launching a call for tender to find experts in local knowledge or who are actually from the indigenous peoples – which poses a whole lot of practical questions: how do we motivate these people and get them to participate? How do we publicize the work of the IPBES – notably through translation? A list of experts will then be drawn up, and the members of the taskforce will vote for between ten and fifteen of them – this number takes the financing of their trips into account. We try to pair people up: a local knowledge holder and a researcher. For Europe, for example, we have a young small farmer who has joined the Farmers’ Seed Network, with a scientist who works on the same topic. Everyone is invited to a dialogue workshop attended by one of the chairs of the report and, at least one coordinating author or someone interested in the issue of local knowledge in their chapter. The goal is as much to instruct future authors about local practices as to counter the ban on conducting new research: thanks to the on-line report, the contributions of these local indigenous experts that previously existed only in the field and were transmitted orally can now be
mentioned. They are becoming published sources. For the pollination report for example, we were able to bring together NGOs, institutions, several indigenous people, and even a young Ogiek man from Kenya, John SAMORAI LENGOISA, who is a member of an association of honey producers and who had never before left his country. After this, we will be financing some of these people so they can tell people in their country about the work of the IPBES and complete their data, with the Ancients for example. A written report is finally drafted by each “pair”. And all of this in an appallingly reduced time-frame. Obviously, we can only persuade those who are already somewhat convinced, and sceptics can tax us as spreading ourselves too thinly. But with the limited money and time at our disposal, what more can we do? Is it possible to believe that there will one day be one way, like the metadata of biological science, of immediately producing, with a small number of people, databases of all the local knowledge of a whole region which document all the peoples, and all the various lifestyles that may never have been written down, but which we must nevertheless know?

So it is these almost epistemological differences which separate the social sciences from other approaches within the IPBES?

Marie Roué: Yes, some of the conceptual advances of the last thirty years are still not sufficiently considered in the IPBES debates. Certain studies on the definitions of nature, for example: is nature only natural? If we forget that what we call nature is also a social construction, we are not actually seeing that the lifestyles and customs, even in places like the Amazon, have had a marked effect on the environment that we want to protect. We cannot understand the socio-biological dynamics if we do not understand their complexity and neither can we protect if we exclude local populations from their traditional role as managers. We see numerous failures in conservation initiatives which have left out these points. The fierce debates on management by fire are a particularly blatant example of this: this is a type of management which used to exist almost everywhere on the planet, and which has now been banned nearly everywhere, often with adverse consequences for the management of protected sites. This has been proved by scientific studies in the cases of California, North America and Australia for example. These territories were managed by fire for thousands of years by the American Indians and the Australian Aborigines who had created sites which were considered by the settlers landing there as being natural ones. If the emblematic national park of Yellowstone burned in 1988, it was because at the time we had banned all fires whether anthropogenic or natural. To understand the role of these fires, we have to accept the social construction of nature and recognize local knowledge of wind, fire-breaks, the reaction of the biotope according to the seasons, etc. Among the populations which practise management by fire this knowledge is extremely accurate, and this has resulted in shaping of the so-called “natural” environment.

This knowledge is complex, intellectual and structured; we have to stop thinking that local knowledge is only “practical knowledge”. The nomenclature, the taxonomies, and the local analyses are very similar to scientific approaches. If we don’t know all of this – or if we don’t recognize its significance, collective work between disciplines becomes difficult.

Many regions of the world are more convinced of the importance of this knowledge than Europe, where it is still difficult to tackle the issue. Even in France, local knowledge is not totally valued other than in traditional themes, such as terroirs and designations of origin for cheese and wine. And France’s multi-layered administrative system means that when we look for a local knowledge holder, we’re often going to have to speak to the Prefect or the park manager before meeting a livestock farmer, a fisherman or a beekeeper. In addition to this, the French argument is still that in order to guarantee equality for all, we cannot recognize the existence of indigenous peoples in France and its overseas communities. This can create difficulties as we have both Indian populations and different communities in Guyana. On an international level, even understanding the words is still a source of debate and incomprehension. In Africa for example, the indigenous debate boils down to knowing which peoples were the first to occupy a land, whereas for us it is about their lifestyle.

The conceptual framework
adopted at Antalya in 2013 was highly influenced by Bolivia. If local knowledge in the world is not just about Pacha Mama, it is clear that this vision of a relationship between man and the environment is sufficiently powerful and politically effective because it echoes a romantic Western sentiment. On the other hand, the anthropologists and the indigenous people who are closer to the land than the ecologists working on local knowledge or the taxonomies concerning plants and animals are paradoxically less acceptable than when they work on sacred sites. Even in our countries, it is surprisingly more acceptable to talk about rituals than to promote local knowledge in its more ecological dimensions. It may be for those reasons – because we find it easier to accept something that we admit we do not know than something which we know in a different way – that negotiation favoured the spiritual aspect at Antalya. This text is valuable in setting a framework, and in moving past a purely economist outlook on ecosystem services.

What can we reasonably expect from the work of the IPBES?

Marie Roué: The aim of the IPBES, because we know that biodiversity is under threat, is to organize a dialogue between science and policy. We need to do science so that politicians can put it into action. When we have finished writing a report, we’re asked to write ‘key messages’ and, for the report on pollination, the report’s authors were given training on how to produce key messages which can actually be understood by politicians – because that’s not what we were trained for; we’re not really very good at it, whichever science we work in. We also need to understand each other; everyone is going to think that their message is more important than the others. We realize that it’s a crucial issue, but we’re just at the beginning of our work – our first report. We’re starting to talk about communication a lot: how we are going to disseminate the results. This has actually helped me to understand the limits of our own communication at the Museum, especially for the community I belong to - anthropologists and ethno-ecologists – publishing in Sami or in Javanese, in inaccessible journals and on global topics doesn’t help ecologists to understand what we know about biodiversity and its management. It’s not only local peoples whose knowledge is oral and unpublished – it’s also the case with social scientists specializing in biodiversity.

In my view, the absence of major public debates on biodiversity, as opposed to climate, reinforces the difficulty in achieving a collective grasp of these issues of definition. My own current studies, notably in Sweden with the Samis, address climate changes and local knowledge in the management of natural resources and their relationship with science. I notice that the issues of climate change are better understood. And that’s where we realize that we need to be patient because, as you know, programmes like the IPCC have taken a long time to get under way, and a long time to move beyond the reality of climate change and convince governments. With biodiversity, it seems to me that no-one is denying that it’s being eroded, but the connection between biodiversity and sustainable development is even more complex than with climate: what exactly is sustainable development? Whenever the question is asked, there are those of my colleagues who remind us that we are doing science, not politics…

1 See Phil Lyver et al. (ed.) 2015, Indigenous and Local Knowledge about Pollination and Pollinators associated with Food Production: Outcomes from the IPBES Global Dialogue Workshop.

2 See article written by a collective of colleagues to remedy this situation: Marie Roué, Vincent Battesti, Nicolas Césard and Romain Simenel, «Ethnoecology of pollination and pollinators», Revue d’ethnoécologie [On line], 7
A selection of APFL archives on science and politics

The issue of inequality and sustainable development has regularly been treated in *A planet for life*. Here you will find a selection of essential resources:

- Philippe Leprestre et Romain Taravella | Pouvoirs et limites des réseaux d’expertise.
- Elva Escobar et Julian Barbière | Un monde à découvrir : la biodiversité.
- Benoît LABBOUZ et Sébastien TREYER | Recherche agricole : transitions stratégiques pour un système d’innovation mondial.
- Sébastien TREYER | Quelle agriculture demain ? Négocier les priorités de la recherche agronomique internationale.
- Michel Colombier | Climat : ce que dit la science.
- Repère 1 | Nations unies : 30 ans de développement durable.
- Annie Cung et autres | La biodiversité : évolution et perspectives (Paper version only).
- Biodiversité | Gestion collective, expertise partagée, Interview de Ibrahim Thiaw (Paper version only).
## Science and politics: two centuries of environmental interaction

Politicians and decision-makers are seeking an expertise capable of reducing uncertainty and justifying their decisions. In the environmental context, these dynamics become more complex due to the fact that a number of questions are directly raised by scientists, who ask politicians to find answers, quite often on a regional and even a planetary scale. From ozone to the oceans, including the climate and its IPCC, soil fertility or the loss of biodiversity, dealing with environmental issues is built with political science interfaces which transform the social demand into a question of research and partial knowledge of practical politics.

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1827</td>
<td>Climate</td>
<td>The greenhouse effect warming the Earth. French physicist Jean-Baptiste Fourier highlights the existence of the greenhouse effect and suggests its influence on the planetary climate.</td>
</tr>
<tr>
<td>1873</td>
<td>Climate</td>
<td>Standardized observations. The International Meteorological Organisation (IMO) is founded in Vienna (Austria) to contribute to the standardisation of national observations and to the comprehension of climate mechanisms on a planetary scale.</td>
</tr>
<tr>
<td>1885</td>
<td>Oceans</td>
<td>Assessing fishing opportunities. The International Council for the Exploration of the Sea pour les anglophones (ICES) is set up to answer the scientific issues and techniques raised by fishing. Its headquarters are in Copenhagen in Denmark.</td>
</tr>
<tr>
<td>1895</td>
<td>Climate</td>
<td>CO₂ amplifies greenhouse effect. Swedish chemist Svante Arrhenius suggests that CO₂ emissions, by reinforcing the greenhouse effect, could lead to a rise in the Earth’s average temperature.</td>
</tr>
<tr>
<td>1919</td>
<td>Oceans</td>
<td>Common research in the Mediterranean. The Mediterranean Science Commission (CIESM) is created in Madrid (Spain). Based in Monaco, it aims at standardizing research methods on the marine environment and encourage scientific dialogue.</td>
</tr>
<tr>
<td>1951</td>
<td>Climate</td>
<td>Taking meteorological factors into consideration. The IMO becomes the World meteorological organisation, (WMO) based in Geneva (Switzerland). Its mandate remains the standardisation of research in order to facilitate taking meteorological, climate and hydrological factors into consideration in all human activities: protection of people and goods, transport, agriculture, management of water resources and dissemination of information by the press.</td>
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<tr>
<td>Year</td>
<td>Event</td>
<td>Details</td>
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<tr>
<td>1957</td>
<td>Global monitoring</td>
<td>Continuous monitoring of the ozone layer on a global scale is launched for the International Geophysics Year. The British base of Halley Bay (Antarctica) begins carrying out daily readings.</td>
</tr>
<tr>
<td>1959</td>
<td>Conserving tuna stocks</td>
<td>Created by an agreement signed in 1966 in Rio de Janeiro (Brazil), the International Commission for the conservation of Atlantic tunas (ICCAT) starts its research work on tuna stocks. Its work results in recommendations on an authorized total catch whose application is negotiated by strict agreements between the countries signing.</td>
</tr>
<tr>
<td>1972</td>
<td>A global environment agency</td>
<td>The United Nations Environment Programme (UNEP) is set up following the Conference on human development in Stockholm (Sweden). It is in charge of three types of action - assessment, management of the environment and support measures in the following fields: human settlements, terrestrial ecosystems, oceans, development and natural disasters. Its headquarters are in Nairobi (Kenya).</td>
</tr>
<tr>
<td>1974</td>
<td>CFC and their impact</td>
<td>Mario MOLINA and Frank SHERWOOD ROWLAND highlight the impact of chlofluorocarbons (CFC) on the ozone layer.</td>
</tr>
<tr>
<td>1976</td>
<td>Alerting decision-makers</td>
<td>The National Academy of Sciences in the United States publishes a report explicitly aiming at alerting decision-makers on the impact of CFC on the ozone layer.</td>
</tr>
<tr>
<td>1980</td>
<td>A global programme of research and recommendations</td>
<td>Following the first Climate Conference in Geneva in 1979 organised by WMO, an international programme of climate research - World Climate Programme (WCP) - is launched with four components: data, research, impacts and applications. The idea is to supply decision-makers with elements to help them understand the variability and forecastable climate change.</td>
</tr>
<tr>
<td>1985</td>
<td>50% of loss in the spring</td>
<td>The British geophysicist Joe FARMAN records the appearance of a seasonal “hole” (a loss of up to 50%) in the ozone layer above the Atlantic every Spring. It shrinks again in the autumn.</td>
</tr>
</tbody>
</table>
1985
22 March

OZONE

An agreement for protection

The Vienna Convention for the protection of the ozone layer is adopted in Vienna on 22nd March.

1987

The Brundtland report

The United Nations Organisation’s World Commission on environment and development commissions a report offering an international pluridisciplinary programme on environmental problems. Chaired by the Norwegian Gro Harlem BRUNDTLAND, a team of 23 people from 22 different countries publishes the report “Our Common Future” which popularizes the concept of sustainable development.

1987
16 September

OZONE

The supervised withdrawal of CFC

The Montreal Protocol which programmes the progressive phasing-out of the production and consumption of CFC is adopted. It places great importance on scientific expertise in the designation of substances to be withdrawn and in the follow-up of results. The protocol thus becomes a model for the institutionalization of dialogue between politicians and scientists.

1988

CLIMATE

Creation of IPCC

On request from the G7, the World Meteorological Organisation (WMO) and UNEP create the Intergovernmental Panel on Climate Change (IPCC). It is put in charge of summarizing the work carried out all over the world on climate change in order to expose the state of knowledge on the climate and its future trajectories, on the impacts of climate change and the options of adaptation, as well as the options for mitigation.

1990

OZONE

Extension of the Montreal protocol

The London revision of the Montreal Protocol includes carbon tetrachloride in its list of products which destroy the ozone layer. Its elimination (production and consumption) should take place between now and 2007.

1990

CLIMATE

First IPCC report

The IPCC’s first report prepares the Rio Earth Summit and the negotiation of a convention dedicated to fighting climate change. The report concludes that, since 1900, the temperature has risen by about 0.5°C and the level of the sea has risen by 15 cm.
1992 Rio 1992

The final declaration of the Rio de Janeiro (Brazil) Earth Summit highlights, among other things, the multiple role of scientific expertise for the continuation and implementation of sustainable development. This imperative for the construction of a legitimate scientific consensus on the nature and amplitude of the problems is integrated into the three big international conventions signed in Rio which address the three great challenges identified: climate change, loss of biodiversity and land desertification.

1992 Banning of HCF and HCFC

The Copenhagen revision of the Montreal Protocol totally eliminated the production and consumption of two haloalkanes (HCF and HCFC) between now and 1996.

1992 A convention in Rio

The Convention for biological diversity (CBD) adopted during the Earth Summit enters into effect. The CBD aims at encouraging the protection and sustainable use of biodiversity, along with a fair sharing of the advantages drawn from the use of genetic resources. The Convention is equipped with a Subsidiary Organ in charge of giving scientific, technical and technological advice (article 25).

1994 Framework Agreement

The United Nations Framework Agreement on Climate Change enters into effect. Its ultimate target is to stabilize the atmospheric emissions of greenhouse gas at a level which would prevent them from harming the climate system.

1994 Countering soil deterioration

The United Nations Convention to Combat Desertification (UNCCD) decided at the Rio Earth Summit is signed in Paris (France). It has a Science and Technology Commission made up of the representatives of governments who can call on recognized experts to advise the Convention.

1995 The anthropogenic nature of change

In an attempt to document the impacts, vulnerability and opportunities for adaptation, the IPCC’s 2nd report concluded on the anthropogenic nature of climate change and the predominant role of greenhouse gas emissions.
1995

**An alarming observation but which was not heard**
The Global Biodiversity Assessment, (GBA), initiated in 1993 by an independent group of scientists in the absence of official work within the CBD, is published. It identifies the alarming state of global ecosystems. In the opinion even of those who initiated it, the GBA is a relative failure because its work is not recognized as a legitimate contribution to CBD negotiations.

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**Controlling trade**
The Montreal revision of the Montreal Protocol establishes a global system of licences to control international trade of substances which weaken the ozone layer.

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**A protocol to reduce emissions**
The Kyoto protocol monitoring greenhouse gas emissions is adopted on 11th December. It commits those signing it to reduce between 2008 and 2012, by at least 5 %, relative to the 1990 level, the emissions of six greenhouse gases: carbon dioxide, methane, nitrous oxide and three chlorofluorocarbon substitutes.

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**Pesticides and flame retardant**
During the Beijing revision, the 196 countries signing the Montreal Protocol add two new substances to the list: bromochloromethane (a flame retardant) and methyl bromide (a pesticide). The decision focuses on the fact that there are alternatives to using these substances.

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**Common development goals**
The Millennium Summit which gathered 198 Heads of State in New York (United States) adopts the eight Millennium Development Goals (MDGs). They want to guide international cooperation efforts towards the elimination of poverty on a global scale between now and 2015. Even if the environment is present with Goal 7 (protecting the environment), the strongly predominant social element of the MDG will often be highlighted.

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**Assessing ecosystems**
Observing the lack of a politically legitimate assessment, the United Nations General Secretary, Kofi Annan, commissions the Millennium Ecosystem Assessment which mobilizes 1300 experts.
<table>
<thead>
<tr>
<th>Year</th>
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<tbody>
<tr>
<td>2001</td>
<td>CLIMATE</td>
<td>The Earth is warming very fast. IPCC’s 3rd report also confirmed the reality of the warming of the Earth’s surface and its recent acceleration.</td>
</tr>
<tr>
<td>2002</td>
<td>Johannesburg 2002</td>
<td>The World Summit on Sustainable Development (WSSD) convenes in Johannesburg (South Africa). Its action plan focuses among other things, on the importance of scientific expertise for the implementation of sustainable development.</td>
</tr>
<tr>
<td>2002</td>
<td>A systematic review</td>
<td>The implementation plan adopted during the WSSD in Johannesburg recommends the setting up of a regular global systematic mechanism to assess the state of the marine environment from 2004. The group of experts attending will submit its report at the United Nations General Assembly.</td>
</tr>
<tr>
<td>2005</td>
<td>Kyoto enters into effect</td>
<td>The Kyoto protocol enters into effect “on the ninetieth day after the date on which not less than 55 Parties to the UNFCCC, incorporating Parties included in Annex I which accounted in total for at least 55% of the total carbon dioxide emissions for 1990 of the Parties included in Annex I, have deposited their instruments of ratification, acceptance, approval or accession”.</td>
</tr>
<tr>
<td>2005</td>
<td>The Millennium Assessment</td>
<td>The Millennium Ecosystem Assessment documents the destruction of biodiversity since WW2. It highlights the fact that despite the efforts made since 1992 for biodiversity, the sixth extinction of species in Earth’s history is underway and contrary to those preceding it, due to anthropogenic activities.</td>
</tr>
<tr>
<td>2005</td>
<td>An IPCC for biodiversity</td>
<td>The Paris declaration adopted at the time of the International conference “Biodiversity: science and governance” appeals for the creation of a group of experts on biodiversity comparable to IPCC.</td>
</tr>
<tr>
<td>2006</td>
<td>Prior consultation</td>
<td>The exploratory ImoSEB (International Mechanism of Scientific Expertise on Biodiversity) process is launched. It is in charge of consultations prior to establishing a “biodiversity IPCC”.</td>
</tr>
</tbody>
</table>
**Regulating blue fin tuna catches**

Recommendations by ICCTA experts result in a considerable reduction of authorized Bluefin tuna catches in the Mediterranean. A plan of reconstitution of stocks over 15 years proposes around fifty conservation measures including reinforced controls of fishing; a 30 kg minimum catch size; the banning of the use of plans to track shoals of fish; and the deployment of on-board observers.

**The change is anthropogenic**

The IPCC’s 4th report confirms the anthropogenic origin of climate change.

**Agreement in principle**

The Kuala Lumpur (Malaysia) conference ratifies the principle of the creation of the Intergovernmental Platform on Biodiversity and Ecosystem Services (IPBES) to produce expertise which can be easily mobilized by politicians.

**Goals plus a platform**

COP 10 of the CBD in Nagoya (Japan) adopts a protocol dedicated to the access to genetic resources and to the fair and equitable sharing of the advantages resulting from it. It also ratifies the creation of the IPBES platform, demanding that the United Nations General Assembly make the decision executable.

**IPBES launches its work**

The first IPBES work meeting in Nairobi (Kenya) brings together delegates from 112 countries chaired by Robert WATSON.

**Rio is 20 years old**

The Rio+20 conference wishes to take stock of twenty years of implementation of sustainable development and offers to reflect on the promotion of a green economy and the reform of existing institutional frameworks. The divisions posed by these two issues result in the debates being centred on the definition of sustainable development goals which are supposed to describe “The World we Want”. The process for the development of these goals will be reached in 2015.

**Understanding extreme events**

IPCC publishes a special Report on extreme events. Among other things, it highlights the fact that the amplitude of material and human damage depends very much on the preparation of the authorities and the population.
<table>
<thead>
<tr>
<th>Year</th>
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</tr>
</thead>
<tbody>
<tr>
<td>2012</td>
<td>A global partnership</td>
<td>The Global Soil Partnership (GSP) is launched on the initiative of FAO and thanks to an initial financial support from the European Union.</td>
</tr>
<tr>
<td>2013</td>
<td>What about HCF?</td>
<td>After four years of informal consultation, the Bangkok (Thailand) meeting of the Montreal Protocol launches official discussions on the possible inclusion of hydrofluorocarbons (HFC) on the list of substances regulated by the protocol. HFC have spread as an alternative to other refrigerating gases banned by the protocol; their global warming power is 2800 times that of carbon dioxide.</td>
</tr>
<tr>
<td>2013</td>
<td>Consolidating the scientific elements</td>
<td>The 5th report by Group 1 of IPCC, dedicated to knowledge of climate physics, is attempting new modelling. Based on the physical boundaries of ecosystems, it develops climate-compatible GHG emission scenarios. It also highlights the responsibility of human societies and the need for them to change.</td>
</tr>
<tr>
<td>2013</td>
<td>Antalya work programme</td>
<td>The Antalya meeting (Turkey) sets the work programme for IPBES for 2014-2018 with thematic priorities such as: the value of pollination for food production or the cost of land degradation and invasive species.</td>
</tr>
<tr>
<td>2013</td>
<td>A research group</td>
<td>The first plenary assembly of GSP launches the intergovernmental technical panel on soil (ITPS) which must assert itself as a global scientific authority on soil, its management and assessment.</td>
</tr>
<tr>
<td>2013</td>
<td>A working plan</td>
<td>ITPS defines its working plan: integrating the question of soil into the post-2015 targets; taking stock of the current knowledge of soil conditions; defining its relationships with the Global Soil Partnership and other bodies. It brings together over 200 scientists from 60 countries.</td>
</tr>
<tr>
<td>2013</td>
<td>Desertification and its experts</td>
<td>The 11th Conference of the parties to the Desertification Convention in Windhoek (Namibia) endows the UNCCD with a Science-Policy Interface, SPI. SPI must convert the existing scientific data into useful recommendations for political decision-making and interact with existing scientific platforms, such as IPCC, IPBES or ITPS of the Global Soil Partnership.</td>
</tr>
</tbody>
</table>
### Towards a possible reconstitution in 2050

WMO and UNEP publish an assessment conducted by 300 specialists who estimate that the ozone layer is in a reconstruction phase and should return to its 1980 level in 2050.

[![Image of ozone concentration above the Southern Pole slowly reducing to return to its 1980 level around 2050.](image)]

### Outlining fields of action

The 5th reports by the other two IPCC groups - “Impacts, adaptation et vulnerability” and “Mitigating climate change” - appeal on human societies to act today both to keep control of the current change and to adapt lifestyles to current changes.

[![Image of IPCC report](image)]

### Un programme d’action

The GSP adopts its Action Plan recommending the implementation of strong regulations and the increase of investments in sustainable management of soils in ways that contribute to the eradication of hunger, food insecurity and poverty.

[![Image of GSP action plan](image)]

### 17 goals for 2030

17 Sustainable Development Goals (SDG) are adopted by the United Nations Assembly. Contrary to the MDGs, these are universal goals which must find variations in countries all over the world. They also leave more room for environmental issues.

[![Image of 17 Sustainable Development Goals](image)]

### Assessing urban impact

IPCC launches a “6th assessment cycle” which will last up until 2022. Three special reports will be produced: the first on the impact of a 1.5°C global warming (2018); a second on the links between climate change, the oceans and the cryosphere; and a last on the links between climate change, desertification, land degradation, sustainable land management, food safety and the flows of greenhouse gas in terrestrial ecosystems. Moreover, the 6th Assessment Report plans to give great importance to the impact of climate change on cities.

[![Image of urban assessment](image)]

### Paris Agreement

The Paris Climate Agreement opens a new phase in international climate policy by creating the obligation for those signing to review their targets every five years with no possibility of revising them upwards. It will enter into effect when 55 countries representing 55% of emissions have ratified the agreement. COP21 also launches an appeal to IPCC to supply mitigation and adaptation scenarii compatible with warming limited to +1.5°C.

[![Image of Paris Climate Agreement](image)]
The GSP publishes its first report on the *Status of Soil Resources* all over the world. It relies on 200 world specialists to draw up a status of the recent soil changes per region, providing comparable data in terms of erosion, variation in organic carbon, biodiversity, acidification, compaction, salination and sodization, contamination, nutrients or soil congestion. The study observes a concerning degradation of soil quality all over the world.

The United Nations publish the *First Global Integrated Marine Assessment* (IOMA). The first global assessment of the state of the oceans on physical, environmental and socio-economic aspects conducted by the United Nations on the subject, the report urges for a rapid solution to known problems, focusing on their environmental and economic costs. The text was validated by the UNO General Assembly in December 2015.

At its fourth plenary meeting in Kuala Lumpur (Malaysia), IPBES publishes its first assessments, and therefore those of pollination.

The 27 experts of ITPS devote part of their work meeting in Rome (Italy) to the definition of “soil” indicators for the monitoring and implementation of SDGs, and particularly SDG 15 dedicated to terrestrial ecosystems. In order to specify how to “fight the artificialization of soil and the degradation of soil and the natural environment” (SDG 15.3), ITPS must offer indicators as to soil cover, its productivity and its organic matter components.
After nine years of paper editions, *A Planet for Life* is developing into a digital project. The next contributions to *A Planet for Life* bear on the analysis of the main issues and challenges regarding the collective commitments of Nations, either the Addis Ababa agreement on development financing, the sustainable Development Goals adopted by the United Nations General Assembly in New York or the commitments of Nations on the climate during the COP 21 in Paris.

They are organised around 10 cross-cutting dossiers:

- Consuming and producing sustainably
- Ending inequalities
- Basing public policy on science and knowledge
- Bad governance: the proliferation of the grey areas of globalisation
- Global to local and vice-versa
- Stakeholder participation
- The global vision of emerging countries
- Finding the right indicators
- Financing sustainability
- Digitalization of society

The topics are introduced by experts from the French Development Agency (AFD) and the Institute for Sustainable Development and International Relations (IDDRI) and commented by international reference personalities proposed by both institutions and their partners, including the TERI. These dossiers are based on previously published articles and on other elements such as maps and charts.

**AFD**

At the centre of the French system of public aid for developing countries and French overseas territories, AFD finances and assists development projects and programmes which support a more sustainable and shared economic growth, improve the living conditions of the poorest, contribute to protecting the planet and help to stabilise fragile countries or countries emerging from crisis. AFD also collaborates with French and international academic networks to feed discussion and forward planning on development.

[www.afd.fr](http://www.afd.fr)

**IDDRI**

IDDRI is an independent institute for research on policies which functions as a multi-actor platform. IDDRI identifies the conditions needed to implement sustainable development, and particularly for the protection and management of terrestrial ecosystems and the oceans, the creation of a new model of low-carbon, resilient prosperity, managing transition and the building of new alliances. Since its creation in 2001, IDDRI has been recognized for its key interventions in the field of international cooperation and actions (countries, cities, companies) which keep each other informed.

[www.iddri.org](http://www.iddri.org)