
What's in a Name?

Market-based Instruments for Biodiversity

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E. Broughton, R. Pirard, "What's in a name? Market-based instruments for biodiversity"

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EXECUTIVE SUMMARY

The use of MBIs for the management of biodiversity and ecosystem services is currently booming, as shown by their prominence in high level reports and the grey and scientific literature devoted to environmental management and policy-making. But **the definition and underpinning theory of these tools are yet unsettled matters**. The frontier between market-based and other types of instruments remains blurred and the fact that the theory is still under-developed creates difficulties for identifying the scope of applicability.¹ It is therefore necessary to **advance in the definition, theory and consistent classification of these instruments**, if only to stop mixing apples and oranges. This will pave the road for the **development of meaningful contributions to the policy debate**.

Such an effort is deemed to be useful as a contribution to on-going debates, and as a way of informing policy-making. Indeed, the rapid and wide-ranging implementation of MBIs to address environmental issues rests on a **fragile justification**: the presumed inappropriateness of regulatory instruments in certain contexts. Despite the limitations of such an argument, it is followed by many decision-makers in a context where the virtues and efficiency of economic liberalism are often taken for granted. Putting the debate on the principles of economic liberalism aside, **the application of such principles in the environmental field is challenging and deserves special attention** due to the specificities of this field and the risks, perceived or real, of a drift in management.

The report is **structured in two parts** that address two different questions. **In the first part**, our working hypothesis, based on what we identified as a common belief in the field, is that **MBIs constitute a particular mode of intervention that differs substantially from other types of instruments**. The term "MBI" is widely used in institutional documents and various prominent reports, but we aim at testing our working hypothesis: **is it relevant and useful to gather those instruments under a single label?**

To test this first hypothesis, we review MBIs for biodiversity and ecosystem services through an analysis of their principles and modalities in the perspective of economic

¹ R. Muradian, E. Corbera, U. Pascual, N. Kosoy, P. May, "Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services", *Ecological Economics*, vol. 69, n° 6, 2010, pp. 1202-1208.

theory applied to markets. These instruments cover fiscal policies, subsidies, payments for ecosystem services, certification, tradable rights or permits. They show extremely contrasted characteristics, which makes it difficult to conclude that they form a single category of instruments. It appears that their only common characteristic may be that they have a price component: in one way or another, these instruments put a price on nature, through fiscal intervention, private initiatives relying on existing markets to get a premium for environmentally-friendly production, the creation of new markets to reach a predefined objective or to sell new products, or the negotiation of contracts between providers and beneficiaries of a given ecosystem service, etc. Our interpretation is that **commodification – i.e. the process of putting a value on nature for the purpose of trade or payments more broadly speaking – is taking place rather than true market development.**

This common characteristic – putting a price on nature – can serve to explain the popularity of MBIs: **having such a price is assumed to be one of the conditions for the correction of market failures, and for the orientation of decisions through the distribution of the right incentives.** Furthermore, many of these instruments have the capacity of relieving public spending, or of providing new sources of revenues. **But the assumption that cost-efficiency is enhanced is not demonstrated for all of these instruments.** In addition, **few of these instruments are in a position to reveal information**, which is in our opinion one of the main requirements to improve cost-efficiency through market-based approaches, compared to more prescriptive modes of intervention.

We therefore propose new categories to better apprehend these MBIs from the point of view of economic theory:

Regulations changing relative prices: they form part of a fiscal policy, operate on existing markets with environmental consequences, and include, for instance, Pigouvian taxes and agro-environmental measures.

Coasean-type agreements: rights are exchanged between beneficiaries and providers of given services and goods in their common interest, an operation which requires clear initial allocation of rights. They include Payments for Ecosystem Services (ala Wunder), conservation easements or conservation concessions.

Reverse auctions: candidates to service provision set the level of payment in response to a call by public authorities to remunerate landholders, with no guarantee of being selected. Competition and information revelation are thus enhanced. The BushTender program in Australia, and Conservation Reserve Program in the US are two prominent examples.

Tradable permits: users of a given environmental resource need to purchase permits (or rights, certificates, credits, quotas...) that can be further exchanged on the market. This category encompasses experiments with contrasted characteristics such as the cap-and-trade system for greenhouse gas emissions, mitigation banking or Individual Transferable Quotas for fisheries.

Specific markets for environmental products: these products are directly traded, rather than their rights of use or associated services, and include non timber forest products, genetic resources, eco-tourism, etc.

Premium capture on existing markets: producers take the initiative to engage in environmentally-friendly production, thus sending a signal to consumers through various means and capturing a premium compared to standard goods. Examples of application include forest certification, labels for organic agriculture, norms.

In the second part of the report, and also based on what we identified as a common belief, we put forward the working hypothesis that **MBIs support a "roll back" of the state**, in other words the decline in its scope of action and authority in environmental policy-making. Indeed, in the context of economic liberalism, one of the main interests of MBIs is perceived to lie in their handing-out decision-making capacity to non-state – mainly private – actors, thus enabling an optimal allocation of efforts and a better revelation of information compared with prescriptive approaches wielded by states.

But **studying this issue is not straightforward**, first and foremost because such an assessment will vary depending on pre-existing conceptions of the place and role of the state in policy-making. At one end, public policy may be viewed as the action of an authority invested with *public* power (e.g. the state), and at the other, as the result of a multiplicity of interactions between a number of state and non-state stakeholders. In this "governance" perspective, a "roll back" of the state is almost irrelevant for even decisions taken by states are the result of negotiations and lobbying with non-state actors.

The use of MBIs could therefore **be perceived by some as a "rolling back" of the state** in environmental policy-making because the "invisible hand" of the market is introduced to solve collective environmental issues, while proponents of a governance approach **would not automatically infer a decline of the state's role and authority from the participation of different – state and non-state – types of actors** in the elaboration and implementation of MBIs. MBIs could in this perspective be seen as putting emphasis on different aspects of the state's authority (such as monitoring for example), and bringing new types of advantages, such as the opportunity to ease public spending.

In the report we overcome these differences by focusing on the analysis of the links between public authorities and MBIs in order to determine the magnitude of the transfer (if any) of decision-making capacity from state to non-state actors. Such an analysis can be clarified if we distinguish between three possible levels of shift in the decision-making: the setting of environmental objectives, the choice of the modes of action, and the decision taken by agents on the ground. **The results of our study show the strength of the links between MBIs and public authorities**, particularly on issues of monitoring, setting of objectives and choice of instruments, **and because MBIs rely on the regulatory framework provided by states, to the point that some could even argue that MBIs constitute a new form of regulation.**

LIST OF ACRONYMS

AEM	Agro-Environmental Measures
BTA	Border-Tax Adjustments
CAP	Common Agricultural Policy
CBD	Convention on Biological Diversity
CDC Biodiversité	Caisse des Dépôts Biodiversité
ETS	European Trading System
GHG	Greenhouse Gas
FONAFIFO	Fondo Nacional de Financiamiento Forestal
FSC	Forest Stewardship Council
MBI	Market-Based Instrument
NGO	Non-Governmental Organisation
PES	Payment for Environmental Service
PEFC	Programme for the Endorsement of Forest Certification Schemes
PSA	Pago por Servicios Ambientales (Costa Rican program)
UNFCCC	United Nations Framework Convention on Climate Change

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1. INTRODUCTION²³

Market-based instruments, such as taxes, charges or tradable permits can, if carefully designed and implemented, complement regulations by changing economic incentives, and therefore the behaviour of private actors, when deciding upon resource use. When set at accurate levels, they ensure that the beneficiaries of biodiversity and ecosystem services pay the full cost of service provision. Experience shows that environmental goals may be reached more efficiently by market-based instruments than by regulation alone. Some market-based instruments have the added advantage of generating public revenues [...]

This small piece of text is excerpted from an influential report that was released as part of the TEEB initiative on The Economics of Ecosystems & Biodiversity.⁴ We chose it not only because it is drawn from a prominent and very visible report, which constitutes an important landmark in the thinking on market-based instruments (MBIs), but also for the fact that it contains most of the keywords and issues that we deal with in the present article. First, it lists a number of tools that may have little in common such as taxes and tradable permits; second, it refers to the theory of incentives that stands as a critical justification for the emergence of the market rhetoric; third, it suggests that these modes of interventions lead to the revelation of the "right" price (i.e. taking all costs into account); fourth, it states that these tools ensure efficiency compared to more traditional modes of environmental management; and finally, it evokes the funding issue and the possibility that MBIs allow public budgets to spend less money and/or collect more revenues.

While the use of MBIs for the management of biodiversity and ecosystem services is currently booming, the definition and underpinning theory of these tools are yet

² We want to thank the two peer-reviewers for the extremely valuable comments made to this paper.

³ This paper will be jointly published on the IDDRI's website, www.iddri.org.

⁴ The Economics of Ecosystems and Biodiversity for National and International Policy Makers (TEEB), *Summary: Responding to the value of Nature*, 2009.

unsettled matters.⁵ The frontier between market-based and other types of instruments remains blurred and the fact that the theory is still under-developed creates difficulties for identifying the scope of applicability.⁶ It is therefore necessary to advance in the definition, theory and consistent classification of these instruments, if only to stop mixing apples and oranges. This will pave the road for the development of meaningful contributions to the policy debate. In the debates and documents devoted to MBI, the characteristics and specificities of markets tend to be forgotten (e.g., TEEB 2009 or Pagiola et al, 2002) or taken for granted.⁷ It may not be enough to justify the use of MBIs for solving environmental problems by the fact that regulatory instruments have proved inappropriate in certain contexts; but this is the line of reasoning that is followed by an interesting piece of analysis written by Salzman following the American tradition of Law & Economics⁸

Our main working hypothesis, based on what we identified as a common belief in this field, is that MBIs constitute one particular mode of intervention in the field of biodiversity and ecosystem services in the sense that it differs substantially from other categories. Indeed, it is widely used in institutional documents and various prominent reports that shape discourses and presumably policy-making. This working hypothesis will be tested throughout the article, keeping in mind Sartori's (1991) advice not to compare what is not comparable. We cannot judge by ourselves and *a priori* whether these MBIs constitute a relevant category; by contrast we aim at verifying whether this category includes instruments that are worth being put on a same level within a same category. The absence of a clear and consensual definition may be an indicator that this category (or label) is not worth it. Even a book by some of the most important writers on environmental services does not provide a precise and workable definition:

⁵ S.K. Pattanayak, S. Wunder, P.J. Ferraro, "Show Me the Money: Do Payments Supply Environmental Services in Developing Countries?", *Review of Environmental Economics and Policy*, vol. 4, n° 2, 2010, pp. 254-274.

⁶ R. Muradian, E. Corbera, U. Pascual, N. Kosoy, P. May, "Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services", *Ecological Economics*, vol. 69, n° 6, 2010, pp. 1202-1208.

⁷ B. Madsen, N. Carroll, M. Brands, *State of biodiversity markets report: offset and compensation programs worldwide*, 2010. <<http://www.ecosystemmarketplace.com/documents/acrobat/sbdmr.pdf>>, last accessed 5 April 2011.

⁸ Personal communication, Barraqué, 2010. J. Salzman, "Creating markets for ecosystem services: Notes from the field", *New York University Law Review*, vol. 80, n° 6, 2005, pp. 870-962.

Pagiola et al (2002) in "Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development" expose that

By selling the services [...] these mechanisms aim to generate funds that can then be used either: (i) to increase the private benefits of conservation to individual forest managers, and so change their incentives; or (ii) to generate resources that can be used to finance conservation efforts by public or private conservation groups.

Besides a sound definition and the associated theory – e.g., that markets are developed to reveal information and to enable agents to reach an optimum – a comprehensive study of MBI should include the understanding of the historical and policy context in which they have emerged and thrived.⁹ Indeed, policy instruments are not a-historical, and the rapid up-scaling and expansion into new domains of application of a given policy instrument (without proper validation) due to a specific political agenda might create a mismatch between expectations and actual performance. There is actually a risk that such mismatch occurs with the current spreading out of MBIs for the management of biodiversity and ecosystem services worldwide.

Indeed, market-based instruments may not be effective in any situation. In order to function properly, markets seem to require a particular set of institutional features, especially in relation to the flow of information, transaction costs and the interaction between the parties (competition, coordination, cooperation, etc.).

Furthermore, when it comes to the management of natural resources, markets may bring about social and political changes, which might significantly alter the motivation of agents for environmental stewardship. For example, market mechanisms might induce changes in the perception of agents about their relationship with ecosystems.¹⁰¹¹ The emergence of MBIs is also likely to have influence on national conservation policies and the role of public authorities: these instruments are

⁹ E. Gómez-Baggethun, R. Groot, P. Lomas, C. Montes, "The history of ecosystem services in economic theory and practice: From early notions to markets and payment schemes", *Ecological Economics*, vol. 69, n° 6, 2010, pp. 1209-1218.

¹⁰ N. Kosoy, E. Corbera, "Payments for ecosystem services as commodity fetishism", *Ecological Economics*, vol. 69, n°6, 2010, pp. 1228-36.

¹¹ G. Lescuyer, "Globalisation of environmental monetary valuation and sustainable development. An experience in the tropical forest of Cameroon", *International Journal of Sustainable Development*, vol. 1, n° 1, 2008, pp.115-133.

commonly discussed, conceptualised and promoted at international levels or in academic circles, and afterward adopted by public authorities. This process is currently observed in Indonesia where Payments for Environmental Services are progressively adopted in local and national laws and decrees as a result of the promotion of the concept through international projects.¹² These facts suggest new attributions of responsibilities among the public and private spheres and new conceptions of environmental management in relation to the development of MBIs.

A second working hypothesis is added here to complement to first one. The use of market-based instruments, in themselves and as a terminology, seems to carry with it the idea of a "roll back" of the state, in other words the decline in its scope of action and authority, in environmental policy-making. MBIs are posed as "flexible", "decentralised" and "voluntary" instruments, in contrast to so-called "traditional" or "command-and-control" policy instruments, which are characterised as "regulatory", "prescriptive" or "non-market". One of the main interests of market-based instruments is perceived to lie in their handing-over of decision-making capacity to non-state – mainly private – actors, thus enabling an optimal allocation of efforts and a better revelation of information compared with "command-and-control" instruments wielded by states.

Studying the role of states in the implementation of MBIs is not straightforward. This is first and foremost because such an assessment will vary depending on pre-existing conceptions of the place and role of the state in policy-making. At one end, public policy may be viewed as the action of an authority invested with *public* power (e.g. the state), and at the other, as the result of a multiplicity of interactions between a number of state and non-state stakeholders. In this "governance" perspective, a "roll back" of the state is almost irrelevant, for even decisions made by states are the result of negotiations and lobbying with non-state actors.

The use of MBIs could therefore be perceived by some as a "rolling back" of the state in environmental policy-making because the "invisible hand" of the market is introduced to solve collective environmental issues, while proponents of a governance approach would not automatically infer a decline of the state's role and authority from the participation of different – state and non-state – types of actors in the elaboration and implementation of MBIs. MBIs could in this perspective be seen as putting emphasis on different aspects of the state's authority (such as monitoring for

¹² R. Pirard, "Payments for Environmental Services (PES) in the public policy landscape: 'Mandatory' spices in the Indonesian recipe", *Forest Policy and Economics*, Special issue on Global Governance, *Forthcoming*, 2011.

example), and bringing forth new types of advantages, such as the opportunity to ease public spending.

To overcome these differences, we will focus on the links that may exist between public authorities and MBIs (in their elaboration and implementation), trying to determine to what extent, if at all, decision-making capacity is transferred from state to non-state actors. In order to do so, and to determine whether the use of MBIs leads to a "roll back" of the state, we will consider three possible levels of a shift in decision-making: the setting of environmental objectives, the choice of the modes of action and the decision-making by agents on the ground.

Terms may be misleading, and one key objective of the present text is to clarify the obscure frontiers between fields that appear to be closely connected and greatly overlapping. Are "market-based instruments" equivalent to the creation of markets for exchanging goods and services derived from biodiversity and ecosystem services with the necessary "commodification" process that every fluid market requires?¹³ Does their emergence reveal the utilitarian approach to nature that the very concept of ecosystem services embodies and the myriad of economic valuations promotes? Do MBIs lose contact with public authority, or do they constitute a new mode of intervention but with the same pilots on board? Are MBIs independent from "regulation" or are they part of it? Does terminology matter? As Wunder and Vargas suggest, the term "markets" has both positive and negative impacts for the adoption of instruments that, ironically, do not really deserve this name: "After all [environmental service markets] are seldom true markets".¹⁴ Terminology may matter also because it gives the (wrong?) impression that law is forgotten in the process of developing solutions for the environment – "the component that is least developed in the literature on ecosystem services is the law" – but isn't, say, a fiscal system part of laws?¹⁵

This article is not intended to be based on an exhaustive literature review, a task that would serve different purposes than those pursued here. For instance, we do not wish

¹³ In this article we use the term commodification with two different meanings because, to our knowledge, the English language does not have two different terms (commoditisation does not seem to be an alternative in this respect): first, the process of making goods and services standardised, second, the process of putting a value on nature for the purpose of trade or payments more broadly speaking. We will try to make this clear each time we use it.

¹⁴ S. Wunder, M.T. Vargas, *Beyond "markets": Why terminology matters March 2005*, Guest Editorial, the Ecosystem Marketplace, Katoomba Group, 2005.

¹⁵ J.B. Ruhl, S.E. Kraft, C.L. Lant, *The law and policy of ecosystem services*, Washington, Island Press, 2007.

to replicate the study on the emergence of the concepts of ecosystem / ecological / environmental services in the literature that was performed by Jeanneaux and Aznar, although we strongly encourage such bibliometrics analyses to be applied to markets and the environment.¹⁶ Rather, our study is based on a selection of documents either institutional, scientific, or manuals, that give us direction and allow us to expose our thoughts on the topic while paying real attention to on-going discussions. We intend to provide a modest contribution to the debate in response to the fact that "policy-makers' enthusiasm for market development [for ecosystem services] is not matched by practical understanding".¹⁷

This article thus aims to provide a new, constructive and enlightening analysis of MBIs for biodiversity and ecosystem services by successively (i) looking at the profusion of instruments from an economic theory perspective, (ii) proposing as many operational definitions as required to truly reflect the various characteristics of such a heterogeneous group of policy tools, (iii) presenting a relevant categorisation based on these definitions, (iv) elucidating and discussing the links with public policies, and (v) concluding with the main messages in terms of clarification of MBIs from both an operational and theoretical perspectives and their genuine and potential roles for public policies in the field of biodiversity and ecosystems services.

In the first part, we provide brief descriptions of main MBIs relevant for biodiversity and ecosystem services, we analyse their common characteristics (if any) and relation to markets as defined by the economic theory, we expose the reasons for their emergence in the environmental field and propose a set of definitions that reflects the various views found in the literature, we discuss the role of information revelation and the capacity of the MBIs in this respect, we look at several factors of differentiation between instruments, and finally we propose a categorisation of these various MBIs based on their contrasted characteristics and modalities of implementation.

In the second part, the links between MBIs and public authorities are investigated, followed by a discussion on the reality of a shift of decision-making from public to private agents that would be triggered by market development, and by studying the key role of public policies, public funding and the legal framework to initiate, monitor and manage MBIs in practice.

¹⁶ P. Jeanneaux, O. Aznar, *Analyse bibliométrique de la notion de "service environnemental"*, Note de synthèse WP1 et WP2, document de travail n° 2010-02, Projet Serena, 2010.

¹⁷ N. Landell-Mills, I. Porras., *Silver bullet or fool's gold? A global review of markets for environmental services and their impacts for the poor*, International Institute for Environment and Development (IIED), London, 2002.

2. DEFINITION, UNDERLYING THEORETICAL ASSUMPTIONS AND CATEGORISATION

2.1 A DESCRIPTION OF THE MAIN MBIs

Before we look at the definitions of MBIs, we propose to briefly describe a number of them in order to give the reader a sense of the topic addressed in this document. This selection of instruments does not presume that we believe they are worth being classified as MBIs – this is part of the analysis that will be developed further. But they are commonly referred to as MBIs, and this is a sufficient reason in itself to include them in this introductory section.

Fiscal policies intend to change relative prices of goods and services, and taxation is widely used. Applied to the environment, it follows the principle of the Pigouvian tax – also named eco-tax – according to which the presence of negative environmental externalities of given production processes and activities require the public authorities to intervene in order to change the course of action through market signals. The implementation of a tax is supposed to increase the production costs in order to account for these negative externalities. Ideally, it should reflect the value of the damage to the environment, but this does not happen in practice for at least two reasons: the value of the damage is hard to estimate, and the tax is difficult to apply in a different way for each case. It can target the damage indirectly, either through a unit of input (tons of fertilisers) or an area (m² of land developed), or more directly (tons of CO₂-equivalent emitted). Obviously the more directly connected to the damage, the more equitable and efficient the tax will be. The heavily debated “carbon tax” is an emblematic example of such an MBI, as it would impose CO₂ emitters to pay for the alleged damage to the climate, which is an externality that is not reflected in the market price of resulting goods and services. We will discuss further this particular instrument in section 2.6 by comparing it to tradable permits as an alternative mode of intervention. However, it is important to notice in the first place that genuine Pigouvian taxes are hardly found in practice, because they very commonly serve to generate financial resources for state budgets at least as a partial objective. In France, the

bonus-malus system is aimed at incentivising car owners to purchase a new one that is less polluting, and may as such stand out as an exception.¹⁸

Subsidies can be understood as a negative Pigouvian tax as they are based on a reversed principle: positive externalities are accounted for and rewarded in order to maintain or increase virtuous activities. As with the Pigouvian tax, subsidies can be set up and applied in various ways, and are more or less directly connected to environmental externalities. Agro-environmental Measures (AEM) within the Common Agricultural Policy (CAP) are representative of such an instrument, whereby European states distribute payments to farmers based on their national modalities and for different kinds of ecosystem services. Similar schemes are also developed in the US.¹⁹

Payments for ecosystem services may be understood as a principle – paying for the provision of a service – or as a specific type of instrument (PES), according to the widely used definition by Wunder.²⁰ In the first case, it could be argued that many policy tools form part of this category: any transaction in favour of the service provider, whether subsidies (see above) or more tailored schemes, could be included within it. In the second case, the definition is more precise and specific in terms of concrete application, and consequently less often observed in practice. Indeed, if we consider the Wunder definition (that we personally qualify as an archetype), it appears that the several elements it includes – voluntary agreements between two parties with payments done when a set of conditions are met – are difficult to verify at the same time in a same location. In practice, this is too burdensome.²¹ Two emblematic PES schemes are (i) the Vittel case in France, whereby the company has signed contracts with surrounding farmers to either change their practices or give up their production in exchange for payments in order to maintain the quality of mineral water,²² and (ii) the

¹⁸ Personal communication, A. Karsenty, April 2011.

¹⁹ R. Claassen, A. Cattaneo, R. Johansson, 2008, "Cost-effective design of agri-environmental payment programs: U.S. experience in theory and practice", *Ecological Economics*, vol. 65, pp. 737-52.

²⁰ S. Wunder, *Payments for environmental services: some nuts and bolts*, Center for International Forestry Research (CIFOR), Occasional Paper n°42, Bogor, 2005.

²¹ R. Pirard, R. Billé, *Payments for Environmental Services (PES): A reality check (stories from Indonesia)*, Institute for Sustainable development and International Relations (IDDRI), Paris, 2010.

²² D. Perrot-Maître, *The Vittel payments for ecosystem services: a "perfect" PES case?*, International Institute for Environment and Development (IIED), London, 2006.

Costa Rican "pago por servicios ambientales", which was established in 1996 and proposes payments to land owners according to their land uses – forest conservation, reforestation, sustainable management, etc. with the justification that these land uses generate ecosystem services either locally or globally.²³

Before ending this section on PES, we believe that a comment on the terminology is useful with respect to the relevance of the instrument from a market perspective. We already mentioned in the introduction that three terms were employed in the literature: ecosystem, ecological, and environmental, to qualify the services being remunerated. Basically, economists tend to use the term "environmental" while ecologists tend to use the term "ecosystem" (Jeanneaux and Aznar 2010). Yet another term may emerge soon in scientific publications, as Alain Karsenty brought to our attention on behalf of his colleagues Couvet and Teyssedre from CIRAD: Payments for *Economic Services*. Their point is that these services are produced by people who accept to forgo the benefits from resource exploitation (e.g., forest conservation) or undertake specific activities in order to enhance services (e.g., ecological agriculture). This point deserves attention because it stresses the fact that efficient payments should rely on actual efforts by the economic agents, otherwise these payments do not change anything and efficiency becomes an illusion.

Existing markets can be used by producers and consumers to promote goods and services with positive environmental externalities, at their own initiative and without a determinant role of public authorities. The rationale is to benefit from a premium, namely a higher market price for these products. With higher profits for the producer, or alternatively with the possibility to have higher production costs covered by higher market prices and a larger visibility and share of the market, producers can be expected to favour virtuous practices. An emblematic example of such an MBI is forest certification: FSC and PEFC are two prominent certification schemes whereby forest producers engaged in sustainable forestry can sell their raw or processed timber to niche markets. The same principle can be applied to other products and numerous labels have flourished, particularly for agricultural products. Cashore *et al* refer to these institutions as "non-state market-driven governance systems", which clearly indicates the private origin of these initiatives in contrast with subsidies for instance, though both systems change relative prices of goods and services.²⁴

²³ G.A. Sanchez-Azofeifa, A. Pfaff, J.A. Robalino, J.P. Boomhower, "Costa Rica's Payment for Environmental Services program: Intention, implementation and impact", *Conservation Biology*, vol. 21, n° 5, 2007, pp. 1165-73.

²⁴ B. Cashore, G. Auld, D. Newsom, *Governing through markets*, New Haven, Yale University

Tradable rights or permits are an additional kind of MBIs that rely on the possibility for producers or landowners to exchange rights or permits on a given resource. Such exchanges usually result from regulations that limit the possibility for a given producer or landowner to use the resource at its full potential. They are justified by the search for an optimal situation where producers and landowners with the best characteristics in terms of ecosystem services provision, production costs and economic profitability prospects, are encouraged to substitute for the others through the purchase of their rights in order to reach their full potential. This system can be applied in many ways, but cap-and-trade systems for Greenhouse gas emissions remain the most obvious and emblematic cases of application. A maximum level of emissions is set up in the first place, and emitters exchange rights on the market according to their respective costs of emission reduction. The same principle applies to Individual Transferable Rights for fisheries, whereby fishermen purchase quotas to have the right to produce. With mitigation banking, land developers who degrade biodiversity (on wetlands frequently) have to purchase certificates issued for land restoration elsewhere. In Brazil, landowners in rural areas are legally required to set aside a percentage of their lands under forest cover, but have the possibility to purchase rights to develop more if other landowners accept to develop less.²⁵

2.2 MBIs: ASYLUM COUNTRY FOR ALL TOOLS WITH A PRICE COMPONENT?

In the first place we must notice on the one hand the absence of a clear and generally agreed-upon definition of market-based instruments to our knowledge, and on the other hand the numerous evocations of such an object in debates on biodiversity conservation and the provision of ecosystem services, and in the grey and scientific literature.

While we employ the term MBIs in the present document, in the literature we often come across other terms such as economic instruments, market-based mechanisms, incentive-based instruments, environmental markets, and others. It is not clear whether all of these substantially overlap, but our basic assumption is that markets should be referred to for specific reasons rather than being just a substitute for

Press, 2004.

²⁵ K. Chomitz, "Transferable Development Rights and Forest Protection: An Exploratory Analysis", *International Regional Science Review*, vol. 27, n° 3, 2004, pp. 348-373.

“monetary” or “economic” terms. As we will see over the course of this article, this basic assumption may not be verified although it would in reality make sense to consider markets for what they can contribute specifically. Our categorisation of MBIs and analysis of their links with public actors goes in that direction: what can specific MBIs contribute for the sake of biodiversity and ecosystem services? It is all the more necessary, we argue, that these instruments are qualified *inter alia* as flexible, decentralised and cost-efficient, as opposed to coercive / prescriptive approaches. These qualificatives, however, may not apply equally to genuine market-based instruments or economic instruments more generally.

For example, and bearing in mind the common absence of a definition in documents dealing with MBIs, the eftec and IEEP report reviews the concepts and theoretical backgrounds of MBIs and defines them by their assumed advantages (improve price signals, allow flexibility for agents' behaviour, etc.) and effects (change in the price of goods and services).²⁶ Furthermore, it conveniently reminds us that one of the Rio Declaration on Environment and Development (1992) promoted “the use of economic instruments”. Actually, the confusion between MBIs and economic instruments is striking in many documents, including the eftec and IEEP report that apparently uses the two interchangeably.²⁷ If we look at the “Green paper on market-based instruments for environment and related policy purposes” released by the European Commission, we find the same confusion: “The EU has increasingly favoured economic or market-based instruments – such as indirect taxation, targeted subsidies or tradable emission rights”.²⁸ No definition is given. MBIs are approached through their assumed ability to correct market failures in various ways. And we can hardly expect to get our understanding enhanced by mysterious statements such as “At the EU level, the most commonly used MBIs are taxes, charges and tradable permit systems. In economic terms these instruments work in similar ways. However, they also differ in notable aspects”. With the insistence of the report to point to significant differences between MBIs, one can reasonably wonder whether it is legitimate to have such a broad and vague category and whether some of these instruments do not share more characteristics with instruments outside of this category than with other “MBIs”.

²⁶ Economics for the Environment Consultancy (eftec), Institute for European Environmental Policy (IEEP) *et al*, *The use of market-based instruments for biodiversity protection – the case of habitat banking*, (Technical report for the European Commission DG Environment), 2010.

²⁷ Eftec, IEEP, *op. cit.*

²⁸ European Commission, Green paper on market-based instruments for environment and related policy purposes, SEC(2007) 388, Brussels, 2007.

We notice that this official Green Paper does consider "standard types" of MBIs in relation to public policy specifically – which is logical for a document that is targeted to European policy makers – and therefore does not include a range of other possible instruments.²⁹ As a consequence, it is not so surprising to discover other types of instruments in OECD reports devoted to "markets for biodiversity" with a broader perspective. To begin with, the OECD report defines the financial support that is provided by the Global Environmental Facility (GEF) for projects that deal with biodiversity conservation beyond business-as-usual activities as "non-market transfer payments".³⁰ The principle looks quite similar to subsidies, as public money is spent to support activities that provide environmental benefits. But the difference may be that subsidies are generalised to a given productive activity, while GEF-funded non-market transfer payments usually target a specific location in a project (and money flows from an international body). Is this difference a sufficient reason for making the distinction between market instruments and non-market transfer payments? The same kind of remark applies to PES that commonly deal with specific contracts in specific locations, but are nonetheless gathered under a single banner.

The same report also categorises as MBIs those initiatives that rely on consumers for improving environmental benefits of goods and services that are traded on markets. In contrast with the Green Paper of the European Commission, this OECD report takes some distance from policy-making and focuses its analysis on the producers' and consumers' decisions.³¹ Moreover, in contrast with subsidies and taxes, the OECD report addresses changes in relative prices of goods and services through producers' initiatives and consumers' responses: forest certification leading to timber products sold at a premium, organic agriculture, or non-timber forest products that constitute a market in their own right owing to the preservation of biodiversity.

A prominent academic paper by Salzman on markets for ecosystem services makes a notable distinction between subsidies and taxes, especially in light of the above-mentioned institutional reports: "Despite their poor reputation [...] government payment schemes are surprisingly common [and] should be favoured over the more traditional regulatory and tax-based approaches [...]"³² We find here a conceptual

²⁹ This is the term used in the document, and in others as well which all list "taxes/charges/fees" as the standard types of MBIs for biodiversity.

³⁰ Organisation for Economic Co-operation and Development (OECD), *Harnessing markets for biodiversity: Towards conservation and sustainable use*, OECD, Paris, 2003.

³¹ European Commission, *op. cit.*

³² J. Salzman, *op. cit.*

distinction between subsidies and taxes from the perspective of MBIs, which is far from the statements above. All together, these elements plead for a better definition and categorisation of these various ways of influencing / orienting decisions and managing biodiversity and ecosystem services. Before we do this, however, the next section will be devoted to a discussion of the reasons for such visibility and excitement surrounding MBIs.

Taking stock of the numerous tentative definitions, it seems that the "markets" referred to by almost all authors is not the perfect and self-expanding market of economics handbooks, nor is it even approaching such a standard. A first distinction here can be made between markets and "the market", the latter being a coherent and all-encompassing system that underlies capitalism as a way to structure society for the sake of maximal human well-being, through multiplied transactions between agents, while the former would refer to the capacity for a number of agents to exchange specific goods and services in a competitive manner and in specific places. "The market" has been thought to emerge hand-in-hand with modern capitalist societies as a conscious plan to organise relations between agents in a very artificial way and not necessarily in the interest of society as a whole.³³ Furthermore, while capitalism is supposedly justified by its reliance on the market, it does not necessarily translate into a myriad of competitive markets, as Braudel (1979) argued that capitalists have very commonly defended monopolistic markets.

It is clearly beyond the scope of this article to examine the foundations of capitalism and the associated market principle, but we should at least build on these observations in order to make the point that the market ideology is different from the existence of multiple competitive markets, and does not necessarily translate into these markets. This observation finds a direct application in the analysis of MBIs for biodiversity and ecosystem services. Indeed, the very brief description of the main MBIs suggests already that they do not fit with a definition of markets according to which more than three agents are in competition to produce and exchange a good or service, with accessible information on their characteristics.

Actually, what we find in practice looks more like transactions and trade, but this can easily occur outside real markets. This is in line with what Wunder and Vargas (2007) state when referring to PES: "*Instead of true markets, what we mostly find in the real world [...] are bilateral, mutually-negotiated agreements between ecosystem service users and providers*".³⁴ Apparently many of these "markets" do not host any process

³³ Polanyi, K., (New edition), *The Great transformation*, Boston, Beacon press, 2001

³⁴ S. Wunder, M. T. Vargas, *Beyond "markets": Why terminology matters March 2005*, Guest

of commodification through which a good or service becomes replaceable by another one with close characteristics. While we are aware that perfect markets do hardly exist in the real world, the fact that most "markets" referred to for biodiversity and ecosystem services are at the other end of the spectrum is a reason for being cautious about the MBIs terminology. Is any improvement foreseeable? Maybe not if we agree that

*ecosystem services, while clearly of tremendous value, are ecologically, geographically, and economically more complex than any other kind of commodity or service, which has made tapping into their value a challenge that has yet to be met.*³⁵

2.3 THE REASONS FOR MBIs' PROMINENCE IN THE FIELD OF BIODIVERSITY AND ECOSYSTEM SERVICES

In the context of the confusion over definitions, how can we account for the emergence of MBIs in the field of biodiversity and ecosystem services – both in discourses and in practice? Because of this confusion, some of the reasons and arguments that are proposed do not fit with all MBIs, which is to our view a problem if one wishes to advance ideological views on MBIs – either pros or cons.

Market approaches are complementary or alternative to coercive / prescriptive laws, as they constitute a different way of directing agents to make decisions in line with the general interest, and ideally leading to an optimal situation where all costs and benefits of a given course of action are taken into account. However, the frontier between law and economics is not obvious. Consider taxes and subsidies, two prominent MBIs according to many experts: are they regulations (the issuing of a law imposing taxes or levies or subsidies) or market-based approaches (where payments occur based on productive activities)? The answer is not straightforward and unbiased; it necessarily carries predetermined ideas and values with respect to public action. Furthermore, the following definition tends to place MBIs and regulations quite at the same level: "market-based instruments are regulations that encourage behaviour through market signals rather than through explicit directives."³⁶

Editorial, the Ecosystem Marketplace, Katoomba Group, 2005.

³⁵ J.B. Ruhl, S.E. Kraft, C.L. Lant, *op. cit.*, p. 9.

³⁶ R. Stavins, "Experience with market-based environmental policy instruments", *Resources for*

This being said, the temptation to move from law to economics is based on several sound arguments exposed in many documents. We recapitulate the main ones below:

Correction of market failures. The assessment of a sub-optimal provision of ecosystem services or pollution levels usually points to a lack or even absence of markets that would faithfully reflect the economic values of the environment (for the society at large) subject to management decisions. These market failures mean that some of the environmental effects (positive or negative) of given practices are not economically taken into account and do not translate into transactions between stakeholders. Market-based instruments are then appreciated as a way to correct these values, yet one has to bear in mind that market failures can be addressed through regulatory instruments as well. Nonetheless, as stated by the EC Green Paper: "Public intervention is then justified to correct [market] failures and, unlike regulatory or administrative approaches, MBIs have the advantage of using market signals to address these failures," which makes the connection with another argument: signals and incentives.³⁷

Theory of incentives. A frequent line of justification for using MBIs relates to the theory of incentives, and that banner includes several elements of interest. In economics, this theory refers to the fact that decision-makers receive price signals and take decisions accordingly. Decisions are not imposed through coercive / prescriptive means, and agents have the opportunity to balance the costs and benefits of going one way or another. As a consequence, an optimum level is assumed to be easier to achieve since this approach provides more flexibility, potentially leads to the revelation of previously unavailable information (see part 2.5), and is cost-efficient. In addition, incentives are considered more effective than coercion for motivating agents to make certain decisions, especially in contexts where enforcement of the law is poor. Whether they are more politically acceptable is subject to discussion: on the one hand they provide a softer way for public authorities to change behaviours, but on the other hand they can become controversial when taking the form of payments or subsidies that reverse the polluter pays principle. The incentives argument is perfectly summarised by the Centre for Environmental Management at CQUniversity:

the Future discussion paper 0009, January 2000, in S. Whitten, M. van Bueren, D. Collins, "An overview of market-based instruments and environmental policy in Australia", in *Market based tools for environmental management, Proceedings of the 6th annual Australian Agricultural and Resource Economics Symposium*, Canberra, 2003.

³⁷ European Commission, *op. cit*

*The key idea behind creating new markets and trading schemes is that instead of directly regulating resource use, governments create the environment where market-based systems can be used to create incentives for appropriate resource use.*³⁸

And Stavins goes straight to the point: "the focus in applying MBIs is on achieving outcomes through the self-interest of the firms and individuals."³⁹

Funding gap. The last Conference of the Parties to the CBD that took place in Nagoya in October 2010 has led to several important decisions including the adoption of a new strategic plan with a set of targets. To this aim, a Strategy for Resource Mobilization (SRM) was also adopted and Parties to the CBD are invited to apply a set of financial and resources indicators by June 2011 to measure needs and gaps. This "funding gap" between the cost of achieving the targets in terms of biodiversity conservation and the available funding has been identified for a long time although quantitative figures are still debated. In the last SRM it was said that Parties should "substantially increase resources [...] from all sources, including innovative financial mechanisms." In other words, public funding is far from sufficient and new sources must be sought. The same line of thinking, applied to the forestry sector, resonates in a quote from Koziell and Swingland:

*It is now widely recognized that, given the lack of public funding, biodiversity conservation must start to pay for itself, otherwise it is most likely doomed [...] Severe cuts in public finance are the root cause of the development of [MBIs].*⁴⁰

It is worth noting that the discussions around the high-profile REDD+ mechanism to fund the fight against tropical deforestation have also been focused to a large extent on financing issues, and markets have been proposed as a way to fill the gap between public funding and needs.⁴¹ Some also argue that taxes as MBIs provide

³⁸ "Benefits of MBIs in natural resource management", Centre for Environmental Management at CQUUniversity, <<http://content.cqu.edu.au/FCWViewer/view.do;jsessionid=8a4d179b30dab4f4cadc47244e1db84abce83ef3127d.e34MaxeRbhuObi0LaxqKc3qQax4Pe6fznA5Pp7ftolbGmkTy?page=2612>>.

Last accessed: 06/04/2011.

³⁹ R. Stavins, *op. cit.*

⁴⁰ I. Koziell, I.R. Swingland, "Collateral biodiversity benefits associated with 'free market' approaches to sustainable land use and forestry activities", *Phil. Trans. R. Soc. Lond*, vol. 360, 2002, pp. 1807-16.

⁴¹ R. Pirard, "Reducing Emissions from Deforestation and Degradation in non Annex 1

new revenues to the governments. In our perspective this view is limited when considering MBIs more broadly, since payments or subsidies as MBIs have an opposite effect on public revenues.

2.4 PROPOSED DEFINITIONS FOR MBIs

There are many ways to define an instrument, but the definition is basically either based on its characteristics or its objectives. MBIs are no exception to this rule, and the following definition includes both aspects at the same time:

*MBIs [for the environment] seek to address the market failure of 'environmental externalities' either by incorporating the external cost of production or consumption activities through taxes or charges on processes or products, or by creating property rights and facilitating the establishment of a proxy market for the use of environmental services.*⁴²

This definition seems to represent a dominant view in the literature about MBIs and its stated links with markets (as defined by economic handbooks), which we consider here as a system whereby goods and services are exchanged on a large-scale with some degree of standardisation and competition between buyers and sellers to whom information is available. The process of internalising environmental externalities is indeed at the core of the reasoning. But the links with markets appear weak actually, and one can wonder whether the word "market" is used in an appropriate way. This remark is crucial as markets possess remarkable qualities that result from their characteristics but that many MBIs may not possess. As a matter of illustration, competition among sellers is a characteristic that allows markets to operate properly owing to limited possibilities of rent capture and the revelation of information to reach an optimal situation, but this is not a shared characteristic among MBIs.

Looking at the various ways to define and approach MBIs for biodiversity and ecosystem services, we understand that several conceptions co-exist.

First, existing markets can be improved at the initiative of the private sector in order to account for positive environmental externalities: forest certification is an emblematic

countries, Breaking the Climate Deadlock", The Climate Group, London, 2008, p. 21.

⁴² R.E. Saunier, R.A. Meganck, Dictionary and Introduction to Global Environmental Governance, 2009.

example, but other labels exist, notably for organic agriculture. The rationale is to market products at a premium owing to their positive impacts compared to conventional practices.

Second, existing markets can be modified at the initiative of public authorities through either taxes or subsidies in order to create better price signals: agro-environmental measures (AEM) within the Common Agricultural Policy (CAP) are an emblematic example with the financial support provided to virtuous agricultural practices, but more generally the Pigouvian tax matches this category and is applied in many ways (e.g., ecotax on gasoline consumption). The rationale is for policy makers to orient producers and consumers towards less polluting products and activities through changes in relative prices.

Third, markets can be created explicitly for achieving a given environmental objective: carbon markets associated to emission quotas and mitigation banking are two good examples of such an approach. The rationale is to determine an acceptable or optimal quantity of pollution, and to let economic agents exchange on the newly created market in order to achieve the lowest cost equilibrium for society.

Fourth, deals can be passed and agreements signed between beneficiaries (or alternatively intermediaries) and providers of ecosystem services in a more or less standardised way: Payments for Ecosystem Services (PES), while pertaining to different definitions and modes of implementation, refer to such agreements and related payments. The rationale is that agents will exchange rights over a resource or its use in order to reach a better situation for both beneficiaries and providers, with the condition that these rights (sometimes de facto rather than de jure) pre-exist. It is referred to as the Coase theorem.

This article is not intended to be prescriptive and normative, and we do not seek to elaborate the ultimate definitions of MBIs for biodiversity and ecosystem services (B&ES). We therefore propose a set of definitions that may help the reader think of these modes of intervention according to their scope of applicability, potential for large-scale replication, and reliance on market characteristics and advantages. The following definitions therefore intend to summarise various conceptions that we captured in the literature and thus to reflect co-existing points of view on the matter without prejudging their respective relevance or rightness:

- MBIs for B&ES refer to instruments that provide a means to change relative prices of goods and services with an impact on B&ES through the internalisation of costs and benefits. The internalisation of costs and benefits can notably be done by the State (e.g., taxes and subsidies) or the market

(e.g., tradable permits) and thus be respectively set *ex ante* or as a result of exchanges.

- MBIs for B&ES refer to a variety of markets where B&ES are traded either directly (e.g., bio-prospecting or non timber forest products) or indirectly (e.g., forest certification, organic agriculture labels).
- MBIs for B&ES are policy tools that overcome the limitations of coercive / prescriptive interventions that leave no space for flexibility and do not reveal information about costs and benefits provided by various types of environmental management.
- MBIs for B&ES are new forms of intervention in the environmental field that move decisions from public to private hands in order to save public funding and promote both incentives to private agents as decision-makers and Coasean type bargaining; as such they rely less on public intervention and support except for law enforcement and enhancement of private initiatives.
- MBIs for B&ES refer to new markets created on purpose for exchanging goods and services with a clear environmental component in order to achieve public objectives in the most efficient way (e.g., carbon markets or biodiversity offsetting).

2.5 THE CRITICAL ROLE OF INFORMATION

A very common argument for MBIs development is their assumed ability to help reveal information at a relatively low cost. While it is widely agreed that management is all the more relevant and efficient if accurate and reliable information is available, state planning is not renowned for its capacity to create, reveal and use such information for decision-making – consider the difference between rigid and centralised state planning as opposed to multiple transactions between private agents with a direct interest in decisions according to the induced real costs and benefits. Even if the opposition proposed is schematic, it shows that information will tend to be better revealed in the second situation, not only because of decentralised decision-making in the hands of agents living in the targeted environment, but also because of the direct interest of agents in the revelation of information, being directly impacted by the process.

This aspect is well expressed in an article devoted to tradable permits for biodiversity offsetting that links the informational issue to cost-effectiveness of various approaches:

Lack of cost-effectiveness results from the fact that opportunity costs may have changed in a spatially heterogeneous manner over time [and is] difficult to remedy with a top-down approach because the frequent reallocation of land between conservation and economic development requires an agency to have a high-level of information about changes in opportunity costs [...]⁴³

This point makes sense and needs to be considered seriously. The tradable permits for biodiversity force land developers who plan to destroy valuable habitat to submit a permit to a regulatory authority as a side effect of their activities. The permit issuance results from habitat restoration, and is delivered in principle if the ecological values of the restored and degraded lands, respectively, are equivalent. This short description does not refer to markets, and such a system could be applied in a non-market way with satisfactory outcomes in terms of B&ES. Yet the introduction of the market component by allowing third parties to restore lands and get tradable certificates provides a framework in which incentives are provided to third parties to search for the most appropriate and lowest cost locations for restoration. As such, it decentralises the search for information and creates a business case for land restoration. Anyone can enter the market, which is bound to expand to more buyers and sellers as long as the public authorities issue the right regulations and keep pressing land developers to offset the degradations they cause to the environment. Competition is enhanced, and costs are revealed owing to the incentives provided to third parties who behave as profit makers. One can expect under these conditions that an equilibrium price that reflects the costs of land restoration for the best locations is reached.

Such a market *modus operandi* is also followed by carbon markets that are derived from the flexibility mechanisms that were created under the UNFCCC ("Climate Convention") as part of the Kyoto Protocol for climate change mitigation. The rationale is similar: by enlarging the scope of Greenhouse Gas (GHG) emissions reductions from industrialised countries with binding commitments to developing countries, and by allowing trade of carbon credits and quotas between countries (or between utilities with GHG emissions objectives and carbon project developers), reductions should be achieved where the cost is lowest. With the incentive to look for lowest cost sources of emissions' reductions and thus to reveal information on the matter, this market-based instrument theoretically generates cost-efficient outcomes.

⁴³ S. Wissel, F. Wätzold, "A Conceptual Analysis of the Application of Tradable Permits to Biodiversity Conservation", *Conservation Biology*, vol. 24, n° 2, 2010, pp. 404-11.

The question of information creation, availability, and use for environmental decisions is not only pertinent in terms of cost-efficiency as illustrated by the above-mentioned examples. It is also crucial for making fair deals and for saving limited public financial resources. This perspective relates to the asymmetry of information, which is a very significant problem for economists and a barrier to optimal outcomes (not only for environmental problems obviously). For instance, think of a government that wants to maintain ecosystem services for the sake of sustainable development and well-being, and thus intends to have a number of land owners set aside land or change agricultural practices. It could issue regulations that impose such changes or protection of land with given characteristics (e.g., a steep slope, or proximity to a stream). It could alternatively create a tax or subsidy that incentivises land owners to move in the right direction, usually following a one-size-fits-all model. These public interventions share weaknesses in terms of information: it falls entirely on the public authorities to determine the actions to promote or avoid, and the amount of the taxes or subsidies. Assuming that this information can be found with a reasonable degree of accuracy, the costs of collection would certainly be high. Salzman defends a payment approach to solve this problem and trigger an exchange of information on the basis of willingness to pay and willingness to accept.⁴⁴

This payment approach can take at least two forms, as summarised by Salzman: direct negotiations between beneficiaries (or intermediaries) and service providers in a Payment for Ecosystem Services mode; or reverse auctions.⁴⁵ The latter approach is applied in the Conservation Reservation Program (CRP) in the US and in the BushTender programme in Australia. While the former case shows limitations and works in practice quite like a general subsidy *inter alia* because of collusions between land owners, the BushTender appears attractive to the author and is pointed to as a promising approach. Basically, it relies on

⁴⁴ J. Salzman, *op. cit.*

⁴⁵ *Ibid.*

a publicized competition among landholders who provide sealed bids to the government of how much they are willing to accept for changes in land use management [and it gets] farmers to weigh the costs and benefits of land use changes. This type of payment scheme most effectively creates a market dynamic, where potential purchasers bid against one another.⁴⁶

Key to understand from this quote is the idea that the advantages of a genuine MBI are twofold compared to other instruments: first, reversed auctions force landowners to assess and reveal the costs and benefits of the alternatives, and second the competition between service providers is assumed to lead to lowest cost solutions. Worth noting, this latter characteristic is usually absent from PES schemes as discussed in section 3.3.

From this discussion, we argue that MBIs differ among themselves with respect to their ability to reveal information. Some of them may be considered more as ways to orient decisions through partial internalisation of environmental externalities and associated incentives, than as ways to force agents to reveal information in order to lead to optimal solutions. This difference is arguably very important, and one may wish to consider these particular instruments as a way to put a price on nature and commoditise ecosystem services rather than as a way to use market exchanges in order to reach optimal situations.

2.6 FACTORS OF DIFFERENTIATION BETWEEN MBIs

Prices vs. quantities

If one broadly understands MBIs to be any mode of intervention that internalises, to some extent, positive or negative externalities and consequently either changes relative prices of goods and services or creates new prices for previously free goods and services, then a major distinction among MBIs is based on whether prices or quantities are targeted. In the first case, the price of a given good or service is increased (subsidies, certification/labels) or reduced (taxes, charges) on purpose, in the form of a price signal to the producers or providers. One example is the production of certified timber that sells on the market with a premium: while this premium is taken for granted, the future quantities of certified timber were largely unknown when the

⁴⁶ Ibid.

system was set up. In the second case the quantity of a given good or service is fixed in order to limit the negative externalities, and trade is allowed and encouraged in order to reach an optimum with respect to the costs of its production. One example is the system of tradable development rights in Brazil whereby landowners must keep a percentage of their lands under forest cover (legal reserve), except if they purchase additional rights from another landowner who will develop less than this maximum percentage: the total area of land under forest cover is fixed initially, but the future market prices of these rights to development are unknown. The same principle applies to mitigation banking. The guiding "no net loss" principle is indeed of a quantity type: the area of wetlands is supposed to remain constant. Conversely, the price of a hectare of restored wetland is subject to market forces driven by demand from land developers and supply from mitigation banks. It is important to note that the quantity of developed lands and restored wetlands is not fixed by regulation, and some may argue that it makes a difference with respect to environmental impacts as conservation and restoration are not absolutely equivalent in all respects.

This opposition between prices and quantities is perfectly illustrated by the debate on how to reduce emissions of GHGs to mitigate climate change. Beside all domestic policies of a prescription or persuasion type, the choice is mostly between the design of a carbon tax and the implementation of a cap and trade system. The carbon tax increases the cost of producing goods and services that rely more on GHGs, and thus constitutes an incentive to change technologies, consumption patterns or development paths. The cap and trade system sets quantitative objectives in terms of emissions and lets emitters exchange permits or quotas based on their investment plans, flexibility to adopt new production processes, or abatement costs curves. The seminal work by Weitzman assessed similar outcomes for both approaches (price or quantity) for climate but also for social welfare if abatement costs are known with certainty.⁴⁷ In real life however, there is uncertainty about the cost structure: fixing a tax on carbon leads to uncertain levels of production and associated emissions but producers know for sure the additional costs of production; and conversely, fixing abatement levels leads to uncertain costs for society because the price of emission permits (or carbon credits) is doomed to fluctuate according to market dynamics, but the environmental impact is controlled.

Weitzman's contribution was also to demonstrate that the desirability of one or the other approach depends on a number of parameters related to the shape of the

⁴⁷ M.L. Weitzman, "Prices vs. Quantities", *Review of Economic Studies*, vol. 41, n° 4, 1974, pp. 477–491.

curves for marginal costs and benefits of producing. Later on, several authors have pursued the analysis and concluded that hybrid policies should be favoured in order to combine the advantages of using MBIs controlling prices or quantities.⁴⁸ The rationale is to establish a permit system that gives the choice to emitters to either buy permits on the market at a fluctuating price or buy these permits from the government at a specified price. These propositions for designing hybrid policy tools are interesting in our analysis because they show the variety of MBIs that can be elaborated in order to adapt to specific circumstances, and they stress the key role of information for assessing which approaches are most appropriate and efficient.

Public vs. private goods

Another way to differentiate between MBIs relates to the nature of the goods or services they may (or may not) target. According to our proposed definitions of market instruments in section 2.4 above, MBIs either change relative prices of goods and services with environmental externalities or create new markets where biodiversity and ecosystem services are traded. These interventions are easier when targeted goods and services are excludable (and rival to a lesser extent although the notion of scarcity is central in an economic perspective). This leads us to the issue of public goods, first conceptualised by Samuelson who stated that certain goods require public action if they possess the characteristics of being non-rival (whatever the number of users the satisfaction remains the same for each user) and non-excludable (nobody can be prevented from enjoying the good).⁴⁹ While it is difficult indeed to create a market for a public good because free-riding is likely to become the rule – all potential buyers may choose to wait until other agents finance the production of the good – the case is different for MBIs that change relative prices.

Let's take the case of forest biodiversity preservation for its existence value, which is a public good as everybody can enjoy the existence of an emblematic mammal without having to pay for it. This good can be produced or maintained through virtuous forest management techniques that are rewarded through timber certification. As already described, this mode of intervention at the initiative of the producers from the private sector increases the price of timber on the market with the premium that some buyers

⁴⁸ W.A. Pizer, "Prices vs. Quantities Revisited: The Case of Climate Change", Discussion Paper 98-02, Resources for the Future, Washington D.C., 1997.

⁴⁹ P. Samuelson, "The pure theory of public expenditure", *Review of Economics and Statistics*, vol. 36, n° 4, 1954, pp. 387-389.

are willing to pay when interested in the positive externalities that certification provides. Other potential consumers with an interest in these positive externalities will benefit without paying, but so far the system has proved able to develop and expand. This is an encouraging sign, and one could apply this lesson more broadly to new markets for biodiversity and ecosystem services with public goods characteristics. Willingness to pay does not necessarily have to express itself for private goods only, even though it surely materialises at a larger scale when applied to excludable goods and services due to easier replication.

In addition, MBIs that change relative prices may perfectly apply to public goods when implemented under the control of public authorities. If a tax is created to encourage farmers to use less fertilisers and pesticides for the sake of better water quality, the fact that such an externality is not excludable for water consumers downhill does not constitute an impediment at all to such a market-based approach. The public authorities play the role of an intermediary between service providers and beneficiaries, which easily overcomes the limitations theoretically posed by the public good characteristics of the ecosystem service that is enhanced.

Local vs. global

Another fruitful distinction to apprehend the variety of MBIs applicable to biodiversity and ecosystem services, and their relevance, is related to the scale of the good or service. To make it simple, we can make a difference between local and global scales: ensuring water quality, limiting land erosion or dam siltation, are services that are provided locally, while carbon sequestration or the conservation of emblematic species provide global services. What difference does it make in terms of which MBIs are appropriate?

First, a good or service at a local scale is far more likely to be financially supported by the beneficiaries who make a direct link with the cause of potential economic loss (due to the degradation of the service) and the providers. Classical examples of downhill / uphill agreements for the provision of water-related services show a great deal of evidence in this respect.⁵⁰ The Coasean-type deals find a good application framework in this context as contracts are more straightforward to conclude and transaction costs may remain relatively limited. Furthermore, local services are less likely to be of a pure public good type and thus constitute a conducive environment for

⁵⁰ I. Porras, M. Grieg-Gran, N. Reves, 2008, *All that glitters: A review of payments for watershed services in developing countries*, IIED, London.

making deals, as free riding is controllable. Yet, at the same time the geographical coverage of the market is limited by definition, as the beneficiaries necessarily live near service providers. Therefore, one can expect numerous but small "markets" to develop that will adapt to specific local circumstances.

Second, MBIs changing relative prices of goods or services with environmental externalities may find a better legal framework of implementation in national or sub-regional contexts. Designing a fiscal instrument is a business-as-usual activity for governments or sub-national authorities, but is an extremely complex and difficult objective at an international level where it requires the agreement of a sufficiently great number of countries to make sense. However, the argument is not as straightforward as it may initially look. A carbon tax, for instance, is controversial when applied domestically for competitiveness matters, as is a cap-and-trade system that involves a share of the world only. Recent debates on the Border-Tax Adjustments (BTA) are representative of such tensions: industrialised countries complain about the loss of competitiveness of their producers compared to emerging countries (e.g., China) where industries do not have to pay for the carbon content of their products. The BTA is thought to constitute a possible remedy to this problem.

All in all, the most significant consequence of dealing with global instead of local ecosystem services may be the need to have standardised market products. The case of climate change is illustrative with the rapid development of carbon markets at a global level. The ability to have a standardised marketable product and a single measurement unit has been a decisive factor for this rapid development, which could not have been achieved for biodiversity.⁵¹ And states have been at the core of this development with their negotiation and acceptance of national binding targets for GHG emissions and domestic schemes such as the European Trading Scheme (ETS).

Intuitively one may think that global ecosystem services require more intermediaries because of the more remote distance and the greater number of parties taking part in the transaction. Intermediaries may be a stock exchange, as for carbon markets, or a government, as for the national programme for PES in Costa Rica (cf. *infra*). But this assumption is not always verified and we would hardly make the case that it constitutes a rule. Indeed, even at local scales for local ecosystem services, intermediaries are sometimes unavoidable, as documented for instance in Pirard for a

⁵¹ O. Godard, "Les conditions d'une gestion économique de la biodiversité – Un parallèle avec le changement climatique", Cahier n° 2005 – 017, France, Ecole Polytechnique, 2005.

watershed management PES in Indonesia (see also part 3.3).⁵² The two types of PES, with and without intermediaries, are respectively labelled government-financed and user-financed programs by Wunder *et al.*⁵³

Commodities vs. heterogeneous goods

Markets operate best, especially on a large-scale, when standard goods and services are produced and exchanged. The more homogeneous these goods, the easier the comparison and therefore the setting of a fair price. The ultimate stage would be achieved with commodities such as those we find in some agricultural markets or for energy, where the quality of goods may be measurable in a straightforward way: how many proteins, how many tonnes of oil equivalent, etc. In such ideal cases the markets can expand very rapidly and efficiently, in theory at least.

In the environmental field, such situations may hardly happen. Nature is complex, many of the processes leading to ecosystem services are unknown, biodiversity is a concept that is doomed to change over time as it incorporates new knowledge, and as a rule of thumb, local ecosystem services are site-specific. How could markets develop in such a context? Two cases are interesting to consider in this regard: mitigation banking and carbon sequestration.

Mitigation banking operates on the assumption that it is equivalent from an ecological perspective to preserve a given piece of land somewhere, and to restore another piece of land elsewhere. In terms of ecosystem services this is considered equivalent if a number of conditions are satisfied, these conditions being related to ecological characteristics such as the type of vegetation and its density, amongst others. While these conditions allow project developers to approach, to a certain extent, the objective of "no net loss" – i.e., the avoidance of a loss of ecosystem services overall – it is widely acknowledged that equivalence in this field is not a reasonable expectation from an ecological perspective.

Carbon sequestration poses at least two types of problems with respect to the homogeneity of the goods traded on the (carbon) market. First, debates have been extremely lively between, on the one side, those advocating the consideration of the

⁵² R. Pirard, *op. cit.*

⁵³ S. Wunder, S. Engel, S. Pagiola, "Taking stock: A comparative analysis of payments for environmental services programs in developed and developing countries", *Ecological Economics*, vol. 65, n° 4, 2008, pp. 834-52.

conservation of a natural forest and the establishment of a monocultural forest plantation in terms of tonnes of CO₂-eq only and on the other side those who put forward the risks of perverse effects on biodiversity if such a narrow comparison is allowed. Second, the additionality of projects generating carbon credits in the forestry sector – i.e., the fact that these projects diverge from the business-as-usual scenario – has been contested and seems to remain an issue that will not be resolved for a number of reasons.⁵⁴

2.7 TENTATIVE CATEGORISATION OF MBIs FOR BIODIVERSITY AND ECOSYSTEM SERVICES

Based on our analysis so far, some confusion must be cleared up and a categorisation of these various instruments should be useful. This confusion becomes especially clear when we consider the inclusion of Agro-Environmental Measures (AEM) in the Common Agricultural Policy (CAP) framework. According to the EC Green Paper definition of MBIs, AEMs are included due to their closeness to "targeted subsidies".⁵⁵ Indeed, AEMs constitute a subsidy in a number of European countries where farmers are given financial support in exchange for incorporating environmentally-friendly practices into their production systems. This payment is supposed to account for the value of ecosystem services that are either maintained or newly provided. However, in this same document AEMs are said to be an application of PES because landowners are compensated in exchange for giving up revenue for the common good and because in many cases AEMs are contracts.

As explained in the section 2.1, payments for ecosystem services may be understood as a principle – paying for the provision of a service – or as a specific type of instrument – e.g., according to the widely used Wunder definition.⁵⁶ We believe that it is more useful for the analysis of their advantages, weaknesses and scope of application, to have an MBI category based on the Coase theorem with buyers and sellers of a given ecosystem service negotiating *ad-hoc* contracts that lead to payments in exchange for previously identified positive externalities. This category addresses payments that are tailored to a specific context. While the outcome is

⁵⁴ R. Pirard, A. Karsenty, "Climate Change Mitigation: Should "Avoided Deforestation" Be Rewarded?", *Journal of Sustainable Forestry*, vol. 28, n° 3-4, 2009.

⁵⁵ European Commission, *op. cit*

⁵⁶ S. Wunder, *op. cit*.

expected to be satisfactory, it appears to be time- and money-consuming and not subject to replication on a larger scale due to the high transaction costs as a result of varying situations that require varying levels of payment. Trade-offs are difficult: if a policy maker intends to expand the approach on a larger scale, the very nature of the instrument is going to change as can be observed with the famous Costa Rica initiative (see section 2.1) whereby the government pilots the initiative with a one-size-fits-all mentality.

Table 1:

Category	Exclusive characteristics	Specificities	Relation to markets	Examples of application
Regulations changing relative prices	Consists in mandatory or non mandatory regulatory measures that lead to higher or lower relative prices for a given good or service based on its environmental record	Part of a fiscal policy with environmental objectives and complete control by public authorities	Needs an existing market with clear prices (many transactions)	Eco-tax, agro-environmental measures
Coasean type agreements	Consists in ideally spontaneous transactions (free of public intervention) for an exchange of rights in response to a common interest of the beneficiary and the provider of	Requires clear allocation of property rights, highly site-specific and difficult to replicate on a large-scale	Usually not following market rules, more of a contractual nature	Payments for Ecosystem Services ala Wunder, conservation easements, conservation concessions

	a given service			
Reverse auctions	Consists in a mechanism whereby candidates to service provision set the level of payment (whether it is eventually accepted or not is not an issue) in response to a call by public authorities to remunerate landholders	Aimed at revealing prices and avoiding free-riding and rent seeking	Creates an ad-hoc market and favours competition among bidders for achieving cost-efficiency	Payments for Ecosystem Services (e.g., BushTender in Australia, CRP in the US)
Tradable permits	Consists in an <i>ad-hoc</i> market where users of an environmental resource need to purchase permits that can be further exchanged among resource users	Designed to either serve a clear environmental objective (bio-physical indicators) or based on acceptable social costs (market price of carbon)	Creation of a specific market for a given environmental objective, information is expected to be revealed	Mitigation banking for biodiversity, emission quotas in the European ETS, Individual Transferable Quotas for fisheries, tradable development rights for land, voluntary carbon markets*
Specific markets for environmental	Consists in a market where	Framed at the international	More or less close to the	Genetic resources,

products	an environmental product can be directly traded between producers and consumers (or processors)	level with specific rules for each country and a great variety of deals (genetic resources); classical market with more or less processed products (NTFP)	market definition	non timber forest products (NTFP), ecotourism
Premium capture on existing markets	Consists in schemes whereby producers of a good or service can send a signal to the consumer that environmental impacts are positive (in relative terms) and consequently get a premium on the market price	Still limited as an incentive for action due to relatively low willingness to pay by consumers	Uses markets to identify and promote virtuous activities	Forest certification, labels for organic agriculture, norms (self produced before certification)

* These voluntary carbon markets stand as an exception in this category, as they are of private initiative and are not derived from publicly-led commitments (as for fisheries, greenhouse gas under the Kyoto Protocol, etc.)

As a means of comparison, below are typologies of economic instruments proposed by other authors and cited in Meignien *et al.*⁵⁷

The OECD distinguishes between instruments based on prices (fiscal measures), instruments based on responsibility (penalties), subsidies, suppression of harmful subsidies, market creation, and allocation of property rights.

UNEP lists instruments related to a relevant allocation of property rights, market creation, payments for ecosystem services (large category including extraction of natural resources, entry fees for protected areas, concessions for hunting, fishing, etc.), fiscal instruments, taxes against deforestation, environmental funds, and responsibility systems (including penalties, biodiversity compensation, etc.).

⁵⁷ P. Meignien, E. Lemaître-Curri, 2010, Conservation et utilisation durable de la biodiversité et des services écosystémiques : analyse des outils économiques, Commissariat Général au Développement Durable, Paris.

3. LINKS BETWEEN MBIs AND PUBLIC POLICIES

The second working hypothesis that we outlined in our introduction relates to the relationship between the state, or public authorities, and MBIs. The use of MBIs seems to carry with it expectations of a "roll back" of the state, or in other words, a reduced role of the state compared to other instruments.

Indeed, MBIs are deemed to be "flexible", "decentralised", "voluntary" and "cost-effective" instruments. This is in contrast with so-called "traditional" or "command-and-control" instruments, which are characterised as "regulatory", "prescriptive" or "non-market". In "traditional" policy-making, an "authority invested with public power and governmental legitimacy in a specific sector of society or of the territory" carries out actions through the use of policy instruments, to attain objectives defined collectively for the good of society.⁵⁸ The state is therefore the central actor in the design and implementation of public policy towards a predefined objective, which can be expressed through "materially identifiable practices", such as monitoring, construction work, the maintenance of infrastructures or the allocation of subsidies, or "more immaterial practises", such as institutional communication campaigns, speeches, and the spreading of norms and cognitive frameworks.⁵⁹

One of the main interests of market-based instruments is therefore perceived to lie in their giving decision-making capacity to non-state – mainly private – actors, thus enabling an optimal allocation of efforts with regards to the management of environmental externalities, and a better revelation of information, compared with "traditional", "command-and-control" instruments wielded by states.

The study of MBIs carried out in the first chapter seems to raise a paradox. If MBIs are perceived as instruments giving decision-making capacity to non-state actors, it appears that the majority of case studies on which our analysis is based feature MBIs being put into place and managed by state actors themselves. What is then the nature

⁵⁸ M. Grawitz, J. Leca, J-C. Thoenig, 1985, in J-C. Thoenig, "Politique publique", in L. Boussaguet, S. Jacquot, P. Ravinet, *Dictionnaire des politiques publiques*, Presses de Sciences Po, 2010, p. 420. Translation by the author.

⁵⁹ *Ibid.*, p. 423. Translation by the author.

of the links between states or public authorities and MBIs? How can their relationship be characterised?

This issue is also a central element in our understanding of MBIs, and in enabling their validation as tools for the protection of the environment. If public authorities lose some of their decision-making power to non-state actors, the common project of sustainable development, adopted by governments internationally, could lose some of its force and purpose. Even if an increasing number of non-state and even private actors support such a goal today, public authorities, who have a responsibility to protect the environment as a global public good, carry it more consistently and sustainably in time.

In the following section, we will attempt to clarify the relationship between MBIs and public authorities, by looking into the role of the latter in the implementation of MBIs, and the impacts of MBIs on the decision-making capacities of public actors, evaluating to what extent and in what way they may be affected. To structure our analysis, we propose to make a distinction between three levels of decision-making: the definition of objectives (e.g., reduction of GHG emissions or conservation of wetlands); the choice and design of the appropriate management tools (e.g., cap and trade system, biodiversity offsetting, creation of protected areas); and the concrete decisions on the ground (e.g., changing a production technology to reduce emissions, degrade or restore a wetland). (see Table 2)

Based on our research, it appears that the state remains a central actor in the implementation of MBIs, as a leader, a facilitator, or as the provider of an indispensable institutional and regulatory context and funding capacities. That said, the majority of so-called "market-based instruments" studied in this paper do shift certain aspects of policy decision-making from public to private sector actors.

Table 2:

DEGREE OF SHIFT FROM PUBLIC TO PRIVATE IN DECISION MAKING	Almost non existent	<h3>Defining objectives</h3> <ul style="list-style-type: none"> ▪ Reducing emission for climate change mitigation ▪ Maintaining ecosystem services for sustainable development ▪ Preserving biodiversity for human well-being and reduced vulnerability, etc. <p>These objectives take place at more or less global levels. Apparently MBIs do develop after such objectives are stated and do not seem to be in a position to substitute to decisions by public authorities to pursue a given objective. Only PES in local contexts may have such a capacity, but to a very limited extent according to past experience.</p>
	Low	<h3>Choosing and designing appropriate instruments</h3> <ul style="list-style-type: none"> ▪ Do MBIs get promoted by non-State actors in substitution to other policy instruments? ▪ Do MBIs get designed based on private actors' preferences and wishes? <p>As they commonly develop in response to a public objective, one can suppose they get chosen by public authorities as well. But they function according to market rules (more or less as argued previously in the article) and provide opportunities for stakeholders to seek profit. Lobbying is therefore a likely important factor with the capacity to impose choices of instruments to public authorities, not even mentioning their favorable reputation in many contexts in relation to the economic liberalism trend.</p>
	High	<h3>Taking concrete decisions on the ground</h3> <ul style="list-style-type: none"> ▪ Using one production system instead of another one ▪ Degrading ecosystems on private lands for production or preservation ▪ Managing ecosystems sustainably or for rapid financial gains, etc. <p>Clearly this is where MBIs most notably induce the shift in decision making according to the theory of incentives and free choice with reduced prescriptions from the State. This holds true for all types of MBIs studied in this article.</p>

3.1 FROM CREATION TO IMPLEMENTATION

Two phases can be distinguished for the sake of the analysis: the conception phase, during which the idea of using a market-based instrument is formed, and the implementation phase, which covers all operational stages from the design of the instrument to its implementation on the ground, the monitoring of its achievements and its maintenance in time (sustainability).

Finally, a more structural dimension also needs to be accounted for, which relates to the importance of the institutional context in the creation and implementation of any MBI. The concept of "embeddedness", drawn from economic sociology, suggests that markets do not operate in social or political isolation but are instituted processes.⁶⁰ The great majority of the research on MBIs suggests that a prerequisite for their implementation and success is the existence of a well-developed and functional wider institutional setting.⁶¹ No effective market can be set up without an effective system defining and enforcing property rights, establishing rules and norms regulating and sanctioning the behaviours of actors and enabling the settling of disputes.⁶² An indeed, "an [...]important question is how service markets can be made to work in a country with limited institutional capacity and a weak rule of law".⁶³ This pre-established structure is crucial to set the adequate "rules of the game" by which MBIs will be played.⁶⁴ Furthermore, market-based mechanisms are costly to establish: they involve technical costs, relative to the understanding of the functioning of ecosystems and their services; organisational costs, as a network of supporting organisations is needed to manage, monitor and enforce the mechanisms; legal costs relative to the

⁶⁰ Granovetter, 1985; Polanyi, 1944, 1957, in P.L. Taylor, "In the market but not of it: Fair Trade Coffee and Forest Stewardship Council certification as market-based social change", *World Development*, vol. 33, n° 1, 2005, p. 131.

⁶¹ A. Vatn, "An institutional analysis of payments for ecosystem services", *Ecological Economics*, vol. 69, n° 6, p. 1248.

⁶² M. Jenkins, S.J. Scherr, M. Inbar, "Markets for biodiversity services. Potential roles and challenges", *Environment*, vol. 46, n° 6, 2004, p. 42; Organisation for Economic Co-operation and Development (OECD), *Handbook of market creation for Biodiversity: Issues in Implementation*, OECD Publishing, 2004, p. 31.

⁶³ J. Salzman, *op. cit.*, p. 959; United Nations Environment Programme (UNEP), *The use of economic instruments in environmental policy : Opportunities and challenges*, UNEP, 2004.

⁶⁴ UNEP, *op. cit.*

definition of property rights; and operating costs.⁶⁵ These costs can deter non-state actors, and particularly private actors, from instituting MBIs themselves.

3.1.1 Creating MBIs

To what extent are state actors responsible for the decision to design an MBI to address a specific policy issue? Such a causal link is of course very hard to establish – the formation of public policy is a multi-causal process, shaped by political programmes, socio-political oppositions and lobbying, the macro-economic situation, but also path-dependency, bureaucratic culture, emulation processes in international fora, etc. We will distinguish for the sake of this study a process through which a state actor puts an MBI into place, from a process through which a non-state actor puts it into place.

Taxes and subsidies are the “oldest” type of MBIs. In fact, they could be perceived as being part of a “first generation” of MBIs comprising taxes, charges and subsidies, which are now widely perceived as being part of the “standard” toolbox of states. And indeed, taxes and subsidies are by far the most widely used MBIs. This type of MBI can only be set up by state actors, who have the “public power and governmental legitimacy” and the organisational capacity to do so.

There are numerous cases of environmental taxes and subsidies. The use of environmental taxes is widespread and even increasing in the EU, for example: taxes on nitrogen oxides in Sweden and in France, waste water charges in the Netherlands and Denmark, pesticide tax charges in Sweden, Denmark and Belgium, landfill taxes in France, the UK and Austria, etc. Subsidies are also used extensively as part of the European Union’s agricultural policy. Direct payments are made to farmers with virtuous practices through the European Agricultural Guarantee Fund, under the CAP. Agro-environmental subsidies were used initially to encourage farmers to produce more, but they are now increasingly used to attain environmental objectives.⁶⁶ In Canada, the National Income Tax was amended to facilitate the donation of “ecologically sensitive” land, as a complement to traditional conservation efforts

⁶⁵ S. Pagiola, W. Zhang, A. Colom, “Can Payments for Watershed Services Help Finance Biodiversity Conservation? A Spatial Analysis of Highland Guatemala”, *Journal of Natural Resources Policy Research*, vol. 2, n° 1, 2010.

⁶⁶ I. Bräuer, R. Müssner, K. Marsden, F. Oosterhuis, M. Rayment, C. Miller, A. Dodokova, “The use of market incentives to preserve biodiversity”, *Ecologic*, Final Report, A project under the Framework contract for economic analysis ENV.G.1./FRA/2004/008, July 2006; p. 34.

pursued by the federal government.⁶⁷ With this mechanism, landowners can donate "ecologically sensitive" land without suffering from tax penalties: land is given as an ecological "gift", which is entirely deductible against annual income.⁶⁸

Even though such mechanisms can be seen as "traditional" tools, alongside coercive / prescriptive mechanisms, they are at the root of some interesting and more recent innovations. The UK government put into place a landfill tax that enables landfill operators to donate a part of their tax to environmental projects, in return for tax credits. The donations are directed into a fund, which serves to finance the projects of registered environmental bodies. In this way, the tax acts to control damageable behaviour, but also ensures that the money levied will be redirected to environmental projects.⁶⁹ Admittedly, Pigouvian taxes traditionally serve the primary objective of reducing harmful activities through price signals, and beside may help finance the reparation of damages or the elaboration of alternative activities. But the UK example shows that innovations can induce a change in the relationship between the public actor and the recipient of the policy, giving the latter the choice to participate in the programme. The constraint imposed by such instruments on the recipients is thus further reduced.

In theory, **payments for ecosystem services** can be put into place by state and non-state actors alike.⁷⁰ In practise however, there are few cases in which non-state actors by themselves come up with the idea of setting up a payment system. The BushTender reverse auction programme, or the Costa Rican "Pago por servicios ambientales" (PES) programme, were both set up by state actors. The BushTender programme in Australia was set up by the Department of Natural Resources and the

⁶⁷ C. Rubec, "Canadian case study on a national tax incentive measure for biodiversity", International Union for Conservation of Nature (IUCN), 1996, p. 1.

⁶⁸ *Ibid.*, p. 2.

⁶⁹ I. Bräuer, R. Müssner, K. Marsden, F. Oosterhuis, M. Rayment, C. Miller, A. Dodokova, *op. cit.*, p. 41.

⁷⁰ Payment for ecosystem services (with small caps) is a generic expression describing those instruments through which providers of a specific ecosystem service will be remunerated to preserve/restore it. The distinction with subsidies, that largely fit with this definition, is tenuous and lies mainly in the level and nature of their application: systematic and general for subsidies; more specific and voluntary with payments for environmental services. Payments for Ecosystem Services (PES, with capital letters), as exposed in the categorisation proposed in the previous section, refer to the contractual payments based on conditionality for the provision of ecosystem services, according to the Coase theorem.

Environment of the state of Victoria and the Costa Rican programme was elaborated by the government, as a nationwide scheme. Note that different levels of government can be represented: sub-national authorities can also set up payments for ecosystem services.

The case of **wetland mitigation banking** in the United States is an interesting one that illustrates the more complex shape that the decision to use tradable rights and permits can take. In this case, Robertson argues, the idea emerged through a public / private process that took place at the state (and not the federal) level, with the objective of achieving the "no net loss" wetland policy.⁷¹ A regulation already existed at the federal level, which stated that an entrepreneur wishing to develop a wetland had to restore an equivalent amount of wetland somewhere else, but the quality of wetland restoration was not perceived as being satisfactory under this system, on account of the coercive / prescriptive federally-directed system through which the regulation was administered. A system of off-site restoration was therefore drafted by a coalition of local regulators and businessmen, independently from federal directives, and this opened the door to wetland mitigation banking.⁷² Here, the idea of using tradable permits emerged within the context of existing federal regulations, through a public / private process located at the state level. In a similar field, the CDC Biodiversité in France is a private initiative that aims to sell restoration certificates to project developers. It may in the future be promoted through the creation of a mitigation banking scheme under the control of public authorities.

Some **certification schemes** are set up by states, as a communication and informational tool to their citizens, but most of the time certification systems emerge in non-state spheres, and often as a palliative to the absence of such mechanisms in public policy. It is interesting to note that the idea for certification schemes can emerge in the private sector but also in non-state non-profit sectors. Fair trade coffee, an emblematic certification mechanism, was launched by non-profit organisations wishing to respond to dropping coffee prices, unmanaged by the International Coffee Organization's regulations. In 1997, the Fairtrade Labelling Organizations International was created, merging pre-existing fair trade NGOs to promote the Fairtrade Certification Mark in the countries in which it is represented. Another of the most famous examples of certification, the FSC, emerged in the non-profit community as a collaboration between forest retailers, as a way of palliating the deadlock at the

⁷¹ M.M. Robertson, "The neoliberalization of ecosystem services: wetland mitigation banking and problems in environmental governance", *Geoforum*, vol. 35, n° 3, 2004.

⁷² *Ibid.*, p. 364.; J. Salzman, *op. cit.*, p. 909.

international level on the creation of sustainable forestry standards, and as an alternative to threats of boycott for tropical timber products.⁷³ The certification scheme was thus set up by non-state actors but with the objective of filling a "public service mission". This example provides another illustration of the notion of "non-state market-driven" governance, which sheds light on the power that private actors may seize in substitution to state action.⁷⁴

The state is therefore an important actor in the decision to use an MBI to address a specific policy issue, but its role seems to vary according to the MBI in question. The public authority is the only actor responsible for the use of taxes and subsidies or reverse auction schemes, while this responsibility can be shared in the case of PES and tradable rights and permits. Although the state remains the catalyser for action in the great majority of cases, the initiative and implementation lie mostly in the hands of private actors for certification and for specific markets for environmental products.

3.1.2 Implementing MBIs

For each PES to be established, argues Salzman, one needs to: determine the service that deserves provision, determine how it should be provided, identify the providers and the beneficiaries, and assess how much service provision is necessary.⁷⁵ This proposition can be stretched to a certain extent to include all types of MBIs: for taxes and subsidies, PES, reverse auction schemes, tradable permits and certification schemes, the implementer needs to identify the positive outcome that is to be obtained, how it should be obtained, by whom, for whom and to what extent.⁷⁶ The instrument needs to be created, monitored, its rules enforced and maintained in time.

These requirements are time-consuming, incur costs, and require organisational and institutional capacities that are often possessed by state actors only.⁷⁷ Some of these

⁷³ P. Pattberg, "The Forest Stewardship Council: Risk and Potential of Private Forest Governance", *The Journal of Environment Development*, vol. 14, 2005, p. 360.

⁷⁴ Cashore *et al*, *op.cit.*,

⁷⁵ J. Salzman, *op. cit.*, p. 899.

⁷⁶ As mentioned in section 2.6., MBIs will determine prices or quantities, thus always leaving one aspect to be determined by the uncertain outcomes of market forces. Therefore, the assessment of how much service provision is necessary may be replaced by the assessment of how much is bearable for private agents in terms of costs, which is both a political and economic issue.

⁷⁷ R.M. Huber, J. Ruitenbeek, R. Seroa da Motta, Market-based instruments for environmental

actions, such as monitoring, also require legitimacy and a commitment to pursue them over time. These two attributes can be possessed by states and non-state non-profit actors, but the latter are less capable of sustaining their action over time, their programme of action being dependent on their more fluctuant funding. As mentioned in the introduction, the institutional and regulatory context provided by states is crucial in allowing the implementation of MBIs, but the state also plays a direct role in enabling the implementation of MBIs, as the central driver and provider of resources (human, financial, material), or as a facilitator of exchanges and transactions.

a) Regulations changing relative prices

Regulations changing relative prices are proposed by states exclusively. Their implementation requires a pre-existing legal, economic and institutional framework. An effective tax collection system needs to be in place, along with an enforcement system and a distribution mechanism. The implementation of taxes and subsidies is also information intensive, as it requires detailed information on the nature of the environmental issue to be addressed, the segment of the population to be targeted and the costs of compliance, the impacts of such a measure on the issue to be addressed, and the way redistribution will be organised. Crucially, the sustainability of the mechanism over time also needs to be addressed. In the case of agro-environmental subsidies, for example, targeted farmers could revert back to former and more damaging behaviour if the subsidies came to a halt. It might be risky to trust private sector actors with the maintenance of such instruments over time, as their interests might at some point clash with those of the society as a whole. The same can be said of non-profit actors, whose capacity for action is more fluctuant, contingent on funding, than States'. Moreover, only public actors have the legitimacy and organisational capacity to implement a tax system.

b) Coasean type agreements and reverse auctions

Payments for ecosystem services, broadly understood, should rely like all other MBIs on a pre-existing institutional context to function in order to: gather information on the value and volume of services being exchanged; create the conditions for participants to meet and negotiate payments (when necessary); take on monitoring and enforcement mechanisms. Most importantly, it depends on a clearly defined and well-

policymaking in Latin America and the Caribbean. Lessons from eleven countries, World Bank Discussion Paper, n° 381, 1998.; R. Pirard, R. Billé *op. cit.* also show that PES would not develop in Indonesia without the strong involvement of international organizations, aid agencies or research centers.

established property rights system, without which it is difficult to identify the buyers and the sellers of a given service, and the effectiveness of the scheme: who owns the carbon sequestered in forests? Who owns the genetic information contained in biodiversity? The water flowing in a stream?⁷⁸ In some cases, states can create dedicated institutions to manage the PES scheme. In Costa Rica, where the government set up the nationwide "Pago por servicios ambientales" programme, the government created a new institution, the FONAFIFO, for its administration.⁷⁹

States are often the only actors capable of launching a payment for ecosystem services scheme. The preparatory work – circumscribing the service to be exchanged, evaluating it, locating the sellers and the beneficiaries – is generally an investment that only public authorities, which have a public service mission, can undertake. Public authorities are also often the sole actor capable of acting on behalf of the beneficiaries of a service. Such beneficiaries are typically spread out and therefore not always able to launch a collective action.⁸⁰ In addition, the public goods nature of the services to be provided often requires that states act as representatives of the beneficiaries, through "government-funded program", as opposed to the relatively limited "user-funded program".⁸¹

Because of this, states, but also inter-governmental organisations are important buyers and sellers in payment for ecosystem services schemes.⁸² A study by the IIED of 72 cases of markets for the protection of forest biodiversity and services in 33 countries finds that the main buyers of biodiversity services, in order of prevalence, are private corporations, international NGOs and research institutes, donors, governments and private individuals, while communities, public agencies and private individuals predominate as sellers.⁸³ The PSA programme in Costa Rica uses revenues from earmarked taxes.⁸⁴ Funding can also be obtained through international

⁷⁸ S. Pagiola, W. Zhang, A. Colom, *op. cit.*, p. 272.

⁷⁹ J. Salzman, *op. cit.*, p. 898.

⁸⁰ Vatn, *op. cit.*, p. 1248.

⁸¹ S. Wunder, S. Engel, S. Pagiola, *op. cit.*

⁸² See for example: M. Jenkins, S.J. Scherr, M. Inbar, *op. cit.*, p. 36.; M.M. Robertson, *op. cit.*, p. 361.; S. Whitten, M. van Bueren, D. Collins, "An overview of market-based instruments and environmental policy in Australia", in *Market based tools for environmental management*, Proceedings of the 6th annual Australian Agricultural and Resource Economics Symposium, Canberra, 2003.

⁸³ M. Jenkins, S.J. Scherr, M. Inbar, *op. cit.*, p. 39.

⁸⁴ S. Pagiola, W. Zhang, A. Colom, *op. cit.*, p. 10.

donors – the Global Environment Facility and the World Bank have been instrumental in maintaining the PSA in Costa Rica – as well as large international NGOs such as the Nature Conservancy.⁸⁵ But as mentioned before, the latter cannot ensure long-term financing.⁸⁶ Ideally, PES would be user- rather than government-funded mechanisms – users would pay service providers directly, ensuring more efficiency and the revelation of information on the relative value of different services according to the Coase theorem. While such formats are producing good results in the case of water services, they are not being widely implemented for biodiversity services, leaving public authorities to fill the gap.⁸⁷

Another crucial role endorsed by public authorities in the case of payment for ecosystem services – and MBIs more largely – is monitoring. The actors paying for environmental services need to be sure that their investments are being effective, that services are effectively being protected by providers. In the case of BushTender for example, the staff of the Department for Natural Resources and the Environment went on the ground to monitor the progress made by farmers in their implementation of conservation plans.⁸⁸ Non-state non-profit actors, who can possess the necessary legitimacy, can also fulfil this role, but the sustainability of their action over time cannot always be secured.

More incidentally but interestingly, states can also serve as intermediaries between buyers and sellers, to catalyse the emergence of markets for ecosystem services. Costa Rica's FONAFIFO, the agency in charge of the PSA programme, endorses this role as one of its founding missions. In the village of Sukhomakri, India, market payments were stimulated through the provision of information and training following the government's establishment of the Central Soil and Water Conservation Research and Training Institute (see part 3.3).⁸⁹

To ensure optimal efficiency and effectiveness (but not necessarily equity), and according to the Coase theorem, one could argue that payments for ecosystem services should ideally demand little public involvement, monitoring functions excepted. The challenges in setting up such schemes means however that public authorities remain central actors, as buyers and sellers, but also through their monitoring activities and their facilitation of exchanges. Public actors have an interest

⁸⁵ J. Salzman, *op. cit.*, p. 903.

⁸⁶ S. Pagiola, W. Zhang, A. Colom, *op. cit.*, p. 9.

⁸⁷ *Ibid.*, p. 10.

⁸⁸ J. Salzman, *op. cit.*, p. 906.

⁸⁹ S. Pagiola, W. Zhang, A. Colom, *op. cit.*, p. 275.

in this position, as PES schemes can often enable them to complement, improve or palliate lacks in their existing environmental policies at reduced costs.

c) *Tradable rights and permits*

Tradable rights and permit systems are also very complex to put in place, not the least because they tend to be large-scale devices and can therefore require coordination at regional or international levels – e.g., European Union Emission Trading Scheme, flexible mechanisms under the Kyoto Protocol. A common use of trading schemes, internationally, is tradable fishing quotas.⁹⁰ The United States has set up a system of tradable permits to reduce pollution (and particularly sulphur dioxide SO₂): polluters are given a fixed amount of "permits to emit", and are fined if they exceed their limit. Those who under-pollute can sell their credits to over-polluters. Such systems have been put in place in Chile to reduce the use of water resources, and in New Zealand to minimise the impact of industrial activities on fisheries.⁹¹

Whether these mechanisms function through the setting of quotas or a cap, they require a solid and complex structure and need to be based on political decisions. Indeed, the level of the restriction must be determined, and translated into a quota or a cap. One therefore needs to decide between whom the rights and permits will be shared (everyone? only the polluting actors? how many rights/permits will they be allocated?), and whether some rights will be distributed to begin with (as was the case with the ETS) or if actors' balance will be set at zero at the onset. If some rights are distributed at the onset, should they be given freely, penalising less-damaging companies, or sold, penalising companies with a strong impact on biodiversity? The system and rules through which rights are exchanged, their life-span, the conditions under which they can be renewed, and the authorised transactions, are all factors that need to be decided upon.⁹² A layer of complexity is added in the case of regional or international systems, as agreements on restriction levels and binding commitments need to be found. Such tasks require research, planning, management, institutional and organisational capacities, which means that they are undertaken (or financed) by public authorities, and mainly states.⁹³

⁹⁰ I. Bräuer, R. Müssner, K. Marsden, F. Oosterhuis, M. Rayment, C. Miller, A. Dodokova, *op. cit.*, p. 34.

⁹¹ D. Kloss, *op. cit.*, p. 173.

⁹² L. Abdelmalki, P. Mundler, *Economie de l'environnement et du développement durable*, Bruxelles, De Boeck, 2010, p. 107.

⁹³ D. Kloss, *op. cit.*, p. 172.

Monitoring and enforcement requirements are also demanding: binding commitments need to be agreed upon, as do penalties for non-compliance. A study by UNEP shows that in several cases, systems of individual tradable quotas in fisheries worsened depletion in the absence of accurate data, which was not checked by a central authority.⁹⁴ Robertson and Salzman also demonstrate the difficulty that exists in ensuring that a carbon sequestration service will effectively be provided through reforestation and land use changes, or that wetland restoration services are effectively provided in exchange of the development of other wetland areas.⁹⁵ In this case, actors wishing to fill a wetland have to compensate for such a loss, either by creating a certain amount of wetland or by buying wetland credits from private firms specialised in the restoration of former wetland areas. This system makes economic sense, but can have negative environmental side effects. Indeed, wetlands do not provide generic services, but specific ones, depending on their characteristics and location. Restoring wetland B following the destruction of wetland A may therefore not be a transparent transaction.⁹⁶ The objective of the American government of "no-net loss" is preserved, but as Salzman asks: "'net loss' of what?"⁹⁷

Public authorities are therefore unavoidable actors in the establishment of tradable rights and permits, because of the complexity and cost (in money, but also time and resources) of the set-up of such mechanisms, and because of the need to monitor their evolution and their link with environmental objectives.

d) Certification

Certification mechanisms seem to be the MBIs that require the least direct intervention from public authorities aside from specific markets for environmental products that may develop in response to private initiatives. While some certification mechanisms can be set up by states, the majority are non-state endeavours set-up and managed by non-state actors. Nonetheless, these mechanisms are related to public authorities in several ways and to various degrees.

To begin with, certification mechanisms, like other MBIS, can rely on the institutional and regulatory context to develop. Typically, certifications rely on existing forest

⁹⁴ UNEP, *op. cit.*, p. 73.

⁹⁵ Salzman, 2005, pp. 908-910.

⁹⁶ M.M. Robertson, The neoliberalization of ecosystem services : wetland mitigation banking and problems in environmental governance, *Geoforum*, vol. 35, 2004, p. 369

⁹⁷ Salzman, J., Creating markets for ecosystem services: Notes from the field, *New York University Law Review*, vol. 80, 2005, p. 909

regulations, and their enactment by public authorities. In the case of the FSC, and the PEFC in Sweden, authors go as far as saying that "the support of state agencies and the enabling Swedish regulatory and political framework facilitated successful implementation".⁹⁸ Lars Gulbrandsen and Philipp Pattberg, in their respective studies of the emergence of the FSC and the PEFC in Sweden, both point to the fact that the pre-existing policy context in Sweden, headed towards the deregulation of previously very stringent environmental protection laws in the forestry sector, set the stage for the emergence of certification schemes.⁹⁹ The deregulation process gave industries more leeway to choose how to achieve the environmental protection objectives set by the state. In other cases however, private certification schemes can be perceived by public authorities or forest administrations as unwanted competition.¹⁰⁰

Certification mechanisms may also need public authorities for monitoring and enforcement purposes, although this function is included in a number of certification instruments. Indeed, certification requires an authentication of the product's origins, and of the producer's claim that his action will be environmentally effective. This supposes being able to authenticate the entire supply chain, which can hardly be done without the help of public authorities.¹⁰¹ In Germany for example, the government introduced a nationwide "umbrella label" for certified organic farming products, independent from associations, as a way of certifying labelled products for consumers.¹⁰² Pre-existing legislation and enforcement mechanisms are a prerequisite for the effective implementation of private certification schemes. As Gulbrandsen argues, "in the absence of strict legal requirements and domestic enforcement capacities, non-state governance schemes stand little chance of changing on-the-ground practices and ameliorating environmental degradation of forests."¹⁰³ The fact that forest certification spread by an order of magnitude more in developed than in developing countries is a clear indication of this.

⁹⁸ L. Gulbrandsen, "Sustainable Forestry in Sweden: the Effect of Competition Among Private Certification Schemes", *The Journal of Environment Development*, vol. 14, 2005, p. 347.

⁹⁹ *Ibid.*, p. 344.

¹⁰⁰ Personal communication, Alain Karsenty, April 2011.

¹⁰¹ P.A.L.D. Nunes, Y. Eko Riyanto, "The use of certification and eco-labelling as a market-based policy instrument for biodiversity management", in S. Krarup, C.S. Russell, *Environment, Information and Consumer Behaviour*, Edward Elgar Publishing, 2005, p. 145.

¹⁰² I. Bräuer, R. Müssner, K. Marsden, F. Oosterhuis, M. Rayment, C. Miller, A. Dodokova, *op. cit.*, p. 36.

¹⁰³ L. Gulbrandsen, *op. cit.*, p. 353.

3.2 THE SHIFT IN DECISION-MAKING AND THE ROLE OF THE STATE

One of the first conclusions to emerge from this review relates to the importance of the state in the implementation of MBIs, as a leader or as a facilitator. Two areas of activity stand out: the first one relates to monitoring capacity. If MBIs take away some control or decision-making capacity from the state, the public authority must keep an eye on their functioning to ensure that they fulfil their environmental objectives. The second area of action is less "voluntary", and more structural. The institutional and regulatory contexts, as well as the funding capacities provided by public authorities (directly or indirectly as intermediaries) are essential to the implementation and the development of MBIs, which would be too costly or ineffective to establish otherwise.

States tend to be involved in the implementation of MBIs because their intervention is necessary, but they may also be supportive of this implementation since MBIs are assumed to be more cost-efficient than traditional tools due to their capacity to correct market failures, deliver the right incentives and, in some cases, rely less on national budgets for funding. This evolution is visible in the directives of international organisations, which recommend that "policy makers should consider markets as an integral part of biodiversity policies", to help channel scarce public resources in the most effective way possible.¹⁰⁴ UNEP argues that "it is important to view economic instruments not as a sole solution in all circumstances, but as one component of a wider policy package, complementing rather than replacing existing CAC policies".¹⁰⁵ The European Commission's Green Paper considers MBIs as potential tools to achieve policy objectives, arguing that "public intervention is [...] justified to correct [market] failures and, unlike regulatory or administrative approaches, MBIs have the advantage of using market signals to address these failures." The use of economic or incentive-based instruments is also recommended in the CBD texts, which informs the biodiversity objectives of states.¹⁰⁶

¹⁰⁴ OECD *op. cit.*, p. 9.

¹⁰⁵ UNEP, *op. cit.*, p. 19.

¹⁰⁶ Article 11 of the Convention states that "each Contracting Party shall, as far as possible and as appropriate, adopt economically and socially sound measures that act as incentives for the conservation and sustainable use of components of biological diversity." At its fourth meeting, the CBD's COP stated that "incentive measures should be designed using an ecosystem approach, and that economic valuation of biodiversity and biological resources is an important tool for well-targeted and calibrated economic incentive measures" (Decision IV/10), *in* UNEP, "Economic instruments in Biodiversity-related multilateral environmental agreements", UNEP,

That said, MBIs seem to generally modulate the decision-making capacity of states. At the onset of this chapter, we determined three levels of decision-making for public actors when using policy tools: choice of the objective, choice of the instrument, choice of the day-to-day functioning of the instrument. Most MBIs leave the authority of public actors almost untouched when deciding on the environmental objective to be pursued and the instrument to be used to achieve it. In our understanding, only certification schemes and specific markets for environmental products involve decision-making by non-state actors on all three subjects – and this is globally very good news. But all MBIs devolve a part of decision-making power to participants. Taxpayers and tradable permit scheme participants can choose to pay more to continue consuming the same products or amount of resources. Local actors can choose not to participate in PES, and if they do participate they can evaluate the price that they are ready to pay to conserve a specific resource, as is the case in the BushTender programme.

Two concepts can help us analyse such findings: “**governance**” and “**New Public Management**”.

3.2.1 Governance

The notion of “governance” is a very popular but also a very unsettled one. Different aspects or readings of it can be put forward to defend different political positions and perceptions of socio-political or economic evolutions.¹⁰⁷ However, the reason for its emergence tends to be shared by users of the term: the acknowledgement of the incapacity, weakness, or failure of the state to adjust to changes in the social, political and economic contexts. Governance is perceived as a response, whether adequate or

2004, pp. 31-33.

¹⁰⁷ In his entry on “Governance”, P. Le Galès outlines four possible uses of the governance notion in public policy: “Good governance” as a problem of efficiency to be solved; Governance as a critique of the domination of private interests in public policy-making; Governance as a way for society to manage itself, beyond the failings of the state; Governance as the result of the articulation of regulations. See P. Le Galès, “Gouvernance”, in L. Boussaguet, S. Jacquot, P. Ravinet, *Dictionnaire des politiques publiques*, Presses de Sciences Po, 2010.

not, to this condition, and is closely linked with theories and research on the changing role of the state.¹⁰⁸

A basic common observation is also at the root of the notion, and its different interpretations. Governance can be defined as the "coordination process between actors, social groups, institutions to achieve specific and collectively-defined objectives". This process is generally seen to be based on the failure of the state, mentioned above, and the concomitant transformation of the relationships between the public and the private sectors, with the increasing integration of non-state actors in policy-making processes: "if the public authority is assumed to play a central role [in the creation and implementation of public policy], it is far from being alone in this endeavour."¹⁰⁹ Non-state actors (NGOs, private actors, international organisations) increasingly participate in political processes and, more specifically, in the performance of public functions.

The other aspect of this development is the reconfiguration of the powers of the state. As non-state actors "become subjects, responsible and active, of the regulatory policy",¹¹⁰ the state can be perceived as "rolling back", focusing more on facilitating, monitoring and regulating social exchanges, and ensuring that services are indeed delivered. Public services are therefore produced in concert, between public and private actors. Lascoumes and Le Galès describe this new paradigm as "new negotiated governance".¹¹¹

¹⁰⁸ The changing role of the state, and the increase in the participation of non-state actors in decision-making processes, have been documented by scholars in the fields of International Relations, political science, and management among others.

¹⁰⁹ M. Grawitz, J. Leca, J-C. Thoenig, 1985, in J-C. Thoenig, "Politique publique", in L. Boussaguet, S. Jacquot, P. Ravinet, *Dictionnaire des politiques publiques*, Presses de Sciences Po, 2010, p. 425. Translation by the author.

¹¹⁰ "Accèdent au statut de sujets, responsables et actifs, de la politique réglementaire," a quote from A. Karsenty, "Du développement rural à l'économie politique des forêts: itinéraires de recherches et chemins de traverse en sciences sociales. Dossier pour l'habilitation à diriger des recherches en sciences économiques", Document d'habilitation, Dossier pour l'habilitation à diriger des recherches en sciences économiques, 2003, p. 63.

¹¹¹ "Nouvelle gouvernance négociée," a quote from P. Lascoumes, P. Le Galès, *op. cit.*, p. 23.

The result is "institutional polycentrism", an increasingly complex institutional setting in which centres of power, decision-making and implementation capacity are hard to discern.¹¹²

The frame of analysis provided by the notion of governance provides some elements to help us understand the relationship between public authorities and non-state actors in the implementation of MBIs. Indeed, one of the main thrusts behind the elaboration and implementation of MBIs is the desire to palliate the insufficiencies of the state and its "traditional" policy instruments by proposing a more flexible type of instrument – one which would devolve some decision-making capacity to non-state actors in order to enable an optimal allocation of efforts and a better revelation of information. The development of MBIs is also an illustration, within this perspective, of the changing relationships between public and non-state actors. The reshuffling of involvement, responsibilities and decision-making power in policy-making transforms the practise of power. The authority of the state expresses itself in a more horizontal, cooperative and flexible fashion, favouring the use of less binding policy instruments such as MBIs.¹¹³ The predominant roles of the state in the implementation of MBIs, which we have identified as facilitating, monitoring and providing the regulatory context, are also in line with the increase in the role of the state as a regulator of social exchanges, outlined as one of the characteristics of governance. State and non-state actors are effectively "coordinat[ing] to achieve specific and collectively-defined objectives", in an illustration of "new negotiated governance."

3.2.2 New Public Management

If the notion of governance can provide some indications to understand the transformations in the relationships between state and non-state actors, particularly with reference to power relationships, New Public Management can help us understand the role that states play in this transformation process. It suggests that states can be actors of the reconfiguration of their authority, rather than passively enduring such changes.

Changing power relationships and increasing institutional complexity was accompanied, and to some extent facilitated, by a change in the dominant culture within bureaucracies. The end of the 1980's saw the emergence of "New Public Management", an approach to public policy-making based on private sector

¹¹² P. Le Galès, *op. cit.*, p. 301.

¹¹³ P. Le Galès, *op. cit.*, p. 301.

management methods and micro-economic principles. The idea is that the opening of public sector management to the market and the adoption of private sector management methods will make public sector management more effective (through a focus on outcomes) and more cost-efficient (through the outsourcing of certain activities to external and autonomous entities, using the competition of the market). A new emphasis is put on decentralisation, performance and customer service.¹¹⁴

Some characteristics of this new bureaucratic culture are the separation between the decision-maker and the implementer (states establishing objectives which have to be met by the implementer), the creation of markets or quasi-markets for the provision of public goods and services, and the establishment of management indicators based *inter alia* on cost-efficiency.¹¹⁵

This evolution was reflected in environmental policy-making through the attribution of economic value to environmental goods and the proposition of market-based solutions to environmental degradation,¹¹⁶ placing "environmental decisions [...] within the framework of cost-benefit analysis".¹¹⁷ This new approach thus had an impact on the type of policy instruments adopted, notably by moving away from prescriptive approaches and towards market-based systems of resource allocation, the MBIs.¹¹⁸

This wider context can help us deepen our understanding of the relationship between public authorities and policies and MBIs. The roles of state and non-state actors are shifting, new activities are developed and emphasis is put on new dimensions of the policy process, reconfiguring the traditional boundaries between public and private spheres of action. From this perspective, it is not surprising to see private sector actors participate in the environmental policy process through their use of MBIs. Furthermore, the new overarching philosophy guiding the work of bureaucracies is positively inclined towards the use of MBIs, despite the effect such mechanisms can have on state power. Market-based solutions are considered more efficient than traditional tools, and are increasingly sought after by states.

¹¹⁴ J-M Sévérino, "Les 3 révolutions de l'aide française", *Géopolitique Africaine*, 2003. p. 3.

¹¹⁵ F. X. Merrien, "La Nouvelle Gestion Publique: un concept mythique", *Lien social et politiques*, Spring 1999, pp. 95-103.

¹¹⁶ Constanza et al., 1997, Joeres and David, 1983; Knees, 1984, *in* M.M. Robertson, *op. cit.*, p. 490; Berthoud, 1992, *in* N. Kosoy, E. Corbera, *op. cit.*

¹¹⁷ J. Salzman, B.H. Thompson, 2007 *in*, E. Gómez-Baggethun, R. Groot, P. Lomas, C. Montes, *op. cit.*, p. 1215.

¹¹⁸ J-M Sévérino, *op. cit.*, p. 3., P. Lascoumes, P. Le Galès, *op. cit.*, pp. 26-27.

In this sense, MBIs can be taken as the expression of a changing policy context: the restructuring of the state towards a more framing and monitoring role, and under the influence of a policy culture inspired by economic liberalism.¹¹⁹

3.3 MANAGEMENT AND INTERMEDIARIES

From the above it seems obvious already that MBIs rely heavily on public authorities to exist and operate. The case of PES for a local service is a telling example as it represents in theory, and could potentially be, the perfect case for private deals of a market type without a significant intervention by intermediaries in general, and public authorities in particular. Indeed, according to the Coase theorem, beneficiaries and providers should almost spontaneously agree on deals and sign contracts, especially when transaction costs remain low. In a sense, it should be the perfect illustration of a shift of decision-making from public to private hands with the development of markets in substitution to hierarchical and regulatory modes of environmental management. And this shift could theoretically apply not only to the third level we identified – namely agents' decisions on the ground – but also to the definition of objectives (conservation of a given piece of land for the sake of ecosystem services) and the choice of the appropriate tools to achieve this end. But evidence from the field tends to show opposite developments, as illustrated by the following examples: the emblematic PES program in Costa Rica and another case studied on the ground in Indonesia by one of

¹¹⁹ "Restructuration de l'Etat, dans le sens de l'Etat régulateur et/ou sous l'influence des idées néolibérales", *ibid.*, p. 26. Kosoy and Corbera shed light on the process through which a specific policy programme – in this case, an economic liberalism programme – can underscore the choice of specific policy tools, through a "hidden" or invisible process. They explain that the choice of implementing PES needs to be understood in the context of a dominant liberal economic public policy paradigm, which legitimises, within the minds of policy makers, the commodification of ecosystem services as a modern and cost-effective way of addressing biodiversity degradation. The choice of specific policy instruments therefore becomes a way of supporting a specific policy agenda. See N. Kosoy, E. Corbera, "Payments for ecosystem services as commodity fetishism", *Ecological Economics*, vol. 69, pp. 1228-1236. For a more in-depth study of the concept of "policy paradigm", see P.A. Hall, "Policy paradigms, social learning and the state. The case of economic policymaking in Britain", *Comparative Politics*, vol. 25, n° 3, April 1993, pp. 275-296.

the two authors of the present article. The two cases presented below reinforce that statement by Greiber (even if the text refers to "private" schemes):¹²⁰

PES schemes do not require a specific legal framework beyond basic contract law, but they are usually limited to local water problems. However, scaling their positive results up through a nested approach may require a specific policy and legal framework.

*A "mandatory PES" for water services in Lombok, Indonesia*¹²¹

The scheme takes place in Lombok, which is part of the Eastern Indonesian islands. Forests in the vicinity of the Rinjani volcano – a main feature of the northern part of the island – are considered crucial for the regulation of water flows and land erosion. Indeed, the Rinjani catchment areas play a central role in supplying water to the capital city of Mataram downhill (about 600,000 people). Degradation of water supplies and forest conditions have been observed for over a decade: 43% of the large springs surrounding Rinjani have dried up and approximately 30% of the Rinjani area was deforested in the past ten years (concept note WWF Indonesia – Nusa Tenggara).

After a series of discussion events and negotiation rounds, and following the application of economic valuations to the watershed, a voluntary mechanism (labelled "PES" even in regulations) was created. This mechanism rapidly became compulsory as far as money collection is concerned. Indeed, a regulation was enacted to generalise the scheme among all water consumers who pay a relatively small monthly fee that is added to their water bill. Decrees determine that 75% of the collected money is to be allocated to payments through PES contracts, while the remaining 25% is allocated to the district budget for overhead costs.

A multi-stakeholder body (IMP, *Institusi Multi-Pihak*) was established and is responsible for collecting financial resources and making deals with resource users to ensure appropriate land management. This body was requested by most stakeholders, especially residents of Mataram city who are the main payers, in order to avoid a situation whereby the government alone would take responsibility for money management (mostly due to the lack of confidence in the administration's management skills). Therefore the IMP was created to involve WWF, the forest agency, a mineral water company, the district government and the National Park.

¹²⁰ T. Greiber (eds.), *Payments for Ecosystem Services. Legal and institutional frameworks*, International Union for Conservation of Nature (IUCN), Gland, 2009.

¹²¹ This section is derived from a forthcoming article by one of the two authors, Pirard (2011).

The process resulted in the issuance of district regulations explicitly stating the need to maintain environmental services with financial support from beneficiaries (thus legalising the "beneficiary pays principle"), establishing the IMP with associated responsibilities, and setting the amount of payments by the various categories of beneficiaries (households as water consumers, mineral water companies, regional water utility company, eco-tourists), setting the share of money devoted respectively to overhead costs (through the local budget) and conservation measures.

Money collection started in late 2009, and the amounts collected so far have been remarkably in line with the IMP's predictions¹²². Yet, the supply side lags behind as no PES contract has been signed so far with land owners or farmers in the targeted area. For a few years some pilot activities have been taking place, aiming to rehabilitate the degraded lands with financial support from either development agencies or the Indonesian government. Still, no PES-like contract has yet been finalised, though this is reportedly because of a lack of capacities and the necessary human resources to negotiate and put the contracts in writing rather than a lack of motivation or willingness from service providers, as explained in more detail in the next sub-section.

So what does this experiment tell us about the links between PES and public policies? Globally, it shows a high degree of convergence, as the two are, to a great extent, intertwined.

A first element of strong convergence lies in the use of regulations. These regulations could be considered in contradiction to the definition of PES commonly used in the literature, in which they are to be voluntary contracts and an alternative to state-driven regulations. This case, however, embodies a type of PES where the voluntary aspect of contracts with service providers is clearly and usefully distinguished from the mandatory aspect of money collection among service beneficiaries. The regulations in Lombok were drafted after the PES concept was extensively discussed and promoted through ad-hoc working groups. They include laws and implementation decrees, *inter alia*, stating the principle of payments for environmental services (using this specific terminology in the official texts), establishing the IMP, and detailing the various fees to be collected by the range of beneficiaries. These regulations have been issued so far in one district but are likely to be replicated in neighbouring districts and maybe throughout the province.

A second element of strong convergence lies in the use of the collected money and the implication of the forest administration. The current director of the IMP is the chief

¹²² Personal communication, director of IMP, 26 July 2010

of the district forest agency, someone who has repeatedly affirmed that previous efforts to rehabilitate degraded lands and initiate reforestation activities have failed to a great extent due to their project characteristics. In practice, this means that planted trees were not properly maintained: salaries were distributed for planting operations but not for maintaining the trees over the years. With no subsequent productive activity tolerated on the state domain, where land rehabilitation usually occurred, it is unsurprising that up to 60% of the trees eventually died¹²³ In this context, the forest administration is avidly looking for new approaches that would improve the rate of success for land rehabilitation, and they view the emerging PES as promising in this respect. The conditionality and the reliance on rights over the land are the characteristics that are most appealing to the authorities in this perspective: planted trees will not be logged without permission from either the service beneficiary or the authorities, and land owners or users will generate incomes from standing forests mostly with agroforestry. The PES concept has already influenced other activities sponsored by the forest agency, particularly those relying on contracts for land rehabilitation outside the state domain: small landowners see their rehabilitation activities financially supported, at the condition that they commit to replacing all planted trees in case of failure, at their own expense.

A third element of strong convergence relates to the land tenure issue. Most of the forests in Indonesia are located within the state domain for historical reasons, and recognition of use or ownership rights to villagers living in these areas remains limited even though it improved after the end of the Suharto era in 1998. In order to draw conclusions from this situation, the Hutan Kemasyarakatan (HKm) program was launched officially in 2001 by ministerial decree. This program aimed at providing limited rights to resident populations under conditions of sustainable forest management, in order to keep the forest cover in good condition. Rights are provided for a renewable period of 25 years.

The program is popular in Indonesia, and Lombok is no exception with about 185 ha in the Rinjani area under this status. It is highly compatible, and even mutually reinforcing, with the PES. Indeed, the latter gives priority (at least until now) to forests within the state domain, which is also the area of HKm application. One condition for obtaining HKm rights is to rehabilitate land through tree planting, but few applicants seem to have the financial capital to do so. PES thus tends to become the financing vehicle that enables applicants to overcome the financial obstacle that usually traps them in low-income agricultural activities. Conversely, when local residents obtain

¹²³ Personal communication, chief of West Lombok forest agency, 26 July 2010

rights under the HKm, they gain a strong incentive to keep the forest standing, which is also the main condition under the PES to receive the rewards. It is worth noting that in other Indonesian settings, the HKm and the associated use rights are provided as the PES reward.¹²⁴

Pago por servicios ambientales programme in Costa Rica

This scheme was established in 1996 in the framework of the environmental law, the forestry law and the biodiversity law, all of them issued in the middle of the 1990s. Its objective is to promote a rational use of natural resources, with limited deforestation and maintaining of forest ecosystem services – carbon sequestration, watershed protection, biodiversity, and landscape beauty. The programme proposes payments to land owners according to their land uses – forest conservation, reforestation, sustainable management, etc. – with the justification that these land uses generate ecosystem services either locally or globally.¹²⁵ These payments vary with land uses, probably assuming that services have different values, but also (and mostly?) with the assumed related costs. For instance, reforestation is paid several times more than natural regeneration,¹²⁶ because reforestation implies investment and maintenance costs, while natural regeneration involves opportunity costs only.

The financial resources for the program are collected from several sources, amongst them the hydrocarbon industry, multilateral cooperations (World Bank loans, Global Environment Facility grants), and voluntary contributions by private hydroelectric producers. The hydrocarbon industry was originally targeted through the consumer tax on fossil fuels, but due to unsatisfactory money transfers by the Ministry of Finance to the institution in charge of making the payments to land owners, a share of this tax on fossil fuels was assigned formally to the PES program. The institution in charge of making the payments is the public agency FONAFIFO. It is also responsible for the management of the whole scheme.

The contracts are signed between the FONAFIFO and land owners for various periods of time depending on the land use. The time periods never exceed 15 years, this being the duration applied to reforestation since the plantation has to be maintained long enough to ensure it is properly done. Durations are not specific to

¹²⁴ J. Pender, Suyanto J. Kerr, E. Kato, 2008, "Impacts of the Hutan Kemasyarakatan Social Forestry Program in the Sumberdaya watershed, West Lampung District of Sumatra", Indonesia, *IFPRI Discussion Paper* 00769, Washington DC.

¹²⁵ G.A. Sanchez-Azofeifa, A. Pfaff, J.A. Robalino, J.P. Boomhower, *op. cit.*

¹²⁶ Personal communication Thomas Sembrès, 2011

each landowner (thus not negotiable) and initial contracts were issued on a "first come, first serve" basis. This resulted in a disproportionate share of the service providers being represented by large landowners.

According to this very brief description of the emblematic PES program for forestry-related ecosystem services, several points have to be made with respect to its "market-based instrument" nature, its links with public policies, and its proximity to a definition of PES.

First, we observe that the scheme is entirely managed by a public body that acts like an intermediary between the beneficiaries and the providers. The rights to trade the greenhouse gas reductions are transferred from the owners to the national government, which, in turn, puts the latter in a position to become a service provider internationally. The payers are certainly not the beneficiaries, but pay because they are polluters (tax on fossil fuels) or representatives of the international community (multilateral cooperation).

Second, the Coase theorem is not applied to the scheme at all. Negotiation does not take place and contracts are of a "one size fits all" type, despite the fact that this principle is supposed to be at the core of PES: providers and beneficiaries find an agreement based on their mutual interests. Transaction costs are obviously a key reason for this discrepancy: when the ambition is to establish a nation-wide instrument in order to have an impact on the deforestation at the national scale, it is not possible to multiply negotiations with landowners.

Third, local as well as global services are targeted (at least on paper), but this looks more like an excuse for action than a real concern for a variety of services. It looks like the emergence of the concept of ecosystem services in the field of environmental management has been used to justify a program that mostly pursued the objective of controlling deforestation. This control stems from various reasons including the desire to be regarded as a virtuous country in the region.

These remarks all converge toward the conclusion that the Costa Rican PES programme looks more like a flat subsidy, even though a (crude) distinction is made between several contrasted land uses. In other words, a classical fiscal policy that is mainly financed by sectors of the economy with little or no relation to the targeted ecosystem services (except if one considers that fossil fuel consumers in the country should pay for forest carbon sequestration).

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4. CONCLUSION

The analysis we developed in the present document, while limited in scope and space, provides us with a number of elements that tend to clarify the nature and role of market-based instruments for the conservation of biodiversity and provision of ecosystem services. We recapitulate below several key messages that support our **main conclusion: MBIs are a highly heterogeneous group with loose links to markets as defined by economic theory, but with close ties to public policies and legal frameworks as they represent a prominent policy tool for the environment.** Ties with public authorities are strong and the common rule for MBIs is to rely on the regulatory framework provided by states. Some could even argue that they constitute a new form of regulation. Only archetypal coasean-type agreements such as PES *ala* Wunder, ideal-type certification schemes, or specific markets for environmental products, stand as exceptions with respect to the links between MBIs and public authorities. All other MBIs stand as policy tools in the hands of policy-makers, with a shift in decision-making only happening for actors at the on-the-ground level.

Their main common characteristic is to **use monetary values in one way or another (change relative prices, use economic incentives) through a commodification process** – to be understood here as considering nature from a utilitarian perspective with associated monetary values, not as creating commodities with standard units – but ironically and in many cases without either conducting proper economic valuations or revealing information about economic values. It is worth noting that putting a price or value on nature does not need to be done through MBIs only: for example, before enacting a law in the United States, compulsory cost-benefit analyses are carried out that may include monetary valuations of nature and ecosystem services when necessary.¹²⁷

Heterogeneity is striking when one starts investigating the broad range of mechanisms labelled "MBIs". The market terminology seems to have been adopted by default, as a way of making a distinction with all other approaches that do not put a price on nature. Our interpretation is the term "MBI" serves as an asylum for all instruments with a price component that, in many instances, have only minor or even no real links with markets as defined in economic handbooks. This point is extremely important for a number of reasons:

¹²⁷ J.B. Ruhl, S.E. Kraft, C.L. Lant, *op. cit.*

One can hardly expect that environmental management will benefit from the assumed advantages of markets just by picking-up MBIs. Information on the economic values associated with the environment are poorly revealed as many of these instruments do not imply sufficiently frequent transactions between buyers and sellers. Some of these instruments do imply the revelation of information but not specifically on the costs of degrading an ecosystem or on the benefits of providing new services. As some of these instruments are directly managed and funded by the state and the national budget, tax payers rather than specific beneficiaries commonly contribute to their functioning – a fact which may constitute an absurdity from a market perspective.

Such heterogeneity pleads for a better categorisation of the MBIs based on their theoretical (e.g., relation to markets or ability to reveal information) and operational (e.g., institutional requirements or potential for replication) characteristics. Worth noting, **this heterogeneity disqualifies any statement that MBIs are good or bad, efficient or not, or any assessment that would apply to the whole range of approaches.** While we did not study the emergence of MBIs in discourses and in the literature in a systematic manner (e.g., with bibliometric analysis, which we strongly encourage social scientists to do), we consider it probable that ideology has played a role in the popularity of such a large basket of instruments explicitly linked to markets. Taking stock of this heterogeneity, we decided to distinguish six broad categories:

- Market creation for goods and services derived from biodiversity and ecosystem services. This category includes, for instance, non-timber forest products and genetic resources.
- Market creation for the management of biodiversity and ecosystem services, where standard products are exchanged at the initiative and under the close control of public authorities characterises the second category. Carbon markets under cap-and-trade systems and mitigation banking are the emblematic examples. A sub-category includes similar markets but at the initiative of the private sector or beyond the control of public authorities: e.g., voluntary carbon markets.
- The third category consists of the implementation of regulations that change relative prices of goods and services on existing markets according to their positive or negative environmental externalities and at the initiative of public authorities. Taxes and subsidies belong to this category.
- The fourth consists of the creation of mechanisms that change relative prices of goods and services on existing markets according to their positive environmental externalities and at the initiative of private actors. These mechanisms allow virtuous producers to capture a premium with a higher sale price for their products. Forest certification and labels for organic agriculture

belong to this category. This category deserves to be separated from the previous one, as its scope of application is far more limited (of a different order of magnitude) as is the premium captured by private companies.

- The fifth category is defined by the contractual agreements between beneficiaries (or their representatives) and providers of ecosystem services according to the Coasean paradigm, based on mutual interest and usually assuming that property rights are thoroughly recognised. Payments for Ecosystem Services *ala* Wunder are an emblematic example of such an approach (but more an archetype than a real practice), for instance when a hydroelectric plant designs contracts with uphill land users. A sub-category can be distinguished when the public authorities keep complete control and the scheme is applied widely (e.g., on a country-wide scale) with one-size-fits-all contracts. The PSA program in Costa Rica for forest conservation and restoration is a perfect example of this.
- Lastly, reverse auctions (alternatively called procurement auctions) refer to secret offers by sellers in response to a specific demand. The rationale is to reveal information about willingness to receive, which is all the more justified with publicly financed environmental programs with limited financial resources at their disposal, and to spend public money as efficiently as possible. The BushTender program is an example in Australia, where landholders submit bids with detailed management plans that are then assessed against indicators of Biodiversity and Habitat services.

Our findings gain from being put into perspective with two important research results presented in the literature a while ago already. **First**, Sartori (1991) developed a theory of comparative studies that helps determine whether objects (in our case MBIs) deserve to be compared in order to control (confirm or infirm) the validity of generalisations (in our case whether MBIs should be put under one unique category or label). In order for one category to be valid, its various components should at least have properties that exclude them clearly from other categories. The only such property that we found among MBIs is that of putting a price on nature in one way or another, but these "ways" vary a great deal. In our opinion, it is highly questionable that this is sufficient to justify lumping all of these instruments into such a category, and thus informing the choice of instruments in policy-making. As a consequence, **we tend to disqualify the appellation of the MBIs as a category of policy instruments.**

Second, the poor use of markets as defined by economic theory for the design and implementation of MBIs resonates very well with findings presented in Hahn.¹²⁸ This author investigated the implementation of MBIs such as tradable permits and environmental fiscal regimes. He concluded that implementation was extremely different from what economists would want it to be, based on sound economic theory: "[experience] shows how the actual use of these tools tends to depart from the role which economists have conceived for them". Several factors can explain this situation, and, among these factors, the necessity to adapt to specific contexts due to differences in political objectives. This is an essential reason that we need to be cautious about if we want to avoid a mismatch between high expectations and actual outcomes for the preservation of biodiversity and the maintenance of ecosystem services. This is also why one should pay attention not only to such statements: "Compared to previous approaches to forest conservation, market-based mechanisms promise increased efficiency and increased effectiveness, as well as increased equity in the distribution of costs and benefits", but also to the following; "such policies, **if carefully designed and implemented**, can achieve environmental goals at significantly less cost [...]"¹²⁹ (emphasis added). **The devil is clearly in the details.**

Several years ago, Wunder and Vargas stated that, "Except for the emerging carbon markets, it seems incorrect to constantly refer to some of these schemes as 'markets for environmental services' [...] since spatial specificities usually restrict or eliminate any of the competitive forces so fundamental to [their] proper functioning".¹³⁰ Our review and analysis confirm this statement and the abuse of the market terminology to the detriment of a good understanding of what is at stake. Our interpretation is that commodification is taking place rather than market development. Some authors have pointed to this process: "PES disregard ecosystems complexity in order to facilitate market transactions based on a single exchange-value, thus imposing a trend towards monetary, market-driven conservation."¹³¹ Notwithstanding the confusion in their use of the term "market" in light of our previous assessment, and our slightly different understanding of the term "commodification" that we associate more to the use of monetary values than the creation of standard commodities, we subscribe to this analysis. The commodification process here means that monetary values are

¹²⁸ R.W. Hahn, *op. cit.*, (1989, 2000)

¹²⁹ Pagiola, S., Bishop, J. and N. Landell-Mills (Eds.), *Selling Forest Environmental Services: Market-Based Mechanisms for Conservation and Development*, London, James & James/Earthscan, 2002.

¹³⁰ S. Wunder, M.T. Vargas, *op. cit.*

¹³¹ N. Kosoy, E. Corbera, *op. cit.*

attributed to the environment in order to trigger better management. But trade is another stage that is not yet reached, or even targeted, for many of the MBIs.

Instead, the ambition to create incentives or sources of funding is at the heart of the development of MBIs. The largest on-going initiative at the moment, the REDD+ mechanism to finance reduced tropical deforestation for the sake of climate regulation, illustrates this. By putting a value on forests based on their carbon stocks – an easily defined and measured environmental commodity compared to most ecosystem services – the international community agrees that forests can be kept standing as they may become profitable in economic terms. Furthermore, it assumes that developing countries will make decisions favouring their conservation and sustainable management. In addition, carbon markets have been presented as being the most sustainable source of funding (a view to which we do not subscribe) and the most politically acceptable as tax payers do not need to be tapped directly. But the underlying assumptions are debated, as well as its feasibility and effectiveness.¹³²

Part of the reason for the denial of the weaknesses of carbon markets as a source of sustainable funding is the belief in the possibility not only to create the right incentives, but also to reveal information about the costs and benefits of various environmental decisions. This ability to reveal information is central to understanding the advantage of using MBIs as policy tools and identifying which ones really add value to other policy tools that can be classified as purely regulatory instruments or coercive or prescriptive instruments.¹³³ In addition, we assessed a lack of capacity to reveal information for many, if not most, of these MBIs in practice. The very nature of biodiversity and ecosystem services makes it an impossible goal for most valuations because of the complexity of the relations between a given state of the environment and the provision of services.¹³⁴ This challenge has been addressed in prominent recent studies such as TEEB¹³⁵ and Chevassus-au-Louis *et al*¹³⁶ without conclusive

¹³² R. Pirard, A. Karsenty, "Climate Change Mitigation: Should "Avoided Deforestation" Be Rewarded?", *Journal of Sustainable Forestry*, vol. 28, n° 3-4, 2009.

¹³³ Admittedly most MBIs rely on regulations, either for their creation, monitoring, enforcement, or effectiveness. The term "regulatory instrument" in this document refers to regulations that impose decisions instead of influencing decisions through economic incentives.

¹³⁴ J.B. Ruhl, S.E. Kraft, C.L. Lant, *op. cit.*

¹³⁵ TEEB, *op. cit.*

¹³⁶ B. Chevassus-au-Louis, J-M. Salles, S. Bielsa, D. Richard, G. Martin, J-L. Pujol, *Approche économique de la biodiversité et des services liés aux écosystèmes. Contribution à la décision publique*, Paris, Centre d'Analyse Stratégique, 2009.

progress being made in this regard. The complexity of the ecosystem services from an ecological point of view, the challenge of dividing ecosystems in order to avoid the conflicts between services that are bound to emerge, the inherent limitations of economic valuations methodologies to capture economic values of ecosystems, and finally the high transaction costs that this exercise entails if one ambitions to achieve a satisfactory level of accuracy are doomed to remain major obstacles.

French philosopher Joseph de Maistre said that he had never seen Men, but that he had met with Frenchmen, Italians, and Russians, each bound by their own cultures, politics, languages and rules of conduct.¹³⁷ **We have met, in the course of our research, with Payments for Ecosystem Services, fiscal systems, and tradable right systems, but have we seen MBIs as an homogeneous and thus relevant category?** It seems we did not encounter an archetypical MBI, but rather possible derivatives with widely varying characteristics. If this archetypical MBI were to exist, one could describe **it as an instrument based on the transformation of certain properties or ecosystem services provided by biodiversity into standard commodities, as a way of stimulating the emergence of an exchange system.** This system would be developed enough that the confrontation of the willingness-to-pay and the willingness-to accept of actors would reveal the value of commodities and make way for their optimal management.

¹³⁷ "Il n'y a point d'homme dans le monde. J'ai vu dans ma vie des Français, des Italiens, des Russes [...] mais quant à l'homme je déclare ne l'avoir rencontré dans ma vie ; s'il existe c'est bien à mon insu" in *Considérations sur la France*, 1796.

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