



## Reconciling theory and practice: An alternative conceptual framework for understanding payments for environmental services<sup>☆</sup>

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### ABSTRACT

This article provides an alternative and novel theoretical approach to the conceptualization and analysis of payments for environmental services (PES). We devote special emphasis to institutional and political economy issues, which have been somewhat neglected in the literature on PES. We argue that the Coasean and pure market approach dominating the conceptualization of PES in the literature cannot be easily generalized and implemented in practice. By contrast, taking into account complexities related to uncertainty, distributional issues, social embeddedness, and power relations permits acknowledging the variety of contexts and institutional settings in which PES operate. The alternative approach presented in this introductory article to the special section may be more appealing to PES practitioners, since while avoiding restrictive and prescriptive standpoints, it allows some key sources of complexities they usually deal with on the ground to be more easily understood.

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### 1. Introduction

This paper introduces a special section resulting from the outcome of a number of sessions and discussions that took place during and after the 10th Biennial Conference of the International Society for Ecological Economics, held at UNEP headquarters in Nairobi, Kenya, in August 2008. Edited by Unai Pascual, Esteve Corbera, Roldan Muradian and Nicolas Kosoy, the aim of the section is to present recent theoretical and empirical developments in the analysis of payments for environmental services (PES), in order to better respond to the complexity and diversity of this environmental policy toolbox. ‘Environmental’ and ‘ecosystem’ services are often used interchangeably in the literature. However, for the sake of the present article we will refer only to environmental services, since we consider that ecosystem services is a subcategory of the former, dealing exclusively with the human benefits derived from natural ecosystems. Environmental services also comprise benefits associated with different types

of actively managed ecosystems, such as sustainable agricultural practices and rural landscapes.

The main purpose of the present article is to articulate a common vision in relation to the conceptualization and analysis of PES. This is done by developing a broad theoretical framework for understanding PES and by drawing insights from the different articles composing the special section. We devote special emphasis to institutional and political economy issues, which have been so far rather neglected in the literature. The proposed conceptual framework is more sensitive to different sources of complexity embedded in PES and it aims at facilitating the work of practitioners, who often become frustrated when trying to design and implement PES based on theoretically consistent but difficult-to-apply conceptualizations. We think that a more inclusive and reflexive dialogue is needed between scholars and practitioners and that there is a need to reconcile both theoretical and practical views using alternative notions of PES.

This paper develops as follows. Section 2 describes the Coasean conceptualization of PES that has so far dominated the literature and highlights some of its main limitations. Section 3 describes the complexities characterizing the majority of PES, such as lack of well-functioning markets, trade-offs between equity and efficiency, and the social embeddedness of PES schemes. These issues are used as a starting point to sketch a novel conceptual approach towards PES in Section 4 based on three criteria: the importance of the economic

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incentive, the directness of the transfer and the degree of commodification of environmental services. Section 5 highlights the implications of such characterization for practitioners and the paper finishes describing the structure of the special section.

## 2. The ‘Coasean’ Approach towards PES

To date, the mainstream conceptual basis for PES has been Coasean economics. This institutional economics stream favors policy options based on market or quasi-market bargaining, underpinned by the allocation of property rights, to achieve socially optimal levels of environmental externalities (Turner et al., 1994). The ‘Coase theorem’ argues that regardless the initial allocation of property rights over assets, the social optimum may be attained via bargaining, which, in turn would render direct government regulation redundant. In other words, in the case of environmental problems, it proposes that, as long as transaction costs are low enough and property rights are clearly defined, individuals, communities and even supra-national entities would trade their rights away until a Pareto-efficient provision of environmental goods and services has been achieved. The creation of markets for trading environmental services thus becomes the solution for market failures leading to undersupply of this type of services. This is something that neoclassical economics fully embraces given its effort of ‘getting the price right’ for any environmental asset or service.

In the context of PES design, the Coasean approach puts great emphasis on reducing transaction costs, allocating property rights and establishing bargaining processes between those who own or manage the natural assets and/or their associated services (i.e., providers of environmental services) and those who are willing to maintain or enhance the provision of such services through a payment (i.e., buyers of services). It is worth noting that property rights in this context have to do not only with land ownership but also with land use rights and the right to commercialize services generated from natural assets. In this light, payments reflect a *de facto* (re)-definition of property rights insofar as service providers acquire contract obligations to maintain or undertake specific land use activities and in some cases buyers also gain the right to trade the service units for their own commercial purposes (e.g. carbon sequestration credits). The evolution of the Coasean notion of PES is discussed by Gomez-Baggethun et al. (2010–this issue), while they also discuss the analytical connections between the Coasean and the neoclassical schools of thought.

Adopting the above-mentioned viewpoint, Engel et al. (2008, pp. 664) define PES as ‘a voluntary transaction where a well-defined ecosystem service is bought by a buyer from a service provider if and only if the provider secures its provision (conditionality)’. Consequently, they argue that there are at least three necessary conditions for the design of a ‘genuine’ PES scheme: a) the relationship between the type of land use being promoted and the provision of the ecosystem service must be clear; b) stakeholders must have the possibility to terminate the contractual relationship (it is a voluntary transaction); and c) a monitoring system must accompany the intervention, in order to ensure that the provision of services is taking place (additionality and conditionality of payments). However, as discussed below, most PES experiences do not comply strictly with these conditions. We think this is problematic, since a prescriptive definition of PES that excludes the bulk of PES cases can be deemed at least flawed. Furthermore, dividing PES into ‘genuine’ (good) and PES-like (less good) may cause a mismatch between theory and practice, given that practitioners may often feel the frustration of not meeting theoretical expectations.

Vatn (2010–this issue) points out that a wide variety of PES cases depend strongly on State and community engagement, and therefore cannot be considered as voluntary market transactions, at least from the buyer’s point of view. Even if private transactions occur, sometimes the voluntary condition is not met. Typical examples include watershed-level PES schemes where ‘upstream’ land managers are rewarded for improving their land use practices, but where generally water users are

not even aware of paying higher water fees for PES (Kosoy et al., 2007). Furthermore, environmental services are often not fully defined, and in particular PES tend to be implemented without previously establishing a clear-cut causal relationship between land use practices and the expected enhancement of the targeted environmental services (Muñoz-Piña et al., 2008). As a result, in many cases, the efficiency of PES can hardly be demonstrated. In addition, many PES cases in developing countries fail to meet the conditionality criteria. For example, in his review of cases in Bolivia and Vietnam – which reflects situations in many other settings – Wunder (2007, pp. 50) points out that ‘many initiatives were either loosely monitored or not monitored at all, payments were up front instead of continuous, and payments were made in good faith rather than being truly contingent on service provision’. Usually, monitoring tends to be restricted to checking compliance with the promoted land use changes, instead of verifying changes in the actual provision of the targeted environmental services.

Another feature of the mainstream PES conceptualization is its distinctive separation between efficiency and equity considerations, which suggests that PES must be considered primarily as instruments for improving the efficiency of natural resource management and not necessarily for alleviating poverty (Pagiola et al., 2005, 239). This vision renders effects on poverty reduction as (welcome) positive ‘side effects’. The poor should be targeted however as long as their inclusion does not imply efficiency losses. This may be attained in some cases. For instance, Pagiola et al. (2008) note that poorer landholders have been able to participate as providers of environmental services derived from silvopastoral biodiversity practices in Nicaragua thus benefiting from the scheme. However, the evidence regarding the effects of PES schemes on poverty alleviation remains mixed. For instance, in the PES scheme for forest conservation in Costa Rica, possibly the most well known PES scheme in Latin America, most environmental service providers are relatively well-off landholders (Miranda et al., 2003; Zbinden and Lee, 2005; Kosoy et al., 2007). Similarly, in a review of eight other PES initiatives in Latin America, Grieg-Gran et al. (2005) point out that some initiatives discriminated against poor smallholders because formal land tenure titles were required to access payments. Corbera et al. (2007) have also recently reported that households with limited land endowments find difficulties in participating in a carbon forestry project in southern Mexico.

Despite such mixed evidence on pro-poor outcomes of PES, the significant interest that can be observed towards PES in the policy arena may be explained in part by the expectation that they may become win–win mechanisms for both environmental protection and poverty alleviation. Practitioners (NGOs, government agencies, etc.), particularly in developing countries, are often confronted with the need to meet these two goals at the same time, and frequently cannot skip taking equity and fairness into account when designing PES. Consequently, we argue that efficiency and equity considerations are in practice usually intertwined; and practitioners will increasingly face the challenge of having to link PES schemes with rural development programs. Therefore, we think that an approach primarily concerned with pure efficiency goals, where distribution issues are deemed to be of secondary importance, may be limited in scope and not very useful.

In the following section, we describe the complex contexts in which most PES schemes operate – particularly in developing countries – in order to draw insights for the elaboration of an alternative conceptual framework, which we sketch in Section 4. We pay special attention to developing countries since we consider that it is there where there is the largest interest and scope for PES implementation. We point out that these complexities prevent most PES schemes from meeting the Coasean criteria described above.

## 3. PES in a Diversity of Contexts, Social Relations and Goals

This section describes the complexities characterizing the implementation of PES. Here special emphasis is put on the structural

conditions that lead to the lack of well-functioning markets, to trade-offs between equity and efficiency, and to the importance of social embeddedness in the design and implementation of PES schemes.

### 3.1. *Uncertain Markets and Costly Information*

The context in which most PES schemes operate is often characterized by high uncertainty in the accountability of environmental services provision, due to the biophysical complexities associated with the relationships between land use and such services. This directly translates into incomplete access to necessary information on the part of practitioners and policy-makers. [Kosoy and Corbera \(2010-this issue\)](#) draw, for example, on biocomplexity research to stress that ecosystems properties evolve from the interplay of behavioral, biological, physical, and social interactions which in turn suggest that human managerial interventions like PES can affect ecosystems in both predictable and unpredictable ways. PES thus face important challenges regarding the incorporation of uncertainty into the calculation of the provision of ecosystem services. This issue is also taken up by [Norgaard \(2010-this issue\)](#), who argues that the current ecological knowledge is still insufficient to accurately characterize the environmental services that underpin most PES schemes. Norgaard points out that knowledge about the functioning of one type of ecosystem is not transposable to another ecosystem of the same kind, as both human actions and differences in key variables like climate or soil affect the structure and services of ecosystems.

To achieve a 'genuine' PES requires developing sound, context-specific, socio-ecological research prior to implementation, which could guarantee a realistic connection between payments, services and economic benefits. However, this is clearly impractical in many situations given resource constraints. In fact, it is generally the case that benefits are assumed as a social construct rather than through periodic monitoring of the interactions between land management and the provision of services. This often implies that in PES schemes important contract terms are negotiated on faith. [Fisher et al. \(2010-this issue\)](#) also concur, based on a case study on watershed protection in Tanzania, that the design of PES schemes ought to be context-specific due to uneven information of socio-ecological systems at different scales, which in turn makes it difficult to scale-up local initiatives. Their study shows that knowledge about the interactions between ecosystem properties and water flows is very limited, which is further aggravated by low capacity to monitor water withdrawals and stream flows.

Gathering technical information for establishing and clarifying causal relationships between land use practices and the provision of environmental services (and their associated economic benefits) is costly, which in turn increases transaction costs, perhaps tilting the benefit-cost ratio in favor of alternative environmental policy instruments. That is, when scientific knowledge is hard to obtain, a condition of full information would make unfeasible the implementation of many PES schemes. As a result, practitioners normally face a trade-off between the need to estimate efficiency gains resulting from the intervention and the need to keep transaction costs low enough to make PES schemes feasible. In other words, the consequence is that the assumption of full information adopted by the Coasean approach is in practice almost never met. Instead, the need to make decisions in a context of incomplete information is a key feature of most policy environments in which PES have to be implemented, particularly in developing countries.

### 3.2. *Efficiency and Distribution as Interdependent Goals*

We argue that the initial endowment and the way property rights are allocated have considerable distributional implications and that this cannot be overlooked in PES implementation and analysis. Distributional issues are an important concern to most practitioners

not only because PES schemes — at least in developing countries — are framed by broader rural development interventions targeting vulnerable social groups, but also due to the fact that stakeholders' perceptions about the distribution of costs and benefits and the adopted notion of fairness are key factors determining the feasibility of the scheme.

Even if they are considered efficient from an aggregated point of view, a PES scheme that leads to an unfair distribution of benefits and costs among stakeholders has a lesser chance to be acceptable and legitimized by some of the concerned agents. This point is developed by [Pascual et al. \(2010-this issue\)](#), who elaborate the idea of intertwined equity and efficiency effects of PES and the importance of understanding the different notions of distributional justice. Since different fairness criteria are championed by different stakeholders in any given PES scheme, the political economy of which criterion prevails is something that ought to be looked upon with due care in any PES design. In this light, [Sommerville et al. \(2010-this issue\)](#) address the local perception of fairness and the distribution of benefits among different stakeholders in a case study in Madagascar. They find some evidence of elite capture and that poorer individuals are less likely than others to perceive benefits from participating in a PES scheme. In addition, [Börner et al. \(2010-this issue\)](#) analyze the implications of rewarding land users for avoiding deforestation in the Brazilian Amazon and show that different models of financial compensation diverge in terms of the trade-off between efficiency and equity outcomes. Interestingly, they predict that in all PES design modes, even those that are more universalistic in payment allocation, larger landowners, who account for the currently largest deforestation rates, would tend to reap most benefits. Similarly, [Gong et al. \(2010-this issue\)](#) show that the local perception of fairness about the distribution of benefits between the communities and logging companies became a source of conflict in China. The PES schemes from Cambodia presented by [Clements et al. \(2010-this issue\)](#) also show that there is a trade-off between efficiency in achieving environmental goals and social inclusion, which also might affect the performance of PES in the long term.

Besides the intertwined relation between efficiency and equity in PES, another issue of concern is that of the thorny ethical questions that may arise when targeting of landholders is based primarily on competitive criteria derived from purely market considerations. For instance, given a fixed budget to run a PES program, targeting is associated with prioritizing those who show the most favorable ratio with regard to environmental additionality (or effort) and the willingness to accept compensation for such effort. It is plausible to think that in many contexts the level of poverty is inversely related to the compensation requested, as the poor may show the lowest opportunity cost for their effort in environmental protection in absolute terms, even though in relative terms the opportunity cost for the poor may be larger than for the better off landowners. If such differences in willingness to accept compensation by service providers become an overriding element for targeting PES providers, then the poor would be the main beneficiaries of PES schemes. This may be seen a win-win situation, as equity may be increased without jeopardizing efficiency gains. But this opens at least two important questions. Firstly, one may ask whether the poor would 'voluntarily' agree to the PES contracts or if behind such voluntary agreement there may be situations where the poor may not be in a real position to reject such a payment (even if small) because of their condition. Thus, the concept of free agency in agreeing to a PES scheme may in reality become 'forced trade' instead. Secondly, by relying on the lower absolute opportunity costs to the poor, an ethical question may arise in relation to the long term responsibility to conserve the flow of environmental services. The 'burden of environmental protection' may tend to fall disproportionately on the poor while the poor may have traditionally had much lower impact on degrading those same flows which we now cherish and value. Even though compensation is

offered, the burden may take the form of a lower degree of freedom to choose alternative land uses, which may induce a kind of productive lock-in. What are the long term development implications, for example, that poor landholders become specialized in carbon sequestration (at low price) at the expense of self-reliance in food production? If these issues are considered, it seems that the market based PES approach, even if it may apparently seem to be favorable to the poor, in certain situations may raise ethical problems, echoing the idea that the 'poor sell cheap' (Martínez-Alier, 2004).

### 3.3. Social Embeddedness, Perceptions and Power Relations

In some circumstances, economic incentives may 'crowd-out' local rules and social norms, affecting 'intrinsic motivations' for environmental protection behavior (Clements et al., 2010-this issue). Gong et al. (2010-this issue) also stress that social capital is a critical factor conditioning PES success, since stakeholders' mistrust may prevent attaining environmental goals, and they also point out that economic incentives are insufficient on their own to engender full participation. Vatn (2010-this issue) elaborates further on these ideas and argues that PES schemes constitute a mechanism for reconnecting decisions about land use management across different actors through cooperation, and that such a process is mediated by existing institutions, which include property rights, legal frameworks, social perceptions and values.

The Coasean approach towards PES does not pay enough attention to the role of institutions and shared beliefs in shaping PES design and outcomes, even if these are critical under 'non-perfect' market situations. For example, social perceptions about the relationship between land use and the provision of ecosystem services may be significant factors in determining the feasibility of PES, particularly in conditions of incomplete information. Many PES at the watershed level are based on the conventional wisdom that there is a positive relationship between forest cover and water quantity and quality, a shared belief that sometimes is not supported by hydrological evidence (Kosoy et al., 2007). Very often, practitioners base their decisions on assumptions about the relationship between the promoted land use, the impact on the provision of ecosystem services and finally the induced changes in welfare. This does not necessarily have to be seen as a design drawback; it might also be a 'precautionary' strategy to deal with uncertainty and incomplete information.

The role of the intermediary is also key in understanding the performance of PES. Both Vatn (2010-this issue) and Kosoy and Corbera (2010-this issue) suggest that intermediaries often become the 'dominant agents', who define the services to be traded, set the conditions among buyers and sellers, and largely influence the price of the exchange. To analyze the power of intermediary agents to steer the transfer of resources between buyers and providers is then an important subject for research which has not yet been sufficiently addressed in the literature.

Our argument up to this point is that PES are characterized by incomplete information, particularly regarding the relationship between ecosystems, human interventions and the provision of environmental services. This makes it difficult to evaluate performance and efficiency outcomes, which becomes further aggravated by lack of technical capacities and high monitoring costs. We have also emphasized that efficiency and equity are intertwined in most PES, and that equity concerns are salient for practitioners, particularly in developing countries. To take equity and fairness considerations in PES design as if they were independent from efficiency matters may hamper the feasibility of PES schemes in the long run. Our proposition is then that PES, at least in developing countries, should be considered explicitly as part of a portfolio of rural development programs and projects, instead of as an economic tool only used to guarantee environmental protection in the most efficient way. This in turn calls for paying special attention to the social embeddedness of PES and to

frame it as a multi-goal policy instrument (since rural development cannot be reduced to an efficiency problem). Furthermore, we have argued that a more comprehensive conceptual PES framework should embrace, on the one hand, the socio-cultural and behavioral implications of the commodification of environmental services (Bowles, 2008) and, on the other, the social conditions that enable or hinder PES performance. With these concerns and suggestion in mind, we propose below an alternative definition of PES and a three-pillar framework to classify PES initiatives.

## 4. Towards a New Conceptualization of PES

The services that PES deal with are often environmental public goods (both local and global). Their provision entails a collective action problem insofar as it requires the coordination of various actors to avoid undesirable outcomes from a social point of view. The main goal of PES ought to be the creation of incentives for the provision of such goods, thereby changing individual or collective behavior that otherwise would lead to excessive deterioration of ecosystems and natural resources. Therefore, it may be convenient to define PES as a transfer of resources between social actors, which aims to create incentives to align individual and/or collective land use decisions with the social interest in the management of natural resources.

Such transfers (monetary or non-monetary) are embedded in social relations, values and perceptions, which are decisive in conditioning PES design and outcomes. The transfers may thus take place through a market (or something close to one), as well as through other mechanisms like incentives or public subsidies defined by regulatory means. Therefore, not all PES are market transactions and even those that may be considered as such tend indeed to be rather imperfect on the ground. These considerations and the definition presented above translate into the existence of a large diversity of PES initiatives which can be clustered according to three criteria, namely the importance of the economic incentive, the directness of the transfer and the degree of commodification of environmental services.

By importance of the economic incentive we refer to the relative role of the transfer in steering the desired land use among providers of environmental services. As stated above, we assume that economic incentives are just one of the multiple drivers that may influence behavioral patterns in relation to land use and the provision of environmental services. For example, PES may work as a reward for ancestral forest conservation practices (such as the 'Bolsa Floresta' scheme in the Brazilian Amazon) among indigenous populations, or as an economic incentive to reforest (as in the Chinese CDM case described in this issue). In the former case, there would not be environmental additionality associated with the payment, since individuals would likely carry on with their ancestral practices even if the payment is stopped. In the Chinese case, the magnitude of the economic incentive is larger than the opportunity costs of reforestation, and we assume that landholders would stop reforestation when the transfer is longer offered. Therefore, by definition, the lesser the importance of the monetary incentives, the larger the weight of other kind of incentives, such as intrinsic motivations and cultural practices, in explaining land use behavior. Clements et al. (2010-this issue), for example, discuss the importance of combining economic incentives with other kinds of incentives and motivations for collective action and sustainable management of natural resources, and how not taking into account these other factors may lead to the scheme's failure.

By directness of the transfer, we refer to the extent to which individual providers receive direct payments from the ultimate beneficiaries of the environmental service. Whilst very few PES schemes take place between only one supplier and one buyer, most cases involve large coordination efforts between several suppliers and buyers, where intermediaries play a critical role. In some cases, instead of receiving a



direct payment, providers are rewarded indirectly through investments in public goods. The most indirect situation would be then when the State represents buyers, there is one intermediary between the State and providers and the latter do not receive individual payments for their individual environmental protection efforts.

Finally, by degree of commodification we refer to the extent and clarity with which compensation received by the environmental service providers has been defined as a tradable commodity. The emergence of a sheer market transaction approach would require a clearly defined service that buyers are able to assess and acquire in measurable quantities. While in some PES schemes the tradable service is relatively clearly commodified, based on outputs from environmental functions – such as tons of carbon sequestered by forests in a given period of time – in many cases the characterization of the commodity is fuzzy, based on inputs and assumptions (shared beliefs) about the relationship between land use and the provision of ecosystem services.

Since a large number of situations and combinations involving the above-mentioned factors may be found in the field, we consider that a continuous classification is the most appropriate to describe the existing variety of PES schemes. The diversity of situations goes from sheer market transactions to more conventional institutional arrangements for collective action where compensation to providers is very indirect (through investments in common goods, for example) and where the environmental service for which compensation is received is not so clearly specified. For example, the salinity credit trade schemes in Australia (Connor et al., 2008) is an outcome-based system where the transaction takes place between private agents after the State has set a cap-and-trade regulatory framework. Therefore, this is a cost-effectiveness approach which encourages direct transfers and is very close to a market transaction. Economic incentives are therefore of primary importance, transfer is very direct between buyers and providers and the ecosystem service is clearly identified (salinity prevention). Likewise, the case of direct contracts for bird nest protection described in Clements et al. (2010–this issue) holds a high degree of commodification (nest protection) and directness of the transfer (between a conservationist NGO and individual dwellers). The importance of economic incentives is also relatively high, since it is likely that without cash compensation villagers will stop protecting the nests. Therefore, in the heuristic Fig. 1, these two cases may be positioned in circle A.

The case of payments for carbon sequestration services through the CDM (Gong et al., 2010–this issue) is also an example of a highly commodified market (carbon sequestration), where the importance of the economic incentive in steering land use behavior is high (otherwise

reforestation would not take place). Yet, local municipalities and logging companies play a key intermediary role between the buyers (i.e., the World Bank Bio-Carbon fund) and providers. The World Bank in turn is also an intermediary, since it is expected to represent the interest of beneficiaries of carbon sequestration worldwide. Compared to the previous one, this case will be then positioned in a lower scale of directness of the transfer, represented as a smaller circle in B.

In the well known Costa Rican nationwide PES scheme (Pagiola, 2008), the State is the buyer and suppliers are compensated individually with a fixed amount, independently of the cost or the level of provision (all the land covered by forest receives the same amount). The definition of the traded commodity is more vague than in the previous cases, since the compensation is based on inputs (forest cover) and the scheme is expected to promote provision of a bundle of ecosystem services (not clearly specified). The importance of the economic incentive is also lower, since it is not obvious whether landholders will clear their land in the absence of the payment (likely not since deforestation is highly restricted by law). Therefore, this case would hold a lower degree of commodification, directness of the transfer and importance of the economic incentive as compared to the previous ones. It may be depicted by circle C in Fig. 1.

Another illustrative nationwide PES scheme is the one implemented in Mexico, where in some cases the government allocates payments for reforestation and forest conservation to peasant communities which hold forests in common and invest all or a share of payments in collective goods and development projects (Corbera et al., 2009). This makes the directness of the transfer lower than in the previous cases. Seemingly, environmental additionality is probably low (Muñoz-Piña et al., 2008) since indigenous communities will likely conserve the forests independently of the payment, and therefore we assume that the importance of the economic incentive is relatively small. In addition, the very indirect transfer may be considered then a kind of reward for good environmental stewardship framed by rural development policies, instead of a market transaction between the State and rural communities. Thus, compared with the previous cases, the degree of commodification is consequently also lower. This case could be depicted by circle D in Fig. 1. The case described by Sommerville et al. (2010–this issue) and the ‘community-based ecotourism’ and the ‘agri-environment payments’ cases analyzed by Clements et al. (2010–this issue) may be considered similar to the Mexican PES scheme, since they also show a low degree of commodification, operate at community level, and the importance of the economic incentive in steering the promoted land use behavior is probably limited.

In sum, the proposed definition and classification of PES schemes goes beyond the dichotomy between State-driven and private-driven schemes and does not distinguish between ‘genuine’ and ‘PES-like’ interventions. This approach allows a wide diversity of possible institutional settings and permits to identify a large variety of cases as determined by the combination of our three main criteria, from schemes that could meet the conditions of market transactions (fitting into the Coasean definition) to more complex institutional arrangements for dealing with the management of common-pool natural resources (CPR), where economic transfers play a role in facilitating the coordination between participants. In this regard, there are two particularities of PES as CPR regimes: a) the use of economic incentives and b) the high leverage of the intermediary in setting the rules. While conventional CPR regimes rely on payoff rules in order to encourage the adoption of norms and behavioral changes, normally involving penalties to defaulters, such as fines, loss of appropriation rights or incarceration (Ostrom et al., 1994), PES schemes put in place an incentive system, aiming to meet fundamentally the same goals, incorporating sanctions to the extent this is feasible in the context of generalized uncertainties regarding service delivery (Fisher et al., 2010–this issue). Economic transfers may be then understood as a particular type of payoff rule.

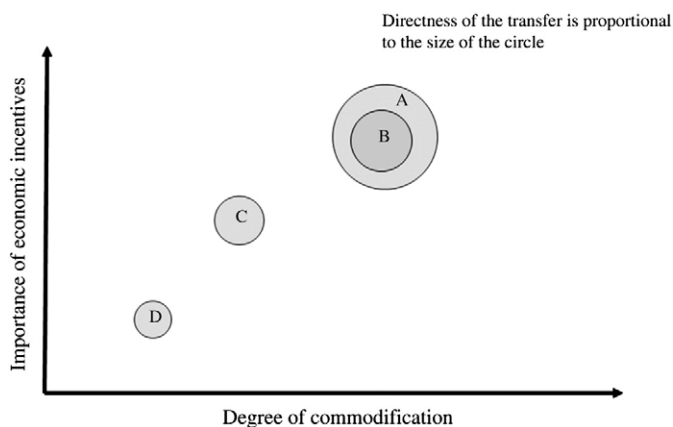


Fig. 1. Varieties of PES schemes in terms of importance of the economic incentive, degree of commodification and directness of the transfer. Note: The centre of the circle represents the interaction between the x and y axes.

## 5. Implications for Practitioners

The dominant Coasean approach to PES may be appropriate when the scheme is close to resembling sheer market transactions but it would be misleading when applied to more complex conditions. Practitioners can rarely imitate the conditions under which the dominant theoretical construct is assumed to function (i.e. clear property rights, perfect information, and competition) and for this reason we have proposed adopting a wider definition of PES which allows taking into account the complexities and constraints of PES implementation in the real world. From this point of view, the implications of information costs, uncertainties in service provision, inequities in access to resources, the high leverage of intermediaries and the broader institutional and cultural settings where PES thrive are among the key issues to consider.

The contribution of this broader analytical approach to PES research and practice is that it transcends the idea of PES as only a market-driven tool, links PES to the literature on CPR and incorporates a broader range of situations and institutional arrangements. It pays further attention to the 'social construction' of PES and its role in the performance of economic incentives (Granovetter, 1985) and helps to fill the gap created by the 'social emptiness' of the Coasean analytical lenses. Interventions needed to set up PES schemes are not just a matter of reducing transaction costs, defining clearly the traded environmental services and straightforwardly allocating property rights. Usually they also entail a substantial degree of coordination between stakeholders, as well as strategic decisions about trade-offs and the management of uncertainty. To face information incompleteness is more the rule than the exception among PES practitioners, and decisions have to be taken often under a high degree of uncertainty about the provision of environmental services and therefore the expected economic gains for which buyers should pay. Moreover, PES are frequently part of rural development programs, and thus other concerns besides efficiency are regularly part of the criteria used for their design.

Transparency is particularly necessary in schemes in which collective practices contribute to the success of the scheme as a whole. Verification is closely related to trust, essential virtue toward successful collective action (Ostrom et al., 1994). The need for trust also extends to the global commons. The Brazilian PES schemes 'Pro-Ambiente' and 'Bolsa Floresta' are both based on a uniform fixed monthly payment per household. The question is whether the service buyers, who would not sense immediate improvement in the global climate, would be satisfied with this approach, expressing a global sense of trust in the distant service providers. How proximate (geographically or psychologically) do players need to be to create the grounds for trust in collective action? This type of concern raises the importance of social capital indicators in conditioning PES performance.

There is an implicit perception in the literature that PES must cover all costs, including at a minimum the complete opportunity costs of alternative uses. However, this vision does not take into account the logic of collective action and the insertion of payments within a policy mix that requires obedience to biophysical limits as a point of departure, and it is shaped by different types of social relations. Landholders will certainly be happy to receive full opportunity costs, but they can be also convinced through negotiation to accept less to bring themselves into compliance with social codes for land use. This is especially true since in many regions in developing countries few landholders have complete property rights, but many would like to legitimize their holdings, and adhering to environmental regulation can help them to achieve this.

The Coasean approach advocates PES strategies that reduce the number and increase the scale of providers, simplify practices and species, and hold down transactions costs and complexity, while maximizing payment to reflect at least the opportunity costs of alter-

native land uses. We argue that there is instead a greater need to develop local and regional institutional frameworks that can cope with complexity and diversity, and that can integrate PES within existing regimes of rural development and other policy instruments for environmental protection. In addition, we consider that a more comprehensive approach allows placing PES decision-making processes and trade-offs in the centre of any analysis (Zilberman et al., 2008) since it acknowledges that PES can be multi-goal interventions, in which aggregated measures of efficiency normally are not the single concern.

## 6. The Structure of the Special Section

The papers of this special section illustrate, theoretically and empirically, how setting up a PES scheme can be a highly contested, complex and context-specific endeavor. The next paper by Eric Gomez-Baggethun et al. review the history of the concept 'ecosystem services' and examine turning points in economic theory and practice with regard to ecosystem services incorporation into markets and payment schemes. Richard Norgaard takes a step further and locates the ecosystem service concept into wider narratives of sustainability and environmental governance. Norgaard warns against the perils of simplifying our understanding of ecosystems by reifying the 'stock-flow' framework underpinning the ecosystem services concept, and highlights the risk of involving ecologists to just inform markets rather than wider governance. He thus advocates for a deeper reflection and more substantive action about how we could reduce our pressure over the Earth's biophysical systems.

The paper by Nicolas Kosoy and Esteve Corbera develop a constructive critique of PES through the lens of 'commodity fetishism' and draw attention to three inherent weaknesses of the instrument, namely the simplification of complex biophysical systems, disregard for multiple values, and insufficient attention to existing asymmetries in people's access to ecosystem services. Then, Unai Pascual and colleagues address the relationship between equity and efficiency in PES and by stressing the role of institutional aspects in shaping the equity-efficiency relationship, their paper transcends the dominant Coasean vision on PES. Furthering the institutional point of view, Arild Vatn argues that PES success depends critically on state and community facilitation and that this often brings about a re-configuration of social relations, particularly of property rights. Vatn asserts that while payments may strengthen community relations and simplify action for environmental care, they may also introduce a purely instrumental logic and in some cases worsen the environmental status by crowding out environmental virtues.

After these conceptual papers, the special section progresses with five other papers that review PES experiences from Africa, Latin America and Asia. Brendan Fisher and colleagues focus on the role that ecosystems play in regulating water flows in two basins in Tanzania where feasibility studies have been conducted for the potential implementation of PES for water. Drawing on lessons from research on common property resource management, they shed light on the likely challenges of an effective future implementation of PES and provide a framework for taking into account user-resource considerations in similar contexts across East Africa. Andrew Sommerville et al. analyze the opportunities and challenges posed by the distribution of benefits in a community-based PES scheme in Madagascar, highlighting positive and negative outcomes and identifying key local governance barriers for achieving greater success. Jan Börner and colleagues specify the argument for the particular case of PES in the Amazon. They argue for the need of establishing a set of economic and institutional preconditions for PES to become a feasible and cost-effective conservation mechanism. They develop a macro-scale spatial analysis and overlay of opportunity costs, deforestation patterns, carbon services, and land tenure, in order to assess where these preconditions hold. They show that PES can be economically attractive for an important share of the Amazon but stress the importance

of institutional issues, such as land grabbing, insecure land tenure, overlapping claims, and lacking information on private tenure, which constitute real impediments to effective PES implementation.

Tom Clements et al. compare three PES programs in Cambodia and evaluate them against three key criteria: the institutional arrangements, distribution of costs and benefits, and the conservation results observed. They show that the program with the simplest arrangements and lowest administrative costs disburses higher payments to individual villagers but fails to build local management skills or understand conservation goals by the communities involved. By contrast, the more complex PES designs (in terms of rules and organizations), appear to take longer to get established, but are more widely supported by local people. The last paper by Yazhen Gong and colleagues examines the first reforestation project registered under the Clean Development Mechanism of the Kyoto Protocol. It focuses on the role of social capital in shaping contractual arrangements and influencing benefit distribution across local villagers, logging companies and carbon 'buyers'.

Overall, we hope that this special section helps advance our understanding of what 'ecosystem services' are and how they can contribute to improve environmental governance by entering into vivid debates around the strengths and weaknesses of PES. Our aim is to address both research orientated concerns about PES as well as practitioners' concerns when designing and implementing this environmental policy tool on the ground.

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