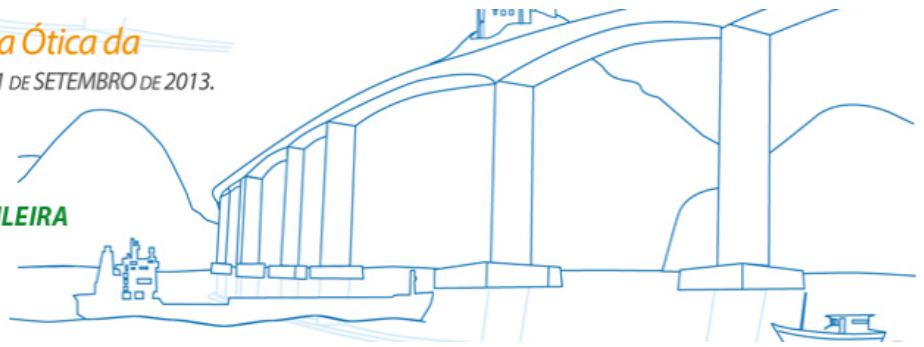


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**PAYMENTS FOR ECOSYSTEM SERVICES AND INCENTIVES FOR COLLECTIVE ACTION**

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# Payments for Ecosystem Services as Incentives for Collective Action

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## Abstract

The design and thrive of payments for ecosystem services (PES) have occurred as a response to the relative failure of integrated strategies for reconciling conservation and development. The most widespread definition of PES conceives these payments as markets to solve environmental externalities. The paper analyzes the limitations of this “Coasean” approach using insights from transaction costs economics, and it pleads for looking at PES with different analytical lenses. It argues that PES should be seen as “incentives for collective action”. The extent to which incentives can contribute to the management of ES should not be however taken for granted. The effects of monetary incentives are determined by their “social meanings”, which are context and culture-dependent. The proposed conceptual shift has significant analytical and practical implications.

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# 1. Framing the emergence of PES

In this article I elaborate on the limitations of conceiving payments for ecosystem services (PES) as markets to solve externalities, and I propose an alternative framing. Before moving into the theoretical discussion, let's start contextualizing the emergence of PES. During most part of the 20<sup>th</sup> century, biodiversity policies were dominated by the adoption of protected areas as the main strategy to safeguard natural ecosystems. Advocates of parks argue that as soon as poor rural communities gain access to modern ways of production, local economic growth is usually propelled by resource extraction and extensive land use changes that are in detriment to biodiversity (Terborgh, 2000). Therefore, they assume a strong trade-off between economic development and environmental conservation and a pessimistic vision about the possibilities of “sustainable” management of natural resources in biodiversity-rich ecosystems (Sanderson and Redford, 2003; Miller et al., 2011). Critics of this vision argue nonetheless that excluding vulnerable rural communities from protected areas induces a disproportionate and unfair cost of conservation on local people, and tends to prolong the conditions for social exclusion (Schwartzman et al., 2000a, Roe, 2008).

Integrated conservation and development projects (ICDP) were initially explicitly proposed to tackle the shortcomings of parks (Wells and Brandon, 1992), and in a relative rapid pace they “became the standard approach in attempting to combine the conservation of biodiversity with community development” (Sunderland et al., 2007; 276). One of the main reasons for such a swift change was that global environmental NGOs adopted the new approach quickly, in part as a response to the rising criticisms about the local social costs of parks (Schwartzman et al., 2000b). The change of emphasis from protected areas to integrated projects constituted a “paradigm shift”. By paradigm shift I mean a significant change in the ideas and practice dominating the international agenda of environmental conservation. Though successive “paradigms”

have not fully substituted the previous ones, they represent the “dominant” framework that guides the actions of key players during a determined period of time.

The shift towards ICDP coincided with the rise of a new way of conceptualizing human-nature interactions, which was more anthropocentric and integrative than the previous conservationist’s vision dominated by the cult of wilderness. The theory and practice of ICDP acknowledged that conservation issues needed to be addressed from a “complex-system” perspective and that a cross-scale approach, dealing with governance and community along different scales was necessary (Berkes, 2004; Folke et al., 2005). It is worth to clarify that, despite the shift towards ICDP, protected areas have played an important role in the practice of biodiversity conservation during the past two decades, though the empirical evidence about their effectiveness is not yet conclusive (Miteva et al., 2012).

During the past decade, disenchantment towards “integrated” approaches has grown considerably, partly due to their difficulties to achieve properly either environmental or social goals. Integrated approaches have been blamed for inducing “only indirect and often tenuous effects on conservation” (Pattanayak et al., 2010) and even for worsening the conditions of impoverishment of marginal rural populations (Schmidt-Soltau, 2004). Sayer and Campbell (2004) stated that “their credibility as a development or conservation tool is now seriously questioned”. Christensen (2004) summarized the main causes of failures of integrated approaches as being based on naive assumptions, adopting unconvincing notions of local participation, targeting the wrong threats, requiring continuous external support, and not generating enough benefits for local dwellers. The “fall in disgrace” (in metaphorical terms) of integrated approaches has coincided with a call for the adoption of direct payments for biodiversity conservation and the rise of the ecosystem services framework for conceptualizing the interaction between human societies and the environment (MEA, 2005). By “falling in disgrace” I mean losing leverage in the agenda of influential organizations, such as global environmental

NGOs and donors. It is worth noting however that, in spite of criticisms, ICDP are still executed as biodiversity conservation interventions in developing countries (Blom et al., 2010).

Direct payments for biodiversity conservation have been proposed as an explicit response to the relative failure of ICDP (Ferraro and Simpson. 2002; Ferraro and Kiss 2002). The emergence and thrive of this type of policy instruments constitute a new paradigm shift in the field of environmental conservation. Similarly to what happened during the rise of integrated approaches, the emergence of PES has been accompanied by a particular conceptual framework. Wunder (2005) introduced a definition of PES that has been widely adopted in academic and practitioners' circles. According to such definition, a PES is a voluntary transaction where a well-defined ecosystem service (ES) is being 'bought' by a (minimum one) ES buyer from a (minimum one) ES provider if and only if the provider secures the provision of ES (conditionality). This way of conceptualizing PES has been derived from the Coase's proposition that socially sub-optimal situations (as under-supply of environmental services) might be solved by transactions between agents, provided that transaction costs are low enough. Coase proposed policy instruments based on "negotiations between individuals in the market" as an explicit reaction to Pigou's idea that social costs should be resolved by state interventions (Coase, 1992). According to such "Coasean" conceptualization of PES, transactions between the concerned parties should fill the gap of missing markets for ecosystem services, and therefore solve environmental externalities. Within environmental economics, there is a long intellectual tradition that conceptualizes most environmental problems basically as a result of externalities (Pearce, 2002). Table 1 summarizes the main features of the three "paradigms" described above.

#### **INSERT TABLE 1 ABOUT HERE**

One of the important attributes of the Coasean definition is its theoretical simplicity. The Coasean conceptualization of PES has implied a reduction in the level of complexity in the discourse surrounding

interventions dealing with conservation and development simultaneously. The rather “complex” catchwords of the previous paradigm, “such as adaptive co-management”, “traditional ecological knowledge” or “social-ecological systems” have been substituted by simpler words such “direct payments”, “compensation” and “opportunity costs”. Nevertheless, there is a gap between the simple discourse (and theorization) of markets as tools for solving environmental externalities and what they can actually deliver in the management of ecosystem services. Such a gap is what can be coined the “fallacy of simplicity”.

Ronald Coase did not only make seminal contributions about how to deal with the problem of social costs (or externalities, as they were called later). He was also the founder father of transaction costs economics. Below I draw on insights from the key tenet of this the stream of thought — namely that the efficiency of alternative governance arrangements is determined by the incidence of transaction costs — to argue that market transactions are often not the most efficient governance structure to deal with the management of ecosystem services.

## **2. Conceptualizing PES: Insights from transaction costs economics**

Before discussing how insights from transaction costs economics can be incorporated into the conceptualization of PES, let’s start describing important features characterizing the management of ecosystem services:

*High complexity and uncertainty.* The performance of beneficiaries of ecosystem services and resource users (providers of such services) are interconnected by ecological functions that are typically complex (Cardinale et al., 2012). For instance, non-linear dynamics are common in the relationship between land cover, species richness and ecosystem services (Isbell et al., 2011). In addition, due to the number of factors involved and the complexity of their interactions, ecosystem functions and services usually hold a high degree of

uncertainty (Ascough et al., 2008). Uncertainty refers not only to the dynamics of the biophysical processes underlying ecological functions, but also to the social value of ecosystem services. Sources of uncertainty include the complexity of the relations between the parties, the multiplicity of ecological functions, the importance of geographical and time scales, and the presence of epiphenomenal properties of the systems, such as resilience (Cote and Nightingale, 2012). With regards to the value of ecosystem services, sources of uncertainty include for example non-linear relationships between human preferences and ecological conditions, the context and site-specificity of valuation and market variability affecting trade-offs and the allocation of resources (Skourtos et al., 2010; Johnson et al., 2012). Such high levels of complexity and uncertainty imply that the necessary information for coordination is usually difficult to codify and therefore to manage and transmit.

*Imperfect and asymmetric information.* The intrinsic complexity and uncertainties of ecosystem functions imply that management decisions have to be taken with imperfect information. These conditions often also make the cost of information particularly high. Knowledge systems are generated along close and long-term interaction between the users of the resource base and the ecological systems (Chapin et al., 2009). In addition, beneficiaries of ecosystem services generally face cognitive barriers for assessing the ES. A typical example is the limited ability of downstream dwellers in a watershed to assess the services provided by upstream socio-ecological systems in the regulation or quality of water flows. Furthermore, the geographical and social distance between beneficiaries of ES and users of the resource base also raise information barriers, and open up the possibility of opportunistic behavior. For instance, assertions by users of the resource base in the upper part of a watershed about their provision of water-related ES may be hardly verifiable by downstream water users. This could facilitate an “opportunistic claim” about the supply of ES. Such pervasive information gap and the need for coordination is part of the explanation why in most PES schemes intermediaries play an important role, both in setting up the schemes and in running them.

*High level of asset specificity.* The literature on transaction costs economics defines asset specificity as the degree to which assets or investments can be redeployed to alternative uses without incurring into substantial losses (Williamson, 1988). The type of investments necessary in the provision of ecosystem services entail often a high level of asset specificity since the returns of the investments done by the users of the resource base (e.g., the adoption of particular agricultural practices) for enhancing the provision of ecosystem services are usually lower in transactions alternative to the ones linking them to the beneficiaries of ES (the regular agricultural market for example). In addition, several ecosystem services are typically site-specific. High asset specificity creates dependency between the parties of a transaction and increases contracting hazards.

The combination of factors explained above makes markets not the most appropriate governance structure for shaping the interaction (transaction) between beneficiaries of ES and users of the resource base. Below I elaborate on insights from transaction costs economics for arriving to such conclusion.

Transaction costs economics have been also called the “economics of governance”, as the distinctive feature of this field is to take transactions between parties as the unit of analysis (Williamson, 2005). Transactions here are understood as transfers of good, services or rights between parties. From this perspective, emphasis is devoted to characterize the attributes with respect to which transactions differ and to describe “the cluster of attributes that define alternative modes of governance” (Williamson, 2010; 674). Modes of governance are thus defined by a set of characteristics describing the way the parties involved in a transaction interact and organize their activities. These characteristics refer mainly to the instrument of interaction (e.g, price system; direct control) and what Williamson (1991) has called types of adaptation to disturbances (autonomy and cooperation). The underlying assumption is that the parties engaged in a transaction need to align their activities (since they are inter-dependent), and such alignment can be done through different mechanisms (governance modes). The alignment normally entails adaptation to “disturbances”. Disturbances are unforeseen changes in the conditions framing a transaction, to which agents need to be responsive. Three



main generic governance modes have been identified: market, hybrid and hierarchy. As well, this stream of literature has identified uncertainty and asset specificity as two important attributes of transactions determining governance modes. Both are normally assumed to influence positively the emergence of more hierarchical structures. The main reason is that they give the possibility to “opportunistic agents to take advantage of incomplete contracts” (Menard, 1996). For any given transaction, different governance modes will render different transaction costs. It is worth to mention that transaction costs economics assumes that agents tend to choose the governance mode that renders the most efficient outcome in a particular transaction (minimizes transaction costs). Transaction costs economics is thus mainly concerned with the efficiency of transactions. Other considerations (such as equity) may be also taken into consideration when analyzing the management of ES. However, the scope of the present paper however is circumscribed to efficiency issues.

If transactions are characterized by low uncertainty and asset specificity, it is easier that adaptations to disturbances are made through autonomous responses from the parties. The market is predicted as the most efficient governance mode in such type of situations, since the price system is expected to be a suitable mechanism for the alignment of activities when autonomous responses prevail. However, “when bilaterally dependent parties are unable to respond quickly and easily, because of disagreements of self-interested bargaining, maladaptations costs are incurred” (Williamson, 1991), and more hierarchical structures become more efficient. The move from market to hierarchy might increase bureaucratic costs. Nonetheless, those costs can be offset by the bilateral gains from a higher adaptation capacity of the parties. Between the extremes of markets and hierarchies, hybrid governance structures combine elements of both. As compared to markets, the hybrid structure sacrifices monetary transfers as coordination tools in favor of a higher level of control (authority), whereas when compared to hierarchy, it sacrifices control in favor of monetary transfers.

The features characterizing the management of ecosystems and their services explained above (high complexity and uncertainty, imperfect and asymmetric information and high levels of asset specificity) have

two important implications: (a) they make high the chances of opportunistic behavior; and (b) they make difficult the commoditization of the service. In such situations, coordination through a price system (autonomous adaptation) would likely lead to high “maladaptations” costs. Markets are therefore not the most appropriate governance mode in these circumstances.

On the other hand, a long geographical and social distance between beneficiaries of ecosystem services and the users of the resource base tend to make the cost of bureaucracy extremely high. In addition, these two social groups often belong to different political and legal systems, which also impose constraints on the possibilities to control, directly or through governmental regulations, the activities of the users of the resource base. Furthermore, the users of the resource base are often multiple and spread geographically, and hold a high degree of autonomy, which also increase the cost of monitoring and control. All these factors likely make the cost of hierarchical modes of governance also very high. The corollary is then that hybrid structures are expected to render more efficient outcomes.

### **3. From internalizing externalities to creating incentives for collective action**

The management of ecosystems and their services typically involves social dilemmas, usually along different scales and centers of decisions (Ostrom, 2010a). Social dilemmas refer to situations where to pursue the individual interest in the short run leads to socially undesirable situations (where typically the whole population ends up with welfare losses). In the case of ecosystems, such dilemmas are independent of the property regime of the resource base. Regardless whether the resource base is owned by private individuals, a community or the state, its ecosystem functions affect the welfare of agents located in different geographical areas. Through ecosystem services, the welfares of different stakeholders are interconnected. Beneficiaries of ES cannot exclude easily neither the users of the resource base nor other beneficiaries from benefiting from

them. Most ecosystem services are therefore either common-pool or public goods. These goods are characterized by difficulties in excluding beneficiaries, and hence a high potential incidence of free-riding and opportunistic behavior when individual sacrifices are needed to maintain the flow of benefits (Muradian and Rival, 2012a; Farley, 2012). Hence, the management of ecosystem services shares many characteristics with the “problems of the commons” (Ostrom, 2010b). Such problems can be solved through hierarchical or hybrid structures. However, when agents hold a high degree of autonomy or when monitoring or enforcing costs of hierarchical control are too high, hybrid modes would be more efficient option. In the management of natural resources, such hybrid forms usually take the form of collective action. Menard (2011) has already suggested that the systems for the collective management of natural resources can be considered as cases of hybrid governance, since members typically keep their autonomous rights but they give some of them away in order to cooperate with other members and ensure the sustainability of the resource across time. There are several mechanisms for aligning the activities of agents in a collective action situation, including penalties, trust, leadership, etc. Monetary transfers can also play a role in facilitating concerted action. The following paragraphs develop some theoretical insights about what types of transfers and under which circumstances can actually contribute to the management of ES.

Muradian and Rival (2012b) make a distinction between the role of monetary rewards, incentives and markets in the management of ecosystem services. These three generic types of monetary transfers between beneficiaries of ecosystem services and the users of the resource base have different goals and convey different information (social meaning). Rewards to the users of the resource base are meant to acknowledge past performance, as a way to (i) give social recognition; (ii) encourage future good performance; (iii) induce other users of the resource base to follow similar practices; and in some cases (iv) to work as a social transfer to vulnerable social groups (contribution to rural economic development). As I define them, rewards hold a low level of additionality, since users of the resource base would likely not change their activities/behavior related to the provision of ecosystem services without the payment. Thus, we define here “additionality” as

the extent to which the transfer of resources induces behavioral changes. Additionality is high when the payment has a significant effect on the performance of the agent. As well, under the modality of reward the level of commoditization (defined as the extent to which the ecosystem service is clearly identified as a tradable commodity) is low, since the services are not actually traded. In this context, the process of commoditization requires two steps: the definition of a clear ES and its “exchange”. A low level of commoditization means that the interaction between the agents is not based on transacting a clearly defined “good” or “service”.

Social psychologists distinguish between two broad categories of motivations: intrinsic and extrinsic (Ryan and Deci, 2000). “Intrinsic” refers to psychological drivers of behavior that do not depend on external stimuli, while extrinsic refers to motivations that are steered by benefits provided by somebody else. The behaviors on which rewards apply tend to rely considerably on intrinsic motivations. A simple example of reward is when you give some money to your daughter because of her good performance at the school during the last term. In such situation, the monetary “reward” is not inducing an change in her behavior: you daughter did not know that you were going to give it, and you expect that she will continue having a good performance, independently of the payment, in the future. You hope not to create a “market” for grades, since you assume that she is motivated enough, intrinsically, to be a good student. Though there is a clearly defined feature conditioning the transfer (grades), it is not a “commodity” (the magnitude of the reward, for instance, is not proportional to the grades, as it would be expected when a commodity is transacted). One of the distinctive features of rewards is that they are not proportional to efforts. One of the purposes of rewards is social recognition.

On the opposite extreme to rewards, markets hold a high degree of additionality, since users of the resource base will carry out the promoted activity only if the payment takes place. In addition, in order to set up markets, the level of commoditization has to be high, and the magnitude of the transfer must be proportional

to the efforts. Market transactions rely to a high extent on external motivations, due to the fact that without the payment agents will not undertake the concerned activity. Incentives combine characteristics of markets and rewards. Incentives work properly when there is a combination of extrinsic and intrinsic motivations to undertake the promoted activities. This is the reason why the promoted behavior or practice can remain in place even if the incentive is removed. With incentives the level of additionality may be high, since incentives can tip decisions and change the behavior of recipients (this is the main different between incentives and rewards). The level of commoditization is intermediate since a clear identification of a tradable commodity is not required, though some degree of conditionality is needed. Table 2 summarizes the main differences between these three modalities. These three types of transfers follow different set of “rules” (derived from social conventions). For instance, incentives are not fully proportional to the magnitude of the behavioral change induced (Heyman and Ariely, 2004), and they do not need to be permanent (short-term incentives can induce long-term behavioral changes), whereas markets require to be proportional to the expected response or effort and permanent in time.

## **INSERT TABLE 2 ABOUT HERE**

Since the requirements for setting up markets for ES usually entail high transaction costs, most cases of PES tend to be either rewards or incentives. Though advisable in some situations (particularly when dealing with vulnerable social groups), the contribution of rewards to induce substantial changes in the conditions of natural ecosystems tend to be weak, since by definition their level of additionality is low. From an environmental policy perspective then it is more sensible to aim at setting incentives for the protection of ecosystems. Nonetheless, the effectiveness of incentives cannot be taken for granted, as we will discuss in the next section.

The national level PES scheme in Mexico can be considered as an example of rewards, since it has been reported to hold a low level of additionality and commoditization (Muñoz-Piña et al., 2008; Rico et al., 2011). As well, when analyzing a payment scheme promoting the adoption of silvopastoral practices, van Hecken and Bastiaensen (2010) have found that the payments were welcome but “according to the farmers, did not play a decisive role” in the adoption of the promoted land use practices (and could be then considered as rewards). Interestingly, showing evidence from another silvopastoral PES, in Colombia, Hayes (2012) points out that farmers state different levels of additionality of the (in-kind) payment for the various land use practices being promoted by the scheme. While most farmers have adopted the rotation of grazing and have applied fertilizers to pasturelands in response to the in-kind payment, only about 40% of them stated that they will continue applying fertilizers once the payment is discontinued (despite the positive effect on milk productivity). In contrast, 75 % of them stated that they will continue undertaking grazing rotation. Farmers are therefore responding closer to the market logic in the case of applying fertilizers, while the payment works more as an incentive in the case of grazing rotation. The differences between rewards, incentives and markets are not discrete, but continuous.

The debate about PES has been muddled by the lack of acknowledgment of these three categories. On the one hand, advocates of the Coasean vision on PES (Engel et al., 2008; Kinzig et al., 2010) have not sufficiently acknowledged in their analytical framework that most cases do not meet their prescriptive propositions (and the adoption of such propositions can make indeed transaction costs excessively high). On the other hand, radical critics of PES based on the idea that it is misleading “to sell nature to save it” (Milne and Adams, 2012; Büscher, 2012) have missed the fact that most cases of PES are not actually markets, and indeed hold a low level of commoditization.

#### **4. The nature of monetary incentives**

The literature on behavioral economics and experimental psychology has gained considerable insights about the nature of monetary incentives. In many cases, monetary incentives are effective and induce long-lasting behavioral changes, even after they are removed. Charness and Gneezy (2009), for instance, found that monetary incentives induced a higher level of attendance to the gym, and that the new (good) habits persisted after the incentives were suspended. There are many cases where people respond to monetary signals according to the predictions of microeconomic neoclassical theory. However, there is also abundant evidence showing that, in particular situations, incentives may backfire (induce unintended effects) and crowd out intrinsic motivations to undertake the task at stake (Bowles, 2008). The following are some of the main conclusions about the nature of monetary incentives:

*Monetary incentives can induce a shift in the “framing” of the situation by the recipient.* Incentives are means of social communication and hold a social meaning. Through incentives, recipients can infer motivations, intentions and expectations of providers. For instance, incentives can signal distrust or the intention to control. Incentives are therefore “interpreted”, and such interpretation can influence considerably the response from recipients. Monetary incentives are not morally neutral, and the response to them depends on normative frameworks. In his seminal work, Fiske (1992) identifies four main relational models characterizing social relations: communal sharing; authority ranking; equality matching and market pricing. These domains of social life are governed by different principles and normative frameworks. The contexts in which the models are expected to be applied are social conventions, and therefore culturally determined. Monetary incentives can induce a shift in the model mediating a relationship (Bowles and Polania-Reyes, 2012).

In the often cited real life experiment conducted by Gneezy and Rustichini (2000a), the introduction of a fine for parents arriving late to pick their children up in day care centers resulted in higher rates of delay. The authors explain this unexpected behavior (from the point of view of neoclassical micro-economics) by a shift

in social norms. Without the fine, parents felt the moral obligation to comply with the rule, while after the introduction of the fine the interaction moved into a market exchange, where delays were “bought”. This shift reduced the sense of guilt and shame (powerful drivers of being punctual). External incentives then undermined intrinsic motivations. Gneezy and Rustichini (2000b) conducted two experiments in which they provided different levels of external monetary incentives to answer an IQ test and to undertake volunteer work (to collect monetary donations). They found that small monetary incentives reduced the level of performance (compared with situations where no incentives are provided), whereas higher levels of incentives produced a significant improvement in the performance among the students answering the test, but not among those doing the volunteer work. The authors conclude that incentives do not only reflect a payoff structure but also contain information about the social interaction framing the transfer of resources. These experiments also show that the situation in which intrinsic motivations were expected to play a larger role in steering the task (charitable work), the incentives were less effective.

Frey and Oberholzer-Gee (1997) report that the willingness to accept a nuclear waste repository in the vicinity dropped substantially (from 51 % to 25 %) among Swiss citizens when monetary compensation was offered, and the rate of acceptance of the facility remained low even if the amount offered increased significantly. The authors interpret these results as an example that when public spirit prevails, incentives can crowd out civic duty. Interestingly, the effects of a shift of framing may be seen only in the long-run. For instance, using a randomized field experiment, Meier (2007) shows that matching charitable donations has a positive effect on the short run, but in the long run — when the matching is removed— a net negative effect on the level of charitable contribution is observed. Incentives can affect moral sentiments, but also social norms. Using a public good experiment in a lab situation, Fuster and Meier (2010) found that incentives and norm enforcement (in the form of costly punishment to free-riders) are substitute, and they argue that the presence of incentives weakens negative emotions towards free-riders.



The type of “vehicle” used for the incentive can also induce a shift in the framing. For instance, Heyman and Ariely (2004) show how responses to incentives are very sensitive to whether they are provided in monetary terms or in-kind (candies). Very interestingly, the mere mention of the cost of the candies was able to switch the framing from the “social” to “market” the domain, thus affecting significantly the relationship between effort and the magnitude of the incentive. An important proposition derived from their work is that for tasks in the “social” domain, efforts are irresponsive to the magnitude of the incentives.

*The effectiveness of monetary incentives may vary considerably between social groups and cultures.* Another important finding of experimental economics and psychology is that the effects of incentives on individual behavior are far from being universal. Even within the same cultural background, different social groups may react in a different way to incentives. For instance, using a randomized trial, Angrist and Lavy (2009) found that monetary incentives had a positive effect on school performance among Israeli female students, but no effect among the boys.

## **5. When can incentives be counterproductive?**

The interaction between the motives to undertake a particular task and the normative framework in which it takes place is very important in determining the effects of incentives. The probability of unexpected effects is higher when incentives are applied to induce pro-social behavior. In cases where the task is framed by moral obligations or when the motives behind the task are dominated by moral sentiments, there is a higher probability that monetary incentives would induce motivational crowding out (Bowles, 2008). The chances of unexpected effects are also higher when the incentives convey a signal of distrust. Fehr and List (2004), for instance, show that the use of penalizing incentives induces less trustworthy behavior in trust games (what they call the hidden costs of incentives). Interestingly, they also found that when such threats are available but not used, players are more willing to reciprocate. Finally, when incentives are perceived as a loss of autonomy

the probability of unexpected effects is also higher. However, in fact, autonomy, trust and intrinsic motivations are inter-related, and in practice they are difficult to disentangle (Enzle and Anderson 1993; Falk and Kosfeld, 2006)

Contributing to a public good (such as to the provision of ecosystem services) often involve intrinsic motivations and different types of social preferences, including moral sentiments and obligations. As well, the systems for collective action for the management of natural resources rely substantially on trust relations (Ostrom, 2009a). From the insights gained in social psychology and experimental economics summarized above, we can expect that in the situations characterizing the management of ecosystem services there is a not a negligible probability that the introduction of monetary incentives could actually induce counterproductive effects. Chances of counterproductive effects are higher when (a) the conditions for the payments are seen as an external imposition; (b) when the payment are perceived as undermining trust (are perceived as a threat) and (c) when the tasks at stake have an important component of moral obligation or contribution to the common good. Practitioners should therefore pay attention to the factors that condition the performance of incentives. As discussed above, the effects of incentives are mediated by the way they are socially interpreted, and this can vary substantially along different social groups and cultural backgrounds. Much more empirical research is however needed in this field, and particularly on the interaction between different types of incentives and the governance of collective action. Our knowledge in this domain is still very limited to arrive to conclusive statements.

## **6. Conclusions**

In this paper I have tried to elaborate a new way of conceptualizing PES, which moves away from the assumption that the problems faced in the management of ecosystem services are basically the result of market failures, and therefore need market-based solutions. The alternative vision on PES is based on the

following premises: (a) the management of ecosystem services can be conceived as a social dilemma; (b) hybrid structures tend to be more efficient in the management of ES; and (b) we need to properly acknowledge the distinction between rewards, incentives and markets, and the context in which they are appropriate.

It is worthwhile to clarify the theoretical relations between the three realms outlined above. First, I have argued that it is more appropriate to conceptualize the management of ES as a social dilemma (instead of as an externality problem), mainly because of the observation that most ES are either common-pool or public goods. Secondly, hybrid structures tend to be more efficient in the management of ES basically because of (i) the difficulties in commoditizing ES (which makes transaction costs very high under market modes) and (ii) the fact that often there is a long social distance between the parties involved, particularly when we talk about global ES (which makes transaction costs very high in hierarchical modes). Such hybrid structures usually take the form of collective action, namely a situation where autonomous agents give up part of their rights in a concerted way in order to solve social dilemmas. What is then the role of monetary incentives in facilitating such concerted action? Incentives are just one of the multiple possible coordination mechanisms. I think that they are especially likely to emerge in hybrid structures precisely because they combine monetary signals and control elements. Such combination is one of the distinctive features of hybrid modes. This does not mean however that in all situations monetary incentives are the most efficient or effective option. In many cases, effective governance structures can emerge without them, particularly when dealing with social dilemmas. The literature reviewed above suggests that monetary incentives might undermine intrinsic motivations, and other coordination mechanisms in collective action situations. The extent to which incentives can contribute to the management of ES should not be therefore taken for granted. Further effort is needed in understanding the complex responses of humans to monetary and other types of incentives across social contexts. As argued above, one of the distinctive features of the Coasean definition of PES is its appealing simplicity, and application to situations where there are market externalities. In contrast, the theoretical framework here

outlined adheres to Ostrom's (2009b) proposition that "simple blueprint policies do not work" in complex socio-ecological systems. Management systems necessarily have to be adapted to local social conventions and institutional settings.

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Table 1: Attributes of different conservation paradigms

	<b>Protected areas</b>	<b>Integrated approaches</b>	<b>Coasean PES</b>
<b>Core of the approach</b>	Exclusion of humans from natural ecosystems	Promotion of alternative productive activities	Direct compensation of opportunity costs
<b>Main assumptions</b>	Economic activities and biodiversity conservation are irreconcilable	Alternative economic activities will reduce the pressure on ecosystems and create incentives for their conservation	As far as demand and supply of ES are met, appropriate uses of ecosystems are ensured
<b>Main criticisms</b>	Social exclusion is unfair, and unfeasible in most places	Interventions with multiple objectives tend to be ineffective	Effects on motivations not well understood It needs stakeholders able to pay It is not clear how long-term sustainability will be ensured
<b>Policy instruments</b>	Command-and-control	Technical and external support	Transaction between parties
<b>Main stakeholder</b>	State	Local communities Development agencies	Buyers of ES Suppliers of ES Intermediaries
<b>Expected policy outcomes</b>	Win-Lose	Win-Win	Win-Win
<b>Concern for complexity</b>	Low	High	Low
<b>Catchwords</b>	Parks	Adaptive co-management; local knowledge; multi-level governance	Direct payments, transaction costs, conditionality

Table 2: Main differences between rewards, incentives and markets

	Rewards	Incentives	Markets
Additionality	Low	High	High
Commoditization	Low	Medium	High
Motivations  Intrinsic  Extrinsic	