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Incentives, conditionality and collective action in payment for environmental services

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Abstract: As payment for environmental services (PES) initiatives spread to collectively managed natural resources, questions arise because the incentive structures that might be appropriate for individually managed resources will not necessarily promote the collective action required to manage the commons. Theory suggests challenges for cash payments to promote collective action, and for alternative payment types to facilitate conditionality. Possible ways to reconcile this disconnect involve conceiving of PES more broadly through the use of multiple forms of payment including non-cash incentives and placing greater focus on building institutions for collective action than on strict conditionality.

Keywords: commons, collective action, conditionality, Indonesia, Mexico, payment for ecosystem services, payment for environmental services

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1. Introduction

Payment for environmental services (PES) refers to direct payments to land managers in exchange for managing their land in a way that produces environmental services of interest to the payer. Often environmental services are public goods with high costs of obtaining information about their provision, which explains why markets for them do not emerge spontaneously (Gustafsson 1998). In developing countries, governments or donors are the main sponsors of PES and they use it primarily to internalize the positive externalities of engaging in natural resource conservation (Huang et al. 2009; Southgate and Wunder 2009). As a means of promoting socially desirable conservation, PES is seen as an improvement over earlier approaches such as legal restrictions, investment subsidies, and indirect incentives linked to development projects because it offers positive incentives for voluntary behavior, conditional on performance, with a very direct linkage between the incentive and the desired outcome (Ferraro and Kiss 2002; Wunder 2004). The directness and conditionality of PES are what most distinguish it from predecessor policies.

At its inception in developing countries in the late 1990s, PES focused exclusively on environmental service agreements with individual landholders. PES expanded in Latin America before it did in either Asia or Africa (Southgate and Wunder 2009), and individual contracts were the norm because of the low rural population density and prevalence of privately owned land in many areas that could provide environmental services (Southgate and Wunder 2009). Costa Rica's national PES program and several well-documented payment for watershed services programs are cases in point (Zbinden and Lee 2005; Southgate and Wunder 2009). Subsequently, both in Latin America and beyond, PES began to expand from individual to collective contracts and agreements. This shift reflects the large areas land managed by community groups and an interest in bundling

small individual contracts into one larger agreement in order to reduce transaction costs (Muñoz-Piña et al. 2008; Huang et al. 2009).

The literature on PES devotes very little attention to the question of how to promote collective action under PES as group agreements spread. As is well known from the commons literature, collective management raises completely different problems than individual management. The commons literature has important insights for collective PES initiatives, with the natural question arising of how a group entering a collective PES agreement would manage the inevitably uneven distribution of benefits and costs among its members (Alix-Garcia et al. 2005; Fisher et al. 2010). One question that has not received adequate attention is the likely effects of an exogenous incentive structure on local community norms and institutions (Reynolds 2012). In other words, what does paying people to cooperate do to the process of building collective action? This question is particularly important where PES initiatives call for groups of rural people to manage natural resources in new ways and for new objectives that they did not pursue in the past, and possibly to develop new institutional arrangements in order to do so.

In a collective PES arrangement, group members must work together to agree upon the conditions of the arrangement they will jointly enter and then monitor each other and enforce the terms of the agreement. Where commons have multiple, conflicting uses, the combination of high exclusion costs and subtractability that characterize common pool resources (Feeny et al. 1990) means that individual group members can undermine a collective arrangement if they are not satisfied with it. Thus cooperation within the group of natural resource users is essential. In some settings, it may be possible through coercion or exclusion for a subset of users to ensure conservation and environmental service provision even if others do not lend their support. Over the long term, however, apart from being unfair a coercive system may become difficult to enforce (Muradian et al. 2010). Successful collective action requires building institutions that support it (Ostrom 1990, 2009), so collective PES arrangements should aim to support such institution building (Clements et al. 2010; Muradian et al. 2010; Garcia-Amado et al. 2013). Discussions of how to achieve this are minimal in the PES literature.

Despite the lack of attention to collective action in the PES literature and to the effects of an exogenous payment in the collective action literature, from different strands of literature we can gain insights to understand the issues and identify areas that require attention. Without explicitly addressing it, commons literature gives strong reasons to anticipate difficulties in the use of monetary incentives to promote cooperative management of the commons, as will be discussed below. Research on the psychological foundations of motivation also offers important insights about potential drawbacks of the use of monetary incentives. For example, Frey (1999), Vatn (2010), and Van Hecken and Bastiaensen (2010) all raised pertinent questions about motivational aspects of conservation payments but these studies devoted little if any attention to the implications of incentive payments for the collective action needed to secure conservation.

Some of this literature (e.g. Heyman and Ariely 2004) also suggests that non-monetary incentives could perhaps have better properties for promoting collective action, but as will be discussed below, they would face greater challenges in enforcing the conditionality that is the key feature of PES. Given this potential tradeoff, this paper analyzes the potential implications of different payment types for conditionality, collective action, and non-financial sources of motivation to act collectively to manage natural resources. The paper synthesizes the literatures on PES, commons management, and the psychological foundations of incentives and draws on empirical evidence from around the world, with particular focus on two watershed protection initiatives in Mexico and Indonesia. The main argument resulting from this synthesis is that in facing the potential tradeoff a PES initiative may face between stronger conditionality and stronger potential for institution-building to manage the commons, a focus on institution-building is likely to be a better bet.

2. Collective payment for environmental services

Payment for environmental services is most commonly defined as a voluntary transaction in which a well-defined environmental service (or a land use likely to secure that service is 'bought' by a (minimum of one) environmental service buyer from a (minimum of one) environmental service provider, if and only if the environmental service provider secures its provision (conditionality) (Wunder 2004). PES agreements that actually meet all of these criteria are rare (Southgate and Wunder 2009), but PES-like arrangements that meet most of these criteria are spreading rapidly.

One of the world's largest and longest running PES programs is the Conservation Reserve Program in the US. Since 1986, this program has paid individual farmers to retire land from production with the objective of protecting against erosion that causes downstream water quality problems (USDA 2014). Initiated in 2000, China's Sloping Lands Conversion program, also called Grain for Green, has become the world's largest PES program. It too pays individual farmers to convert cultivated land to permanent vegetation with the objective of reducing erosion. Costa Rica's national PES program, which began in 1997, is perhaps the best known such program in a developing country. When it was founded, Costa Rica's program was available only to landowners with secure, individual title on the grounds that without secure tenure the landholder cannot promise to manage for environmental services over the course of a contract.

As PES spread in developing countries, the need for collective PES arrangements quickly became apparent, for two reasons. First, forests, watersheds, pastures, and ponds that may be a high priority for conservation are characterized by high exclusion costs and cannot easily be managed individually or by the state. Management under these conditions, and hence PES, can only be carried out collectively. Second, often collective PES agreements also are attractive in developing-country contexts characterized by small individual landholdings, such

that individual contracts would incur prohibitively high transaction costs. Each individual PES agreement in a given setting involves the same costs of identifying the party, negotiating, establishing a contract, monitoring and enforcing it, and making the payment if the terms are met. In the aggregate, these costs will be much higher for a large number of small contracts than a small number of large contracts (Pagiola et al. 2005; Wunder 2008; Huang et al. 2009). Group-level contracts effectively shift transaction costs to within the group that is established for the purposes of PES and it must work collectively to minimize them.

After several years Costa Rica's national PES program changed its policies to allow groups of small farmers with individual holdings to enter a collective contract to reduce the transaction costs (Pagiola 2008). Mexico's Payment for Hydrologic Environmental Services (PSAH is its Spanish acronym) program, initiated in 2003, operates with *ejidos*, groups that manage forest land collectively (Alix-Garcia et al. 2005; Muñoz-Piña et al. 2008; Southgate and Wunder 2009). Looking forward, collective PES is a fertile area for the Reducing Emissions from Deforestation and Forest Degradation (REDD+) initiative to pay developing countries for protecting and augmenting as a means to reduce global carbon emissions (United Nations 2010). Rural communities officially own or manage about 27% of developing country forests (Rights and Resources Initiative 2012), making agreements with such communities an area of interest in global climate negotiations (United Nations 2010). Many REDD+ pilot initiatives operate with community groups (e.g. Harvey et al. 2010; Hajek et al. 2011; Peskett et al. 2011). To date, wealthy countries have pledged $171 billion in support of REDD+ (United Nations 2014), making the design of effective collective PES approaches an important development issue.

3. Effects of monetizing incentives for collective action

Research in behavioral economics and social psychology has amassed substantial evidence that human behavior is driven by multiple sources of motivation (summarized by Fehr and Falk 2002; Vatn 2009). In addition to economic motivations – referred to in this literature as extrinsic motivation – people are motivated by "intrinsic" motivators such as an altruistic interest in doing the right thing (Harbaugh et al. 2007), a sense of fairness (Berg et al. 1995; Fehr and Schmidt 1999), and concern about self-image (Andreoni 1989). This literature, summarized by Bowles and Polonia-Reyes (2011) and Vatn (2009), also shows that extrinsic sources of motivation, e.g. cash incentives, sometimes can interfere with or "crowd out" intrinsic sources of motivation. Although theoretical explanations for this observation remain poorly developed (Vatn 2009; Bowles and Polonia-Reyes 2011), substantial evidence exists. Deci (1971), for example, found that once money was offered to subjects in exchange for performing a task, they would be much less inclined to perform the task without payment even if previously they were willing to do so. In a meta-analysis of 128 studies Deci et al. (1999) found broad support for this relationship.

Heyman and Ariely (2004) offered evidence that non-monetary incentives, i.e. payment in kind, may not necessarily have the same negative interactions with intrinsic motivation as cash payment does.

Motivation crowding out has clear applicability to managing the commons (Narloch et al. 2012) and to environmental management more generally (Frey 1999): if intrinsic motivation based on social relationships drives much of our prosocial behavior, and if monetary incentives can undermine motivation based on social relationships, then there are good reasons to imagine that monetizing the incentives to act collectively could undermine people's interest in contributing to the common good. The key questions that arise are under what conditions could monetary incentives improve collective action for conservation, and under what conditions might it lead to unintended outcomes?

Literature on collective action has surprisingly little to say about the impacts of monetary incentives on efforts to promote collective action. Early commons literature focused primarily on explaining long-lived cases of successful commons management (Wade 1989; Ostrom 1990; Baland and Platteau 1996); it focused relatively little on the emergence of successful commons management. Subsequent literature drew upon laboratory experiments to examine tendencies of groups to cooperate and to self-organize (Ostrom et al. 1994; Poteete et al. 2010). This literature offers great insights about numerous factors that predict successful collective action, but it is rather silent on the question of how groups would respond to cash incentives to cooperate.

In recent years a small number of experimental studies have tried to examine the effects of monetary incentives on collective action. In framed field experiments in Peru, Narloch et al. (2012) found that individual rewards were more effective in promoting collective conservation of agrobiodiversity than collective rewards, and that collective payments crowded out social forces in favor of conservation. Vollan (2008), in field experiments in South Africa and Namibia found that monetary incentives appeared to work better for groups that were already cooperative than with groups that were not; he also found some evidence of cash incentives crowding out social motivations. And Kerr et al. (2012) found in field experiments in Mexico and Tanzania that individual cash payments helped raise participation in communal tasks where people were otherwise uninterested, but that participation in communal tasks could be high irrespective of the incentive if social norms favoring participation were already present. They also found that cash payments were associated with a reduced sense of satisfaction with work performed on behalf of the community in comparison with work that had been done without compensation.

Ostrom (2009) proposed a general framework for analyzing sustainability of social-ecological systems, but this model does not give clear signals about how groups would react to cash incentives. Some pertinent insights are that: 1) groups with stronger social capital will have stronger trust in each other and thus face lower costs in reaching agreements and monitoring each other; 2) a group of users will more likely self-organize to protect a natural resource when it is very

important to their livelihoods and they attach high value to its sustainability; and 3) groups with autonomy at the collective choice level to develop their own rules to manage the resource will face lower costs in doing so.

Dietz et al. (2003) further addressed the importance of groups being able to develop their own management rules and concluded that local rules for successful commons management must evolve over time. Meinzen-Dick (2007) argued that resource users must engage in a learning process and gradually develop trust among themselves and with government. Under PES, however, outsiders are the source of demand for conservation rather than insiders, and there may not be time to gradually build institutional arrangements. Local users will experience demand for conservation in the form of an offer of payment. Given that social capital and trust are essential for collective action (Ostrom 2009) and that building trust and establishing mutually acceptable rules can happen only gradually, a sudden influx of funds to a community through a PES initiative risks preventing the opportunity for this gradual institutional development process to take place.

Findings by Clements et al. (2010) support this point. They found in PES initiatives in Cambodia that incentive-based systems that required local communities to gradually build their own governance institutions had greater long-term effectiveness in promoting collective natural resource management than simpler and more direct individual cash payments for individual actions that did not require an institution-building process. Initially the individual payments with no emphasis on institution building had greater conservation impact, but over time this approach became less effective because it had no basis for support in local institutions. Meanwhile, the approach that relied on local institutions was ineffective at first but gradually strengthened and appears to have stronger long-term prospects.

Jones and Murphree (2004) made similar arguments in the context of community-based wildlife management programs in southern Africa. In these programs local communities are given the rights over the financial benefits from safari hunting licenses, and in some cases they have the rights to manage local wildlife resources, including to decide how many hunting licenses to sell (based on training to understand what rate of hunting is sustainable). The most successful cases demonstrate strong success in reducing poaching and in developing local governance capacity, but there are also many failures. Among the lessons that Jones and Murphree drew are that collective action must be allowed to emerge gradually and cannot be imposed. Child and Clayton (2004) demonstrated that program design can support this process: in Zambia, a new law enforcing transparency in revenue management from community-based wildlife management had a strong impact on local institutional development. When revenue became public knowledge, local people demanded responsible management of that revenue and they took a stronger interest in protecting local wildlife.

With this in mind, we propose that developing successful group-based PES requires understanding the conditions under which a payment or reward stimulates collective action for conservation as opposed to bringing perverse outcomes. For

groups already cooperating for the purpose of making money as a business, it stands to reason that an attractive financial offer will stimulate additional work. On the other hand, where groups are newly formed or have little or no tradition of collective natural resource management, a PES initiative may generate a conflict with the need to build cooperation gradually. Often government or donor programs have tried to introduce the institutional arrangements known to be important in cases of long-standing successful commons management. Kerr (2002), in a study of 87 watershed projects in India, found that few were able to promote successful collective action to manage common pastures by introducing institutional arrangements based on the commons literature. Meinzen-Dick (2007) found the same in the context of canal irrigation.

Farrington and Lobo (1997) attributed success in the Indo-German Watershed Project in India partly to its insistence on undertaking community building for the first 18 months prior to any financial disbursements. The World Bank took notice and pursues a similar approach with its shift to the Community Driven Development project approach. As of 2009 it had funded about 500 such projects in 93 countries, delaying financial disbursements until after communities had organized themselves and shown they can work collectively (personal communication, Melissa Williams, World Bank, October 2009).

4. Payment types and collective action

By nature group-based PES lends itself to collective agreements and collective payment. As mentioned above, Narloch et al. (2012) found in Peru that experimental subjects preferred individual payments to collective payments as a means to reduce freeriding, but high transaction costs make it unlikely that those paying for environmental services would make separate arrangements with individual group members. The desire to reduce such transaction costs is part of the rationale for a group-based PES in the first place.

In its original conception PES involved monetary payments and most literature on PES focuses on cash payments. More recently, the literature acknowledges that most cases in practice do not really follow the theoretical model. Muradian et al. (2010) and Van Noordwijk and Leimona (2010) pointed out that many PES-like initiatives are moving away from cash payments.

The effect of payment type on collective action in a group-based PES initiative depends greatly on the group in question. Payment or reward types that most simplify the trust-building process must balance the need to distribute benefits very widely with the need to discourage freeriding. A payment type that undermines collective action may put the environmental service at risk. A payment or reward that is not subtractable (non-rival), such that no one's benefit is diminished by others benefiting as well, has limited basis for the group to compete over it and this can be supportive of building collective action. Whether the benefits of a payment or reward are excludable or non-excludable has ambiguous implications for collective action. For benefits to be widely distributed, ideally the reward is in demand by all

group members and non-excludable among them, such that no one can be kept from sharing the benefit. On the other hand, non-excludable benefits could bring problems of freeriding since receipt of the benefit becomes independent of effort level.

4.1. Cash payments and collective action

Cash payments have different implications for promoting collective action depending on the group. For well-established groups that exist for the purpose of earning money, cash is the form of payment they are accustomed to. Because cash payments are excludable, they can discourage freeriding within the group. On the other hand, for a group that struggles to cooperate and is rife with suspicion and mistrust, a cash payment to the group could pose problems. For such groups, investing in good working relationships and taking steps to maintain trust and avoid suspicion is paramount, but cash payments could interfere with this process. An unscrupulous leader in a weak institutional setting could usurp a cash payment at the expense of other group members, but possibly just as damaging, other group members could suspect even an honest leader of misappropriating funds. It is well known from national-level analysis that sudden injections of cash from mineral and foreign aid can disrupt institutional development and fuel corruption (Harford and Klein 2005; Auer 2007), but the effects of cash injections on local institutional development has received relatively little attention in the literature. Child and Clayton (2004) document the important role that ensuring financial transparency can play in making cash payments contribute to rather than detract from the institutional development of a group that receives those payments, but the extent to which that can be achieved will vary by case.

Financial incentives also can have undesirable effects for existing groups that undertake collective action on the basis of social norms. Fehr and Falk (2002) and Vatn (2009) document cases in which cash incentives crowd out the sources of motivation that previously drove groups to act collectively, with a net negative effect on cooperation.

Kerr's (2010) survey in ten ejidos (communal land management groups) participating in the Payment for Hydrologic Environmental Services (PSAH) program in Puebla, Mexico, illustrates the way in which the implications of cash payments for collective action depends on the institutional capacity of the group. The ten ejidos varied greatly in their history of collective action to manage forests. Several were located in the foothills of the Iztaccíhuatl and Popocatépetl volcanoes (known as Izta-Popo), where from 1947 to 1991 the San Rafael paper mill held a concession and ejidos had no management rights to their forests. As a result they did not develop forest management capacity (Raufflet 2003). Two other ejidos, in the municipality of Chignahuapan, had a strong tradition of community forest management for timber production dating back to the 1970s (Bray and Merino-Pérez 2002). The Chignahuapan ejidatarios (ejido members) are required to devote substantial unpaid labor to patrol the forest to protect against fire and theft, with sawmill proceeds distributed among them.

In most ejidos, payments from PSAH are used for wages for people who patrol the forest. In some cases the work is distributed widely, and in others just a few people work, which makes sense if some people need employment more than others. In the Chignahuapan ejidos, cash payments simply raise the annual income that each ejido member receives from forestry operations. They do not appear to change their operations or the unpaid labor requirement (making it seem unlikely that PSAH would reduce deforestation).

In the Izta-Popo ejidos, many respondents expressed concerns that raised questions about collective action. People frequently complained that they did not know how program funds were being used and that they did not trust their leaders. In such a situation, the very presence of a monetary reward can aggravate discord. Across the survey, only 43% of active ejido members reported having received benefits under the program or knowing someone who had, and only 26% reported that they could trust their leaders to work for the welfare of their constituents as opposed to for their personal welfare. Several interviewees directly accused their leaders of using program benefits fraudulently.

One certainty is that with cash payments there is scope for some people to capture the payment at the expense of others. Situations in which people distrust their leaders and are uncertain about how benefits are distributed are ripe for suspicion, which in turn is unfavorable for collective action. In the Chignahuapan ejidos this is less problematic because the payment fits into an established business arrangement that people are accustomed to.

Field experiments conducted in five of the villages surveyed appear to corroborate these arguments. On the whole, participation in a communal task in the village was highest where an individual payment was offered in exchange for participation and lowest when payment was offered through the village leadership. Participation in exchange for payment to the village leadership was high only in one of the five villages, where trust in local leadership was particularly high compared to the others (Kerr et al. 2012).

4.2. Alternative payment types and collective action

The possibility of perverse outcomes of cash incentives, both in terms of interfering with institution building and crowding out motivation, suggests that payment types that establish favorable conditions for collective action are preferred, other things equal. Other forms of payment besides cash are possible and conceptually we can think of almost any in-kind reward. Some non-cash rewards found in PES-type projects are secure land tenure for local inhabitants and development benefits in the form of infrastructure, employment, services, or a bonus applied to a local development budget.

4.2.1. Conditional land tenure as a form of payment

In exchange for providing environmental services, a number of PES initiatives offer conditional land tenure security as a reward to people who use the land

without legal rights (Pender et al. 2007; Van Noordwijk and Leimona 2010). Conditional land tenure security as a form of reward can promote collective action if it is designed so that either all community members benefit from secure tenure or no one does. For example, if community rights are recognized in exchange for protecting natural resources, all community members will benefit. On the other hand, a carelessly organized arrangement to offer tenure rights in exchange for conservation could lead some people to position themselves to gain formal rights over land to which someone else previously held a customary right. In other words, like cash, land rights can trigger selfish behavior and mistrust.

The *Hutan Kamasyarakatan* (HKm) Social Forestry Program, Sumberjaya, Indonesia (Pender et al. 2007; Van Noordwijk and Leimona 2010), demonstrates a way in which using land rights as a type of reward for environmental services can protect against the type of distrust that can arise with cash payments. In this program, groups of contiguous individual farmers cultivating land illegally in government forests were encouraged to organize into groups that could apply for permission to remain on the land in exchange for managing it in a way that protected the watershed. Groups initially applied for a five-year probationary contract, extendable to 25–35 years if they met their obligations. An advantage of the HKm arrangement for promoting collective action is that the entire HKm group is allowed to remain on the land if it manages it in accordance with the environmental service agreement, and if not then the entire group is required to leave. This means that it is impossible for one group member to benefit without others benefitting as well. As long as all farmers agree to the terms of the program, they all share the same incentive. The nature of the reward – individual tenure security offered to an entire group – makes it impossible for any beneficiary to grab the reward belonging to another beneficiary as long as customary tenure systems have been established and are enforced. HKm leaders expressed confidence that they could thwart any attempts at freeriding.

As in the Mexican case discussed above, many participants were unaware of the program. This ranged from 21% of members in groups with active HKm contracts to 55% in groups that have applied for HKm and are awaiting contracts. There is the risk that people unfamiliar with the program will not adhere to land use requirements and thus fail to provide the environmental service. However, in interviews group leaders stated that they are able to ensure that people adhere to land use requirements even if they don't completely understand the program. They have a strong incentive to ensure that everyone complies, because their share of the reward – i.e. their continued occupation of the government forestland – is contingent on the performance of the group as a whole. This would likely be true in a PES initiative that used cash payment, such as the PSAH in Mexico, but an important distinction in Sumberjaya is that all members are assured of sharing the reward for providing the environmental service, even if they are unaware of the program. There is no real possibility of group leaders embezzling rewards meant for others. Such an approach has favorable properties for promoting collective action in a situation characterized by potential mistrust, since no one has reason to suspect that others are hijacking the program benefits.

4.2.2. Development benefits as a form of payment

Used as a form of reward for providing an environmental service, development benefits like infrastructure or either group- or individual services have ambiguous implications for promoting collective action within groups. Durable infrastructure such as roads or water tanks may be non-exclusive in many cases, so that everyone can benefit. However, in cases characterized by divisions on the basis of race, ethnicity, religion or caste, powerful group members could exclude others from using infrastructure intended for everyone's use, or they could ensure that the infrastructure in question is something of particular interest to them but possibly not others. Group-based development services, such as a teacher's or doctor's salary, would have similar qualities. Individually targeted development services such as extension support, food, or employment are more subject to capture by certain community members who would exclude others.

Clearly there is no particular form of incentive that can ensure collective action. The Conservation Stewards Program or CSP (Conservation International 2007) combines different types of cash- and non-cash rewards that appeal to different community members, with the intention that a mixture of payment types may be effective to promote collective action.

With 57 current projects in 18 countries covering millions of hectares and tens of thousands of people, CSP relies on intensive community organizing to identify people with different, possibly conflicting interests in natural resource use in order to anticipate and address potential obstacles to collective action. As with the World Bank's community-driven development projects described above, this approach is time-intensive, with a long planning period pre-dating any project activities during which CSP assesses the local institutional capacity and negotiates an arrangement that is agreeable to all. Clements et al. (2010), without discussing payment types per se, showed that a scheme that distributes benefits more widely will be more effective in promoting collective management. They also favor forms of benefits that contribute to building institutions for collective action, as do Garcia-Amado et al. (2013).

5. Payment types and conditionality

To fit into a PES framework, alternative payment types must facilitate conditionality, which is the defining feature of PES. Strictly defined, PES calls for strict conditionality, meaning that payment to a land manager is contingent on evidence that that manager's land use has delivered an environmental service, or that the land manager has pursued land use practices believed to provide the environmental service. Muradian et al. (2010) propose a framework that acknowledges that the directness of the relationship between payment and environmental service delivery is actually quite variable, and Van Noordwijk and Leimona (2010) offer a framework distinguishing among different levels of conditionality: 1) actual delivery of an environmental service, 2) maintenance of ecosystems in a desirable state, 3) performance of agreed actions to enhance

environmental services, and 4) development and implementation of management plans to enhance environmental services. In practice, non-cash payments tend to be associated with less strict conditionality as illustrated below.

5.1. Cash payments and conditionality

Cash is well suited to conditionality: land managers receive payment if they comply with the agreement; otherwise payment is withheld. It is easy to understand this condition, and delivering cash payments has low transaction costs. If payment is scheduled on regular intervals it can be discontinued for non-compliance. In a group setting, conceivably it can be distributed commensurate with effort or opportunity cost. Often in commons management, neither the benefits of management nor the costs of contributing to it are easily divisible, so the extent to which this is feasible depends on the case.

5.2. Land tenure security and conditionality

In principle, conditional land tenure security can be consistent with conditionality if eviction is a credible threat. On the other hand, if land users' occupation of the land in question becomes the status quo and eviction becomes politically unrealistic, conditionality will be lost. The use of tenure security as an incentive for providing environmental services in the HKm program in Sumberjaya, Indonesia, faces several challenges. If eviction is the only available penalty for people who do not abide by the agreement, one challenge is the absence of graduated sanctions (Ostrom 1990) whereby initial transgressions could be penalized lightly and repeated offenses punished with increasing severity. Graduated sanctions help ensure that punishment is commensurate with the offense, threats are credible, and participants in natural resource management can learn from mistakes while also developing respect for rules.

When the HKm program began there was no penalty for non-compliance apart from eviction. In 2005 the local district government initiated a scoring system for assessing compliance with HKm agreements (Kerr et al. 2006). The scoring system incorporates institutional criteria (development of the group to manage the permit area), conservation performance (rehabilitation of barren areas and conservation practices in coffee gardens), and overall impact as measured by various social, economic, and ecological indicators. An assessment team scores each HKm area to determine whether the HKm permit is 1) revoked, 2) extended for one year and then re-evaluated, 3) extended for five years and then re-evaluated, or 4) extended for 25 years (subsequently extended to 35 years).

In a 2005 community survey, respondents in Sumberjaya revealed a keen desire for secure land tenure, an appreciation of the idea that they could achieve this by adhering to environmental services agreements, and a fear of being evicted if they did not (Kerr et al. 2006). Given a recent history of eviction and people's strong sense of tenure insecurity, the threat of eviction appeared to be sufficient to generate adherence to the agreements.

The desire to first obtain an initial HKm agreement and second obtain a 25-year extension beyond the initial five-year probationary period is a strong incentive for good behavior. Once long-term extensions are granted, it is difficult to know whether the threat of eviction will carry as much weight, especially if political conditions continue to evolve such that the threat of evicting people from land they have cultivated for many years becomes politically untenable. On the other hand, once groups have planted multi-strata agroforestry systems and invested in soil and water conservation measures, the need for enforcement effort is likely to decline. But the need for continued enforcement of protection of the remaining forest likely will remain a concern.

Pender et al. (2007) found evidence of increased tree planting and investment in terraces and sediment pits on plots covered under HKm than those not participating in the program. These investments were highest on lands previously subject to eviction, suggesting a greater concern by their occupants about the importance of complying with the agreement. Although detailed measurements of land management changes have not been conducted since 2005, Forest Department officials have continued to monitor compliance with the HKm agreement. On the basis of the strong land management performance by the HKm groups in Sumberjaya, in 2006 18 new groups were granted 5-year permits to join the five that were already in place since 2004. In early 2014, 20 of these groups had their permit extended from 5 years to 35 years, and the remaining three groups are applying for a 35-year extension.

5.3. Other non-cash benefits and conditionality

To be consistent with conditionality, the use of in-kind development benefits as a form of payment would require delivering them with the threat of removal if the environmental service is not provided. If government managed such an arrangement questions might arise regarding why those benefits should be conditional on environmental service delivery (Sommerville et al. 2010). There may be other cases where development benefits fit better into a PES setting, for example by offering additional employment benefits with an explicit link to natural resource protection, or by offering a bonus to an existing development budget.

Development assistance in the form of durable infrastructure faces the obvious concern that it cannot necessarily be withdrawn in the event of non-compliance. Payment in the form of an expensive infrastructure investment, equivalent in value to many years of the environmental service, would constitute full payment in advance without leverage to ensure service delivery. In contrast, a piece of infrastructure commensurate in value with the annual value of the environmental service could have similar implications for conditionality as a cash payment.

CSP's approach of combining multiple reward types in a single program (Conservation International 2007) can be a way to reconcile non-cash benefits with conditionality. Reward types include all those introduced above, including cash, durable infrastructure or equipment, land tenure security, and development

services such as educational scholarships, funds for teachers' salaries, and technical assistance. To make these approaches consistent with conditionality, CSP uses many forms of payment or reward together in a single program, with graduated sanctions in the event of threats to compliance. In particular, in the event of failure to meet the terms of an agreement, the program would take away a form of payment that is easy to withdraw, whereas others such as a schoolteacher's salary would not be removed unless the program failed completely (Milne and Niesten 2009).

6. Payment types, conditionality, and non-economic sources of motivation

Bromley (2008) critiqued PES as taking too simple a view of the reasons people degrade natural resources and the likelihood that cash payments can deliver environmental services. He argued that successful efforts to protect valuable natural resources will more likely come from thick and durable collaborative arrangements than from getting the price of conservation right. To the extent that such a durable arrangement involves building a norm of cooperation, it may require appealing to people's non-economic sources of motivation and this may not be consistent with a focus on cash payments and strict conditionality.

Cardenas et al. (2000) found in experiments conducted in Colombian villages that external policing of common property forests undermined people's willingness to participate in their own self-policing management arrangements. Van Noordwijk and Leimona (2010) argued that their fourth level of conditionality, development and implementation of management plans to enhance environmental services, is associated with greater respect for local autonomy and that it can appeal to social as well as financial sources of motivation, compared to strict conditionality with a stronger element of external control.

The HKm program in Sumberjaya, Indonesia, has a potentially powerful effect on intrinsic motivation due to the official recognition it gives to people of their land rights. In Sumberjaya, many people have been cultivating what is now classified as government forestland for decades, well before the government declared those lands off-limits and criminalized people's established livelihood strategies. Kerr et al. (2006) found that HKm participants became very emotional when discussing their situation, expressing great satisfaction with the program for recognizing them as full citizens rather than outlaws as under the previous policy. HKm had brought them into the mainstream of society, no longer outlaws but instead partners with the government to manage previously deforested land in a sustainable manner and protect remaining natural forests.

Supporting non-economic motivation to protect natural resources may be particularly important for governments, international organizations and private non-profit organizations considering PES because public funding may not always be available even if the public still values the environmental service. In this case, an environmental management strategy not overly dependent on PES is sensible. One that helps build non-economic motivation to protect natural resources is

even better, and one that avoids undermining such non-economic motivation is essential. Unfortunately, in the context of natural resource management, there remains limited theoretical understanding of exactly how people's non-economic motivations operate and how they interact with extrinsic motivational sources like money and coercion, so additional work is needed in this regard.

7. Discussion and conclusion

PES programs operating on collectively managed land face special challenges because the relationship between conditionality and compliance is more complex than on individually managed land. Accordingly, new questions arise as PES spreads to commons contexts and collective action becomes a prerequisite for successful conservation. Are the same incentive types that facilitate conditionality also conducive to collective action? If alternative approaches would better promote collective action, would they also facilitate conditionality? Existing literature offers insights about why this issue is worthy of concern but to date it has not addressed it directly, as this paper has attempted to do.

Our overall conclusions are as follows. First, conditionality and collective action are not necessarily mutually supportive – they are not necessarily achieved through the same means. This is clear from several of the cases described in this paper. It implies that project managers cannot assume that collective action and institution building will take place just because sufficient payments have been offered with clear measures to enforce conditionality. This may or may not lead to perverse outcomes; in the case of Mexico's PSAH program, it merely means a continuation of weak institutional arrangements. As shown by Clements et al. (2010) in Cambodia, conditional payments may produce good individual outcomes but sub-optimal group performance over time if they do not contribute to the process of building stronger management institutions. In Sumberjaya, Indonesia, meanwhile, an approach favorable to building collective action but with weaker conditionality properties also led to strong performance (Pender et al. 2007).

Second, in the absence of some threshold level of local institutional development, external rewards can create challenges regarding how to share the new effort and reward system. In contrast, some of the cases in the literature cited in this paper show that when some form of local institutional strength exists and people trust their leaders, external rewards can work well to yield both collective action and good conservation outcomes. Child and Clayton (2004) demonstrate that a careful effort to require transparent revenue management can play a critical role in supporting the process of local institutional development that can yield these favorable outcomes.

Finally, if cash can create perverse outcomes, in-kind rewards can work well, particularly when they are non-excludable, but this in turn creates its own challenges of how to achieve conditionality and how to prevent freeriding. In that case, the work of the Conservation Stewards Program (Conservation International 2007; Milne and Niesten 2009) provides some possible options whereby strictly

conditional benefits for individual members of the group can be combined with less conditional rewards for the entire group.

Combined, these findings support the approaches presented by Clements et al. (2010), Conservation International (2007), Milne and Niesten (2009), and Van Noordwijk and Leimona (2010) that use a combination of direct and indirect, cash and non-cash reward types that encourage institution building, support conditionality and discourage freeriding. Given possible tradeoffs between imposing conditionality and encouraging collective action, these approaches clearly put a premium on institution-building to promote collective action while imposing only weaker forms of conditionality, although they do not abandon conditionality. Van Noordwijk and Leimona (2010) point out that this approach is founded on strong mutual respect and appeals to social as well as financial sources of motivation while building stronger local natural resource management capacity. Such an approach is essential as PES moves increasingly into the realm of collective conservation.

These findings have important implications for REDD+, which is likely to be the most important arena for collective PES going forward. For national governments that anticipate earning REDD+ revenue by protecting forests that local community groups control, institution-building well in advance to strengthen the capacity for collective action by those communities is essential. This is even more pertinent where a forest area has been prone to mismanagement due to absence of collective action. In such cases imposition of conditionality alone will not lead to collective action. Instead, implementing agencies will need to invest in institution-building before introducing conditional payments for forest conservation. As Clements et al. (2010) show, conditional payments without any emphasis on institution-building may produce short term conservation outcomes but will be less effective in the long run.

However, we also anticipate REDD+ being implemented in areas where forests are already well managed through collective norms among local communities. In such a scenario, the local context will guide whether or not the existing institutional arrangements are easily transferable to new governance structures required under REDD+. The paradox that may confront implementing agencies is that where genuine collective action exists, the underlying resource may be in such good health that hardly any additionality is to be gained through a PES kind of arrangement. The framework of Van Noordwijk and Leimona (2010) can help resolve this dilemma. Instead of defining conditionality only on the basis of the actual delivery of the environmental service (carbon sequestration), conditionality can be seen in terms of maintenance of the forest ecosystem in a desirable state, and development of management plans to further enhance carbon sequestration services. In general, if strong mutual respect is to be a guiding principle, a national government must direct REDD+ revenue to the inhabitants of forest areas that generate it even if there are concerns about the effects of cash payments on collective action. Requiring transparent revenue management as per Child and Clayton (2004) is essential, and it can be coupled with mixed payment approaches that balance the need for conditionality with the need to promote collective action.

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