Payment for Agrobiodiversity Conservation Services and Implications for Institutions of Collective Action

Summary

We examine the potential of external reward mechanisms, such as payments for ecosystem services (PES), to increase conservation levels as well as the degree to which alternative approaches (such as individual versus collective payments) interact with the social norms that underlie collective action associated with the management of plant genetic resources (PGR).

The analyses draw on field experiments from the two study sites in Andean Altiplano, subsistence-based farming communities from the Northern Altiplano in Peru and communities with more commercialized farming systems from the Southern Altiplano in Bolivia. This allows us to account for different market contexts.

Findings indicate that we cannot generally assume that external reward mechanisms would unequivocally provide resource users with the incentives to increase their conservation efforts. Different reward systems influence different types of resource users in different and complex ways, and thus may differ in their effectiveness depending on the market context.

Conceptual Background

The conservation of ecosystem services (including those related to agrobiodiversity conservation) is subject to a public goods problem, whereby private/individual and social interests diverge. The on-farm conservation of a diverse portfolio of crop varieties can be associated with local, national and global public benefits. Local public benefits include contributions to agroecosystem resilience, the maintenance of evolutionary processes, traditional knowledge and culture, and future option values which accrue to all farmers within a community. Markets, however, tend to largely favor only those varieties with commercial traits. Under such circumstances, farmers have an incentive to cultivate commercial varieties only, so as to maximize private/individual benefits, while benefiting for free (i.e. free-riding) from those who continue to cultivate a diversity of varieties (including traditional ones) which generate public benefits.

There is also evidence that resource users, farmers included, can cooperate to a certain extent to overcome social dilemmas related to the overexploitation of common resources and the provision of public goods. External reward mechanisms, such as PES, may provide resource users with an incentive to conserve that which benefits wider society, and thus have been praised as an effective instrument to facilitate conservation. Yet in many rural communities collective action towards conservation is based on "intrinsic" motivations leading to pro-social behavior.

This is because individuals are normally driven not only by self-interest but by social norms, as for example altruism, reciprocity and fairness. These norms are determined by social preferences, such as conditional as well as unconditional cooperativeness or inequity aversion, thereby affecting collective action strategies towards conservation. As social preferences are endogenously shaped, conservation behavior depends on socio-economic, cultural as well as institutional factors.

In such contexts there is a concern that external regulatory mechanisms, such as PES, may crowd-out existing pro-social behavior thus hampering existing conservation efforts. The degree to which such crowding-out may occur is likely to depend on resource user-specific social preferences and their interactions with external rewards. More specifically, it may be hypothesized that increasing economic incentives for the conservation of public ecosystem services through individual rewards may erode existing pro-social norms. On the other hand, the use of collective rewards in the form of group-level payments may actually complement such norms.

The responses to such incentive mechanisms, however, may vary significantly from community to community depending on the social norms that are prevalent. Evidence exists that

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Research Findings (Bolivia/Peru 2)

suggests that although regulatory interventions can complement existing community efforts, under certain circumstances they can be ineffective or even reduce levels of conservation. In particular, it appears that external incentives might be beneficial where self-regulating mechanisms are weak or unstable, but might be ineffective or even harmful where pro-social norms and rules are strong and robust. Therefore, it is important to account for social preferences in the context of the implementation of policy interventions such as PES, including under different market and group contexts, in order to better support the design of such reward mechanisms; and with a view to facilitating their ability to build upon rather than undermine existing patterns of collective action.

One such approach to understanding social preferences is through the application of framed experiments in the field. Such experiments can shed light on the behavioral dynamics of the resource users in question when confronting different pay-off situations subject to their group contexts. However, to-date, there has only been limited application of field experimental research regarding the provision of public goods in poor farming communities and the impact of PES-like reward mechanisms. Furthermore, we are unaware of any applications in the context of crop genetic resource diversity.

Experimental game set-up

It is in this context that a public goods game was framed around decisions related to the allocation of land for the cultivation of different quinoa varieties. Each game participant formed part of a group of 4 players and is allocated a number of land units. To control for heterogeneity in land endowments, we organized uniform groups (4 land units each), as well as heterogeneous groups (2 participants with 2 land units each and 2 participants with 6 land units each). Over 12 rounds participants decide on how many land units to allocate to the conservation of a threatened traditional variety. As market prices for this variety are lower than for a commercial variety, the farmer incurs private conservation costs. Yet, the cultivation of the traditional variety is associated with public conservation benefits that accrue to every community once a certain threshold is reached (in this case a group total of 7 land units). 6 rounds of a baseline game were played, before introducing economic incentives for conservation and playing six additional rounds with either individual rewards that decrease the private costs of conservation or collective rewards that increase the benefits of conservation for the public good.

The social optimum, i.e. where the group's total benefits would be maximized, is reached when all the group members allocate all their land units towards conservation. However, a social dilemma arises from the participants' private incentive not to cultivate a traditional variety and instead to free-ride on the conservation activities of others; alternatively participants may choose to allocate a certain number of land units to the traditional variety in order ensure the threshold can be reached, given the expectation that other group members will also allocate some land in this way. With external rewards, the set of optimal private strategies would include the conservation of more land units depending on the expectations of the behavior of others, but there is no dominant strategy that would allow the social optimum to always be reached.

Between February and April 2010 we organized four sessions in the Southern Altiplano of Bolivia and four more in the Northern Altiplano of Peru. Half of these sessions were played with individual and the other half with collective rewards. Each session was organized with 20 participants coming from quinoa-based farm households in the same or (neighbouring) communities, which were selected from different zones within the two study sites.

Participating farmers were randomly arranged in three 'uniform' and two 'heterogeneous' groups of four participants each. Famers were not aware of who else was in their group. However, after each round the participants were informed about the individual land allocations of their (anonymous) group peers and the overall pay-off. This permits that group members may form expectations of the behaviour of their group members in future rounds.

In order to provide an incentive to behave in a realistic manner, two winning rounds were randomly drawn – one from the baseline games and one from the rewards game, and participants were remunerated with real money for the points earned in these rounds. Including a fixed participation payment, an average of US$ 7 was paid to the farmers, which is approximately equivalent to the daily wage in both the study regions.

Findings:

(1) Farmers in the Bolivian communities have more commercialized quinoa production systems and allocate a smaller share of their land to the conservation of non-commercial varieties. They rely less on patterns of collective action, and on average conserve fewer land units in the agrobiodiversity conservation game when compared to the Peruvian participants.

(2) In the Peruvian site less wealthy farmers (either in terms of real landholdings or of hypothetical land units assigned in the game) contribute less to conservation. This is, possibly due to an aversion to inequality as well as safety-first behavior (i.e. they first seek to secure individual benefits before investing in group projects to secure local public good benefits). Heterogeneous groups conserve less than their uniform counterparts.

(3) In both sites farmers are unconditionally cooperative, that is they conserve some share of their land units in the initial round without having learnt about the extent to which their anonymous group members are willing to cooperate. This behavior is likely to be driven by a combination of positive expectations due to trust in the cooperativeness of others as well as altruism. Expectations of course evolve as the game proceeds.

(4) In both sites initial conservation levels to a large extent determine conservation in subsequent rounds, so that it seems that altruism plays a key role in ensuring collective action. There are no differences in the relevance of this pro-social norm across the two sites.

(5) In both sites conservation levels oscillate around the threshold, so that the threshold seems to have a stabilizing effect on conservation levels.

(6) In the Bolivian site, free-riding behavior seems to undermine conservation levels in the baseline rounds. For both sites a similar number of participants behave like free-riders (between 33% and 40%).

(7) In the Peruvian site there are more participants who follow reciprocity-based behaviour (36%) than in the Bolivian site (19%). This would seem to indicate that pro-social behaviour seems to be reduced in commercialized farming contexts. This concurs with findings that conditional cooperativeness decreases with the degree of individual-level commercialization (measured by the amount of quinoa sold at markets) within the two sites.

(8) In both sites conservation levels increase significantly under individual rewards (in both uniform and heterogeneous groups), but collective rewards seem only to have a conservation facilitating effect in heterogeneous groups from the Peruvian site. However, this finding may partially indicate that the collective reward levels used in the game were insufficient to promote increased levels of conservation.

(9) In the Peruvian site, the benefits accrued from group level conservation through collective rewards may actually enhance incentives for collective action.

(10) In the Peruvian site collective rewards may, however, crowd-out reciprocity-based norms, as they trigger free-riding behavior. Possibly some farmers would expect increased collective action of other group members under the collective rewards and thus assume that public benefits would be generated without their contribution.

(11) In The Bolivian site there is some evidence of a guilt-relief effect associated with individual rewards. Due to the increase in individual level pay-offs from conservation, farmers feel less obliged to contribute to conservation. This seems to be mostly relevant in groups operating above thresholds for the generation of collective benefits.

(12) In the Bolivian site individual rewards seem to provide an additional incentive for conservation to those farmers who are driven by altruism, thereby complementing this pro-social norm.

(13) In both sites individual rewards appear to be potential means a reverse anti-social dynamics. In contexts where cooperation is very fragile due to the presence of free-riders, increased individual-level incentives may have a stabilizing effect due to motivating people to stick to pro-social norms. This would increase trust in the cooperation of others and thereby facilitate pro-social dynamics.

Conclusions

Findings indicate that we cannot generally assume that external reward mechanisms would unequivocally provide resource users with the incentives to increase their conservation efforts. Different reward systems influence different types of resource users in different and complex ways, and thus may differ in their effectiveness depending on the market context.

For instance, collective rewards in the Bolivian site are found not to result in any behavior change at all and are thus ineffective (although this finding may also be related to the level of reward offered). In the Peruvian site, collective rewards may have a positive effect on conservation through the provision of benefits through collective conservation efforts, but at the same time provoke free-riding for some farmers. This brings forward concerns about the crowding-out effect of such rewards systems in communities where pro-social norms are still strong. The potential overall impact on the conservation behaviour of different types of farmer within the community thus needs to be carefully considered.

In the Altiplano individual rewards seem to unleash pro-social dynamics. In the Bolivian site they seem to provide altruistic farmers with an incentive to increase conservation. And even more importantly, in both study sites these rewards appear to be a potential means to stabilize pro-social behavior, so that our findings suggest that individual rewards may effectively increase conservation levels due to reversing anti-social dynamics.

These findings highlight the importance of a careful assessment of existing social preferences that are of relevance for the success of formal institutions brought from outside the community. With the growing implementation of PES schemes in the field, there is an urgent need for study site-specific research, including through the use of field experiments, in order to widen the understanding of the ways external rewards systems may affect existing resource management practices given various market and group contexts. This is also highly important in the context of enabling policymakers to design payments for agrobiodiversity conservation services schemes in a way they can draw upon, support and complement existing patterns of collective action.

For further information and full citations see:

- *Narloch, U., Pascual, U. and Drucker, A.G. 2011. Do external rewards crowd out collective action? Experimental evidence from the Andes. University of Cambridge, Department of Land Economy. (Mimeo).*
- *Narloch, U., Pascual, U. and Drucker A.G. 2010. Pro-social behaviour under external rewards: Experimental evidence from farming communities in Peru and Bolivia. 11th Biennial Conference, International Society for Ecological Economics, 22-25 August Oldenburg and Bremen, Germany.*

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