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## Increasing the impact of collective incentives in payments for ecosystem services

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### ABSTRACT

Collective payments for ecosystem services (PES) programs make payments to groups, conditional on specified aggregate land-management outcomes. Such collective contracting may be well suited to settings with communal land tenure or decision-making. Given that collective contracting does not require costly individual-level information on outcomes, it may also facilitate conditioning on additionality (i.e., conditioning payments upon clearly improved outcomes relative to baseline). Yet collective contracting often suffers from free-riding, which undermines group outcomes and may be exacerbated or ameliorated by PES designs. We study impacts of conditioning on additionality within a number of collective PES designs. We use a framed field-laboratory experiment with participants from a new PES program in Mexico. Because social interactions are critical within collective processes, we assess the impacts from conditioning on additionality given: (1) group participation in contract design, and (2) a group coordination mechanism. Conditioning on above-baseline outcomes raised contributions, particularly among initially lower contributors. Group participation in contract design increased impact, as did the coordination mechanism.

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### Introduction

Payments for ecosystem services (PES) programs offer contracts in which landholders are paid for specified environmental actions or outcomes. Recent decades have seen rapid growth in PES programs (Ferraro, 2011; Porras et al., 2008). In many lower-income settings, PES programs have become a preferred policy approach due to their potential to better balance conservation and livelihood outcomes relative to other types of conservation policies (Ferraro and Kiss, 2002; Leimona, 2009; Pagiola et al., 2005; Sims and Alix-Garcia, 2017; Wunder, 2007).

PES programs typically make payments to individuals for actions undertaken on land managed at an individual or household level (Kerr et al., 2014; Porras et al., 2008). Individuals can weigh the private costs of the actions required relative to the payment offered and thus make a rational participation decision<sup>2</sup> (Ferraro and Kiss, 2002). This approach is well

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<sup>2</sup> This is not the only model of PES, but it is a commonly expressed ideal (Wunder, 2007). Other models use rewards and social recognition to motivate a change in environmental attitudes, rather than market-based compensation to outweigh land use opportunity cost (Muradian et al., 2010).

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suitable to contexts with individually tenured land rights. However, the global preponderance of communally titled land, particularly forestlands, means that PES programs are increasingly being implemented at a collective level<sup>3</sup> (Hayes et al., 2017; Kerr et al., 2014). Collective PES involves contracts negotiated with groups of neighboring landholders, or with communities that hold land and resources under common title. Responsibility for contract fulfillment is collectivized, as is the distribution of rewards.

In addition to more appropriately matching common land tenure arrangements, this approach has other potential benefits. Group contracts can reduce transaction costs by replacing small individual contracts with fewer larger contracts (Kerr et al., 2014). They can better account for spatial interaction in the generation of ecosystem services, for example, by preserving contiguous areas of habitat to match the needs of wildlife (Swallow and Meinzen-Dick, 2009). Group contracts may also help solve information problems: at larger scales it is easier to determine both baseline outcomes and program outcomes, making it possible to write contracts that are “additional” (i.e., achieve clearly improved outcomes relative to baseline conditions).<sup>4</sup>

Research on PES to date has largely focused on individually targeted programs; relatively less attention has been paid to collective PES (Kerr et al., 2014). Of particular note is the need to determine how a community's social interactions – especially the way a community self-organizes to provide public goods – influence responses to PES incentives. Collective contract fulfillment requires that individuals accept private costs in order to achieve payments for the group. This requires collective action, which faces well-known barriers such as free-riding (Feeney et al., 1990; Ostrom, 1990). Furthermore, efforts within the group to overcome these barriers can be hindered by externally imposed incentives (Bowles, 2008; Cardenas et al., 2000). As discussed below, these barriers potentially include the conditional incentives provided by PES.

The potential benefits of conditional collective contracts, alongside the uncertainty of collective action in practice, motivates this study. We evaluate the effectiveness of collective conditionality in a context of social interactions. We use framed field-laboratory experiments in Mexico, at sites where collective land tenure is prevalent. Our experiment participants are members of communities enrolled in a PES program run by Mexico's National Forestry Commission (CONAFOR) (described in Section *Setting*). We do not evaluate ex-post outcomes of this program; instead, we simulate outcomes with a voluntary contributions (VC) game. This approach provides experimental control and allows assessment of policy variants not present in the real program. Importantly, the game allows us to test the impact of conditioning payments on *additional* (above baseline) actions, or what we call “conditionality on additionality.” Like many programs globally (Pattanayak et al., 2010), the real program does not demand clearly additional actions in return for payments.

Testing the impact of such “conditionality on additionality” (i.e. testing the impact of a collective contract that makes payments conditional on above-baseline actions) is valuable given that studies of the environmental impacts of PES programs show modest additionality at best (Alix-Garcia et al., 2012; Muñoz-Piña et al., 2008; Pattanayak et al., 2010; Porras et al., 2008; Wunder et al., 2008). We first test whether conditionality on additionality increases contributions towards collective PES contracts. Theory generates ambiguous predictions. It is possible that conditionality on additionality will raise contributions via stronger monetary incentives. Yet, as in any public goods provision context, individual contributions are monetarily irrational. Conditionality on additionality does not change that fact, even if it does reduce the marginal private cost of an individual's contribution. Positive contributions thus require non-monetary “other-regarding” or “prosocial” preferences. These sources of motivation are known to be subject to “motivational crowding,” a detrimental interaction of non-monetary and monetary incentives that can lower overall contributions (Bowles and Polanía-Reyes, 2012; Fehr and Falk, 2002; Frey and Jegen, 2001; Rode et al., 2015). As we discuss below (Section *Interactions between monetary and non-monetary incentives*), this mechanism could, perversely, cause conditionality on additionality to lower contributions towards the PES contract. We also test whether conditionality on additionality's impact is lower for those groups whose members show greater prosocial tendencies. This might arise if such groups' participants have greater non-monetary sources of motivation that are crowded out by the newly imposed monetary motive, among other reasons discussed below. This is relevant for PES programs that target communities based on their history of positive environmental actions.

Well-known influences on collective action motivate our further focus on two other elements of social interactions. Political science literature suggests that group members' *participation* in rule-setting positively affects their response to the resulting rules (Del Corso et al., 2017; Kroll et al., 2007; Ostrom, 1990; Wahl et al., 2010; Walker et al., 2000). We test whether giving groups the option to veto conditionality on additionality will lead them to respond more positively to that conditionality. Finally, we test whether an internal coordination mechanism influences external incentives' impacts. This is inspired by our policy context: CONAFOR prioritizes communities with good governance for inclusion in PES programs. It is plausible that an effective internal mechanism will enhance a group's ability to coordinate and thus respond to an external incentive. To provide context and improve external validity for our results, we complement our experiment with participant surveys, focus groups, and interviews.

We find that conditionality on additionality raises collective contributions, both during the treatment and afterward. This is a novel contribution in the context of PES. While the public goods literature has proposed combinations of taxes and

<sup>3</sup> Globally, 27% of forest area in developing countries is under some form of community title. This proportion is likely to increase given ongoing efforts to devolve forest management to local communities in many countries (Agrawal et al., 2008; Molnar et al., 2011).

<sup>4</sup> Programs that generate additional (above baseline) outcomes are described in this paper and throughout the PES literature as delivering “additionality” (Pattanayak et al., 2010; Wunder, 2007). The baseline is the land management outcome that would have occurred in the absence of the program, and can often be approximated from pre-program behavior. Fundamentally, the term “additionality” simply describes a program that had a real impact on land management outcomes, rather than one that pays landholders for doing what they would have done anyway.

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