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Analysis

Sliding-scale environmental service payments and non-financial incentives: Results of a survey of landowner interest in Costa Rica

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ABSTRACT

This study presents the results from a survey of landowner interest in a propositional payment modality for Costa Rica's *Pagos por Servicios Ambientales* (PSA) program that is based on a sliding-scale payment scheme. This payment scheme would transition from higher monetary payments per hectare per year for the first units of land invested, to lower payments per hectare per year for additional units of land invested; however, as payments per hectare decrease, monetary payments would be supplemented with non-financial rewards. This program structure is designed to 1) offer higher per-hectare financial incentives to smaller-scale landowners, who would otherwise face steep trade-off costs by transitioning to conservation-based land-use, and 2) offer greater non-financial incentives to larger-scale landowners, who face less sharp trade-off costs, and who might be more interested in prestige- and status-based non-financial incentives than the currently meager PSA payments. I found support for the proposed program modality across all classes of landowners. Interest in PSA participation by small- and medium-scale landowners showed sensitivity to proposed payments, with landowners indicating a strong desire to participate in conservation land-use as soon as the proposed financial incentives were sufficient to cover their opportunity costs. Large-scale landowners showed little sensitivity to payment size, and in general—with mode=10 and median=7 responses on a 10 point Likert-scale—indicated strong willingness to participate in the PSA program under the proposed structure, even if financial incentives per hectare were decreased significantly for large investments of land, but prestige- and status-based awards were introduced. These results are discussed in the context of an emerging literature on signaling theory, conspicuous conservation, and the interaction of financial incentives and social norms.

1. Introduction

Despite its small (51,000 km^2) size, Costa Rica is home to a surprisingly large amount of biodiversity, with over 505,000 documented species of plants and wildlife (Henderson, 2002). While amounting to only about 0.03% of the earth's land area, Costa Rica contains over 9.5% of the world's bird species, 4.9% of the world's mammalian species, 3.31% and 3.88% of the world's reptile and amphibian species, and 3.7% of the world's plant species (Sistema Nacional de Areas de Conservación, 2006). Such diversity offers hope for bioprospecting of new chemicals, medicines, and foods, and is one of the main draws for the burgeoning sector of ecotourism (Henderson, 2002). Decades of exploitative land-use, however, severely diminished the forest cover in Costa Rica. In an effort to protect what was left of Costa Rica's biodiversity, the Costa Rican government set aside biological reserves, signed on to several international conservation programs, and implemented a conservation incentive program, *Pagos por Servicios Ambientales* (henceforth, PSA), to stimulate conservation land-use on private lands.

While direct methods of conservation, such as the establishment of government reserves, are based on a comparatively straightforward link between policymakers and tangible results, indirect conservation strategies—like the PSA program—rely more heavily on theoretical models of economic behavior (Wunder, 2013; Zbinden and Lee, 2005). Because of this, much empirical study of the PSA is needed to assess the degree to which the program maximizes the conservation-to-payment ratio, avoids perverse incentives, and ensures fairness. To date, across a wide range of countries and conservation goals, PES programs (Payments for Environmental Services) have had an overall track record of empirical success, in spite of many program-specific inefficiencies (Costedoat et al., 2015; Dickman et al., 2011; Ferraro and Kiss, 2002; Frost and Bond, 2008; Nelson, 2009; Sánchez-Azofeifa et al., 2007; To et al., 2012; Wunder et al., 2008).

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At the time of study, the PSA in Costa Rica paid a flat rate per hectare of land to all landowners, regardless of land-size holdings or relative wealth (Sánchez-Azofeifa et al., 2007; Zbinden and Lee, 2005). This payment structuring is significant, because Zbinden and Lee (2005) found that property area and human capital among Costa Rican landowners were the best predictors of participation in the PSA program; those landowners with less education and smaller land holdings were less likely to participate in the PSA program, raising questions of fairness and efficiency in promoting land-use change.

This paper evaluates landowner interest in an alternative propositional payment structure based on a sliding-scale payment scheme that transitions from higher monetary payments per hectare for the first units of land invested, to lower payments per hectare for additional units of land invested; however, as payments per hectare decrease, monetary payments become supplemented with non-financial rewards. This propositional program structure is designed to 1) offer higher per-hectare financial incentives to smaller-scale landowners, who would otherwise face steep trade-off costs by transitioning to conservation-based land-use, and 2) offer greater non-financial incentives to larger-scale landowners, who face less sharp trade-off costs, and who might potentially benefit more substantially from non-financial incentives than from the currently meager PSA payments. For example, non-financial awards, like recommendation of landowners' businesses in popular tourism guides, might draw enough business to compensate for reduced payments per hectare. Additionally, non-financial rewards that elevate landowners' prestige or social-capital could be valued more highly in the local context than the current PSA payments.

In what follows: 1) I briefly review the literature on PES programs as conservation incentives, and outline the impacts and shortcomings of PES plans in Costa Rica; 2) I provide a theoretical justification for considering a sliding-scale payment system that includes a non-financial component; 3) I define specific predictions to be tested through interviews with a sample of Costa Rican landowners; 4) I detail the methods used in this research project and provide the results of the study. And, finally, 5) I conclude with a discussion of the results, and comment on the implications of these results for future research on conservation economics and PES plans.

1.1. Possible Shortcomings of Payments for Environmental Services

Despite significant promise in changing land-use, improving conservation efforts, and forging a more integrative and healthy market relationship between polluters, beneficiaries, and the community at large, it has been suggested that the PSA program suffers numerous shortcomings, which include, but are not limited to, the following:

S1) Requests for participation in the PSA program by landowners far outweigh the funding resources of the PSA program (Pagiola, 2008).
S2) Much of the money currently paid through the PSA program is being claimed by wealthy large-scale landowners previously engaged in conservation, thus these funds do little to change land-use, and could be better invested in other landowners where the potential for a positive conservation impact is greater (Wunder, 2007).
S3) PSA payments cannot effectively compete economically with extractive land-use strategies, and thus can only alter land-use in specific situations (marginal land, slow moving frontiers, etc.), or when PSA participation and conservation is pursued for reasons other than profit potential (Wunder, 2007). For example, if landowners choose to invest in conservation land-use for intrinsic moral reasons, or as a signal of their wealth or ethical values.
S4) Funds are dispersed mostly to wealthy and large-scale landowners, and impoverished landowners are forced into non-participation due to unfavorable tradeoffs (Sánchez-Azofeifa et al., 2007; Zbinden and Lee, 2005).
S5) The PSA is not structured to strategically invest money more heavily in the areas where it is needed most, like buffer-zones to national parks, international wildlife corridors, and watersheds (Pagiola, 2008).

As Pagiola (2008, pp. 717) states:

> Costa Rica's PSA program offers a relatively low, undifferentiated, and mostly un-targeted payment. Thus it will only tend to attract participants whose opportunity cost of participation is low, or negative... Being undifferentiated and untargeted, the program will also attract many land users who would have adopted the desired practices anyway.

Extractive land-use economically out-competes conservation-based land-use in the short-term (one growing season), and, in most cases, long-term. Due to these steep trade-off costs, other additional factors of influence such as patriotism, moral commitment to environmentalism, concern for the collective, social signaling, or prestige seeking may be responsible for landowners adopting conservation-based land-use strategies and participating in the PSA program (Axsen and Kurani, 2012; Bliege Bird et al., 2005; Brooks and Wilson, 2015; Gintis et al., 2001; Griskevicius et al., 2010; Kinzig et al., 2013; Noppers et al., 2014; Richerson et al., 2015; Ross et al., 2014; Sadalla and Krull, 1995; Sexton and Sexton, 2011; Willer, 2009).

1.2. Proposed Strategic Changes to the PSA Investigated in This Study

Field observations in Costa Rica and contemplation of the above-listed shortcomings of the PSA program led me to develop a hypothesis that an alternate program structure based on a sliding-scale payment system (Van Noordwijk et al., 2012) paired with non-financial incentives could increase both the amount of land conserved (adjusted for its value to conservation goals) and the number of participating landowners. Furthermore, a sliding-scale payment system has the potential to create a more equitable balance of wealthy and poor landowners with the same program budget (Van Noordwijk et al., 2007, 2012), and may possibly yield better conservation outcomes through more effective use of funds.

1.2.1. A Sliding-scale System Integrating Non-financial Rewards

In order to survive, poorer landowners typically have no alternative other than to pursue land-use strategies which maximize economic profit, even at the cost of destroying their forests, which are long-term buffers against future financial insecurity; among poorer landowners, the major trade-off is between intensive land-use and resource insecurity. Wealthier landowners, who are not in a financial struggle to survive, have more flexibility to pursue land-use strategies which balance short-term profit and long-term security. Furthermore, among wealthy landowners there is also a trade-off between current profitability and access to prestige, social status, and community or international recognition of their properties or business—if, for example, they forego the profit of extractive land-use in order to create a private reserve.

In order to balance the needs of both wealthy and poor landowners, and make the PSA program attractive to both, the payment structure of the PSA could theoretically be changed to a sliding-scale system. This system would provide much higher financial payments per hectare for small amounts of land, the first 1–10 ha invested per landowner, for example, and decrease for the next 11–50 ha per landowner, and significantly decrease per hectare for investments of more than 50 ha. However, as the price per hectare decreases, prestige-based awards, and regional or national recognition (in tourism guides, for example), could be granted, as more