

# What types of investment can most cost-effectively ensure ecosystem service provision? A randomized program evaluation

Nigel Asquith, Fundación Natura Bolivia, Santa Cruz, Bolivia

## Introduction

Payments for Environmental Services are increasingly common as a conservation and development tool. Countries such as Ecuador and Costa Rica have national schemes in which the governments pay landowners to leave their forests standing. Mexico alone has spent £300 million on its national PES program since 2003. However, and despite these investments, there remains little evidence that market based conservation and development programs actually work. There are even fewer data about the potential role of social norms in reducing the cost or improving the efficiency of PES.

Thus, although governments around the world are hypothesizing that conditional cash transfers of millions of pounds to landowners will lead to more conservation and less poverty than potentially cheaper alternatives, there is virtually no quantitative evidence about the efficiency and effectiveness of such transfers.

This two year research project investigated a regional scale PES scheme in eastern Bolivia, designed in a form amenable to a randomized control trial, to evaluate if PES improves (vs. an information treatment) performance for the key outcomes of forest cover, poverty reduction, biodiversity conservation and maintenance of water quality.

The research team comprised Nigel Asquith (Fundación Natura Bolivia), Kelsey Jack (Tufts) and Conrado Tobon (Universidad Nacional de Colombia)

## Methods

Across five municipalities ~ 130 communities were identified which depend on forests for their water. Every family was interviewed using a 16 page socioeconomic survey. Upstream, we quantified water quality and biodiversity. Once baselines were collected, municipal leaders randomly assigned which communities would receive PES treatments. Based on an initial analysis of the data, we then stratified the randomization by municipality, community size and numbers of resident cows.

In 65 randomly selected communities, we offered landowners three types of PES contract, which varied with distance to water source and whether cattle are allowed on conserved lands. By November 2012, 694 landowners in 65 communities had been offered the program, and 419 landowners in 57 communities had joined, signing up 16,444 ha under conservation contracts.

After two years we will compare results between treated and untreated communities. We will measure the following impact variables:

- Changes in well being, as measured through various parameters on the socioeconomic survey, such as household goods, income and community cohesiveness
- Water quality, as measured by turbidity, dissolved oxygen and fecal coliform load
- Forest extent, measured by satellite image interpretation, and forest quality, measured by abundance and diversity of amphibians, beetles and aquatic macro invertebrates.

## References

- Asquith N.M, 2011. Reciprocal Agreements for Water: An Environmental Management Revolution in the Santa Cruz Valleys. *Harvard Review of Latin America* 3: 58-60
- Asquith N.M. 2013. Protecting Latin America's water factories for climate compatible development. *Harvard Review of Latin America* in press.
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## Results

- 375 hectares were contracted for conservation in 2011. 8340 additional hectares were contracted in 2012. For example, in 2012, in the community of Huantas, 8 families (5 led by women, 3 led by men) joined the program, signing contracts to conserve 160 ha, and receiving compensation packages of apple and plum tree seedlings and barbed wire worth a total of \$1019.60, with an average value of \$127.50 per family
- Summing 2011 and 2012, land currently under contract comprises 440 ha in contract level 1, 230 ha in contract level 2 and 7670 ha in contract level 3.
- Of the 65 eligible communities, 57 have community members enrolled in the scheme. Fourteen of these communities were new in 2012.
- In 2011 we offered the program to 694 families, 116 signed agreements.
- In 2012 we offered the program to 687 families, of which 187 families signed contracts. Of these 187 families, 168 were new to the program, while 19 had already joined in 2011. The new beneficiaries contracted to protect 6275 ha, while the returnees contracted 2066 ha to add to the 375 ha they had committed to conserve in 2011.

	2011	2012	2011-2012
Total ha	376	8340	8716
Total families	116	187	284
Average ha per family	3	45	31
Average payment per family	128	135	141
Average payment per ha	40	3	5

In terms of project take up, preliminary analysis indicate significant differences between the landowners who are joining the program, and the general population.

	General Population	PES participants	Difference
% Own house	79	90	+11
Hectares owned	33	44	+11
% Own cows	66	87	+21
% Participate in village council meetings	41	66	+25
% Have held post on council	12	27	+15
% Participate in community work	57	79	+22
% Have received support before	21	37	+16
% Think that the environment provides benefits	80	87	+7
n	2801	203	

## Key Findings

The 2012 campaign was implemented by five people (the 2011 team had eight members). In addition to contracting significantly more hectares, we improved efficiency. As a result, the value of the compensation paid increased by 70% between 2011 and 2012, while we reduced the cost of providing this increased compensation by 41%.

We have drastically improved our methods of delivering compensation in 2012, so that for each community the compensation is offered on day 1, land parcels are measured, and pre contracts signed on days 2 and 3, and then final contracts are signed and compensations are delivered on days 6 and 7. Thus, it now takes less than a week from first offering the compensation package to a particular farmer, to actually delivering it.

One important "failure" was our assumption that we had interviewed all families in the project area. It now appears that we missed ~ 10%. We are resolving this retroactively, with the goal that by project end we have all families interviewed. This gives us the ability to examine the interview results of all families who attended the meetings in which we offered the intervention, and to assess if there are differences in the socioeconomic profiles of people who took up the intervention, and those who didn't.