

**Measuring the effects of compensation for environmental services interventions on social norms and conservation behavior in Bolivia**

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April 2010

Masters project submitted in partial fulfillment of the  
requirements for the Master of Environmental Management degree in  
the Nicholas School of the Environment of  
Duke University

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## **Abstract**

Payments for Environmental Services (PES) that give landowners a financial incentive to manage their land to provide valuable environmental services may provide an efficient way to conserve forest land and improve the livelihoods of landowners receiving payments. While these programs appear promising, little rigorous evaluation has been conducted to learn about the impacts of PES on the environment or on the people and communities involved. Fundación Natura Bolivia, a conservation NGO, plans to implement a PES program in a new management area, accompanied by a study that aims to identify and understand the impacts of PES.

Identifying the impacts of PES and determining why they occur requires baseline information from a program site so that changes can be monitored as the program is implemented. The objective of this research is to identify key environmental, social, economic, and institutional indicators to include in the study and to design a survey instrument to measure these indicators. This report is intended as a guide for Fundación Natura Bolivia as they conduct this and future evaluations of their programs.

Key indicators were identified through a literature survey and extensive fieldwork conducted in Bolivia in the summer of 2009. Environmental indicators include agricultural land use, forest use, decision-making, and environmental awareness. Socioeconomic indicators include household consumption, economic access, employment and income sources, and non-income measures of wellbeing. Finally, institutional indicators include community organizations and informal institutions, environmental norms and attitudes, and relationships with outside organizations and other communities. A survey designed to measure these indicators is included with this report, along with recommendations for survey design and implementation.

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## **1. Introduction**

Payments for Environmental Services (PES), a market mechanism that gives landowners a financial incentive to manage their land to provide valuable environmental services, may provide an economically efficient way both to conserve forest land and improve the livelihoods of landowners receiving payments. While these programs appear promising, little rigorous evaluation has been conducted to learn about the true effects of PES on the environment or on the people and communities involved. Fundación Natura Bolivia, a conservation NGO in Bolivia, plans to implement a PES program in a new management area, Rio Grande – Valles Cruceños, providing an opportunity for evaluation that can help Fundación Natura and other organizations design more effective conservation and development programs in the future.

The new program will be accompanied by a study that aims not only to identify the impacts of PES, but to explain why PES has the impacts it does. Interventions may work through a number of channels, including by changing economic incentives, by increasing education and awareness, and possibly by changing social norms and preferences that affect environmental behavior. PES changes economic incentives by internalizing the externalities that landowners impose on others through their land use practices. Such payments may also either reinforce or crowd out existing environmental norms and preferences, thus contributing to or detracting from the environmental goals of the program. Identifying the impacts of PES and determining why they occur requires baseline information from a program site so that changes can be monitored as the program is implemented.

The objective of this Master's project is to identify the key environmental, social, economic, and institutional indicators that should be included in baseline and future data collection for the Rio Grande – Valles Cruceños study, and to design a survey instrument to measure these indicators. This report is intended as a guide for Fundación Natura Bolivia as they conduct this and future evaluations of their programs. It provides recommendations for measuring the indicators identified as important for the Rio Grande – Valles Cruceños program in particular, many of which are likely to be important in future programs implemented by Fundación Natura Bolivia. Overall survey design information included here should also be useful as the organization designs surveys for evaluation or other purposes in the future.

Section Two provides background information on payments for environmental services and on the client and their study. Section Three covers the key components of impact evaluation, including the methods used to design this survey instrument. The recommended indicators, discussed in Section Four, include environmental and physical indicators, socioeconomic indicators, and social and institutional indicators. Included in the discussion are recommendations on how to collect information in order to measure the indicators. Finally, Section Five gives overall survey design recommendations. A draft survey instrument is included as an appendix.

## **2. Background**

### **2.1: Payments for Environmental Services**

Payments for Environmental Services (PES, also known as Compensation for Environmental Services, or CES<sup>1</sup>) provide financial incentives to landowners who agree to manage their land so that their land will provide valuable environmental services, such as carbon sequestration or water quality. These environmental services are public goods that will be supplied at a suboptimal level if the landowners providing them are not compensated. A PES is defined as a voluntary transaction where a well-defined environmental service (or a well-defined land use likely to provide that service) is being bought by at least one buyer from at least one seller. It is key that payments are conditional and only given if the service or its associated land use is provided by the party or parties receiving payments (Wunder 2005). Payments compensate landowners for the opportunity cost of using their land in an alternative way, such as for agriculture, and many have promoted this economic approach as a more efficient way to achieve conservation objectives than traditional command and control measures (Ferraro and Simpson 2002; Arriagada, Sills et al. 2009).

Because PES programs tend to involve farmers in poor regions of developing countries, donors are increasingly considering PES as a way to meet both poverty alleviation and conservation objectives. If the program is designed correctly, conserving forests can offer a steady long-term economic base for local communities, but the effectiveness at meeting both social and environmental goals depends on the circumstances and the design of the program

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<sup>1</sup> Compensation for Environmental Services (*Compensación por Servicios Ambientales*) is the term commonly used in Bolivia, in part due to negative associations with the term “payments.” I have used the more common term PES in this report, but the terms can be considered to be interchangeable.

(Brown, Burnham et al. 2000). Possible benefits for communities include income diversification, reliable and stable payments, training, and better internal organizations. Possible negative impacts include increased competition for land, job losses, and social tension between those receiving payments and those who do not (Grieg-Gran, Porrás et al. 2005).

Whether participants who receive payments for conservation benefit from PES depends on a number of factors, including the relative economic potential of agriculture and environmental service provision. Landowners can benefit if they own land that is poor for agricultural production but high in environmental service production, such as steep land that is hard to farm but which, if maintained as forest has high potential to prevent erosion and landslides (Bulte, Lipper et al. 2008).

The possible effects of PES extend beyond participants to include other community members and those affected by changes in environmental service provision, labor demand, and crop prices. The landless, who tend to be the poorest group, are often harmed by PES programs. While landowners are compensated for the restrictions placed on their land, those without land may lose access to land that had contributed positively to local livelihoods (Asquith, Ríos et al. 2002). Programs can also change demand for labor, depending on the relative labor requirements of the new land use compared with the land use it is replacing. If the program is big enough, it could affect commodity prices locally, which could benefit those who sell commodities whose prices rise, but hurt those who buy such products. Lastly, the increase in environmental service provision has the potential to benefit all people, including the poor, who rely on the service. On the other hand, some households may lose if they have to contribute to a PES scheme in order to obtain environmental service that they used to receive for free (Bulte, Lipper et al. 2008). Programs may also contribute to, or detract from, social capital in a community or between communities, depending on the characteristics of the program (Grieg-Gran, Porrás et al. 2005; Xiaodong, Lupi et al. 2009).

The fundamental concept behind PES is that changing the economic calculations farmers face when making land use decisions payments will induce them to account for the environmental externalities their decisions impose on others. If we assume that farmers are making an efficient allocation of resources, minus social externalities, PES can, in theory, create incentives that lead to the most efficient land uses that account for social externalities (Antle and Stoorvogel 2008). However, landowners consider a large number of other factors and constraints

beyond profit maximization when making decisions about their economic activities. One objective of this project is to gain a better understanding of the factors that affect land use decisions in order to predict better how such a program will actually affect land use in a given community. Opportunity cost of land enrolled in a conservation program is sure to be one factor that farmers consider, but is not the only one (Arriagada, Sills et al. 2009).

While PES programs have been implemented in many countries all around the world, due to a lack of rigorous evaluation, the true effects of these programs on both environmental and development objectives is unclear. Costa Rica's well-known national PES program, for example, has established conservation contracts for nearly 500,000 hectares since 1997, but there is considerable doubt as to how much of that forestland was under threat of deforestation and how much conservation is truly a result of the program. Like physical land use changes, social and economic effects need to be compared with what would have happened without the program in order to be attributed to PES.

## **2.2: Client**

Fundación Natura Bolivia (hereafter referred to as Natura), a non-governmental organization in Santa Cruz, Bolivia, implemented its first Compensation for Environmental Services project in 2003, in the Los Negros watershed of Santa Cruz. The Los Negros watershed borders the 637,000 hectare Amboró National Park, which has been increasingly threatened by illegal land encroachments, threatening the supply and quality of water for farmers all along the Los Negros. Dropping water levels in the Los Negros River has been a point of contention among water users since at least the early 1990s. Natura negotiated a PES program between downstream irrigators in the town of Los Negros and four communities of upstream landowners that involves a payment to upstream landowners of one artificial beehive for every 10 hectares protected for one year – the equivalent of US\$3 per hectare per year (Asquith, Vargas et al. 2008).

As of 2008, 46 farmers were collectively protecting 2,774 hectares of cloud forest in the Los Negros watershed. However, it is difficult to assess how much of the conservation is truly additional. Most of the parcels that have been put under conservation contracts are steep inaccessible forests with clear ownership claims and low agricultural potential, indicating that much of the protected land was not threatened by agricultural clearing in the first place

(Robertson and Wunder 2005). The payments made in the program are generally less than the economic opportunity cost of conservation, so in purely economic terms the PES payments are not competitive for any forest land that was truly at risk of being cleared. However, payments may have had an additionality effect by formalizing *de facto* land-tenure security for participants, thus reinforcing local acceptance of tenure claims and prevent colonization (Asquith, Vargas et al. 2008).

While conservation is the primary objective of Natura's projects, the organization also has a goal of improving local livelihoods in communities where they work. Like conservation benefits, livelihood benefits are difficult to assess accurately in the Los Negros watershed. Returns to participants are estimated to range from a loss of \$US15.25/ha/year to a gain of \$US12.66/ha/year, depending on the skill and luck of the beekeepers. The poorest members of the upstream communities, those who do not own land, are unable to participate, and may lose out by losing access to land and possibly on agricultural employment. On the other hand, some PES participants have sold beehives to landless community members, and other community members have been hired to help with honey processing (Asquith, Vargas et al. 2008). While participants are happy with the program, some community members are still critical and distrustful, claiming that Natura has only helped the richest community members and that this inequality has created tension in the community (Molina, Aguilera et al. 2009).

### **2.3: Study Overview**

Natura is planning to expand their activities into the newly created 740,000 hectare Rio Grande – Valles Cruceños integrated management area (hereafter ANMI, for its acronym in Spanish, *Area Natural de Manejo Integrado*), where donors are investing approximately \$US1 million to implement a series of education and incentive interventions. This project is an opportunity for Natura to conduct a rigorous long-term evaluation, in conjunction with researchers at Harvard University, by designing a randomized field experiment to test the effects of a PES intervention compared with a group of communities as a control that does not receive payments. This evaluation will help Natura improve their own projects and provide lessons for others who are implementing PES projects.

The 141 communities in the new integrated management area will be randomly assigned one of three interventions. The first will be a conditional PES project, where families are offered

compensation based on the number of hectares they leave in conservation. Their land will be surveyed and families will only be compensated only if they have conserved the land they agreed to conserve. The second intervention is similar, with the exception that payments will not be conditional on behavior; families will be paid for signing up regardless of whether or not they comply. The last group will be a control group, where families are given the option of signing up to conserve land, but will not be offered any compensation. To avoid any confounding factors affecting results, the three programs will be presented to the communities in a similar way, changing only the compensation aspect of the program.

Before implementing these interventions, Natura needs to collect baseline data from the communities in order to document changes over time as the interventions are implemented. Natura plans to measure changes in land use behavior to see the effects of the program on conservation as well as socioeconomic indicators to see the effects on people's livelihoods, as conservation and poverty alleviation are both goals of Natura's work. In addition, Natura will collect information about social norms, values, and environmental perceptions in order to measure the relationship between conservation interventions, social norms and behavioral change. PES works by changing economic incentives for landowners, but also may work by changing social norms related to conservation behavior, which may lead to better (or worse) outcomes in the long term. Existing norms and values are also likely to affect acceptance of and participation in a PES program. For example, perceptions that market-based mechanisms for watershed management signify privatization or opinions on the very idea of pricing natural resources could affect whether community members are willing to participate in the program. Other indicators not directly related to conservation, such as those related to cooperation within the community, household decision-making, and other social values, may also affect participation in and adherence to the program, and understanding these effects may make it possible to predict how successful PES projects will be in other communities.

### **3. Impact Evaluation**

#### **3.1: Evaluation**

A critical, and too often neglected, component of conservation and development work is evaluating the effectiveness of programs. Evaluating existing programs is crucial to

understanding whether and in what ways current approaches to conservation and development are effective in order to design future programs to be as effective as possible. While intuition and case-study anecdotes can give us clues as to whether programs have achieved their desired objectives, more scientifically rigorous analysis is necessary to determine whether the intervention truly works better than no intervention at all (Ferraro and Pattanayak 2006).

Unfortunately, program evaluation of conservation lags behind evaluation in other fields. Comprehensive, in-depth reviews of the success of conservation programs is lacking because they are costly and difficult to implement, and practitioners have to decide whether to allocate scarce resource towards implementing new projects or evaluating the existing ones. Evaluations may also be resisted because they may provide unwanted suggestions and recommendations that are difficult to implement (Kleiman, Reading et al. 2000).

Sacrifices may have to be made in program design in order to meet the needs of an evaluation. For example, Natura's past projects have provided in-kind compensation with artificial bee hives, rather than cash transfers, in response to input from the communities where projects were implemented. Community members preferred an in-kind payment that served as an economic investment because local capacity for saving, investment, and entrepreneurship were limited. The bee boxes also reinforced the need for maintaining an intact forest as an income-generating asset (Robertson and Wunder 2005). However, it is difficult to disentangle the many related impacts of these in-kind payments: would conservation outcomes have been similar had payments been made in cash, or with a different kind of in-kind payment? Were positive outcomes observed because the economic incentive of compensation changed land use calculations, or because training and institutional support changed views towards conservation? For the purposes of evaluation, particularly if one wants to be able to learn general lessons that could be applied to other projects, separating the effects of economic incentives from other confounding factors may be easier with cash payments, even if practitioners believe, based on past experience, that in-kind payments will be more effective.

In order to evaluate an intervention, we have to make inferences about an unobserved counterfactual: what would have happened if Natura had never implemented its policy here? Determining a counterfactual against which to measure observed changes is crucial for determining whether the observed effects are additional compared with what would have happened in the absence of the project (Brown, Burnham et al. 2000). While Natura's projects

show signs of success in terms of maintaining forest in conservation and improving the livelihoods of community members, it is difficult to know for sure whether the successes observed can be attributed to Natura without knowing what would have occurred without Natura's intervention.

Without an accurate business-as-usual baseline, we have to be worried about confounding effects that are contemporaneous with the intervention and affect the outcome, thereby masking or appearing to amplify the effects of the intervention. Historical trends, unrelated policies, and other social and environmental changes may affect the outcomes that the intervention is targeting and complicate the analysis of what is truly the result of the intervention. Downstream water flow changes may be due to land use changes, or from other factors like climate change or changes in irrigator demand. Similarly, observed conservation behavior may in fact be non-additional if land enrolled in the program is land that would not have been cleared even without economic incentives (Asquith, Vargas et al. 2008).

Endogenous selection is a common problem that confounds analysis of program effectiveness. It is easy to compare the conservation outcomes of an area where an intervention was implemented to those where it was not, but if assignment to the intervention was not random, characteristics that influence the outcome of interest are likely to influence the probability of being selected for the program (Ferraro and Pattanayak 2006). A comparison group should be a group who, in the absence, of the program, would have had outcomes similar to the group that receives the treatment. Unfortunately, in reality those who are exposed to a treatment generally differ from those who are not exposed (Duflo, Glennerster et al. 2006). If landowners who volunteer to enroll their land in a PES program conserve more land than those who do not volunteer, it may be a result of their enrollment in the program, but is also likely due to other factors, such as lower agricultural productivity of their land or greater interest in conservation, that would have led them to conserve more land even in the absence of the program. It is generally impossible to assess the magnitude, or even the sign, of this selection bias and the extent to which it explains the different between treatment and comparison groups (Duflo, Glennerster et al. 2006).

Randomization can help to solve the problem of selection bias by assigning individuals to receive a program or not so that the group of participants does not differ from the group of nonparticipants in a systematic way. Under random assignment, eligible individuals or

communities are separated into treatment and control groups that are equally representative of the population of eligible individuals or communities. An often-cited case of successful randomized program evaluation is the Mexican anti-poverty program *Progresa*, which provides cash to families in exchange for certain behaviors, such as regular school attendance and preventative health care for children. The program was subject to a randomized trial, phased in randomly across villages, so it could be subject to a rigorous evaluation effort. Because the evaluation design allowed analysts to estimate the effects of the program in a credible way, the program has been expanded in Mexico and to other Latin American countries (Parker and Teruel 2005). Similar evaluation is needed of conservation programs in order to draw similarly credible conclusions about their effectiveness.

A PES project is likely to affect nonparticipants in the community as well as participants, so to include these spillover effects in the evaluation randomization should be done at the community level rather than at the household level. Some members of the communities chosen for the treatment group will choose not to participate, but will feel the effects of the program, such as changes in environmental quality or employment availability. The best way to estimate the effects of the program on both participants and nonparticipants is to compare all members of a community selected for the intervention to all members of a community not selected, whether or not they choose to participate (Orr 1999).

### **3.2: Development of the Survey Instrument**

The objective of this project is to identify key indicators for measuring the impacts of Natura's PES projects on land use behavior, decision-making, and social norms. A survey instrument has been designed for Natura to use to establish a baseline and to measure how these indicators change over time as a result of Natura's projects.

Evaluation should assess the success and failure of a project in terms of achievement of specific goals and outcomes. More than simple program monitoring, evaluation introduces into an assessment values of what constitutes success. Further, a good evaluation should go beyond assessing whether goals were reached to examine the reasons for success or failure and the adequacy of the goals themselves (Kleiman, Reading et al. 2000). The first step of a comprehensive evaluation is to develop criteria for defining program success. This requires all parties involved to agree on the goals of a project and standards or criteria by which to evaluate

success. In many cases of conservation evaluation, an ultimate goal, such as improved watershed services, cannot be observed in the short-term. In this case, it is important to define intermediate criteria to evaluate progress towards ultimate goals and to understand how various biological and social sub-goals can contribute to an ultimate conservation outcome (Kleiman, Reading et al. 2000). Similarly, the question of whether the program has improved livelihoods in the communities requires a definition of what changes indicate improved livelihoods, as well as a way to measure whether those changes have occurred relative to what would have occurred without the project. Section 4 of this report lays out environmental, economic, social, and institutional measures that will be included in the survey.

Once the overall objectives of a survey are identified, significant field work is necessary to ensure that the data collected will provide the information needed to measure the indicators of success that have been identified. Field testing is necessary to ensure that the language in the survey is consistent with how people in the research area speak and understand the concepts in the survey, that coding accurately and clearly captures possible response options, that respondents consistently understand questions the way researchers intend them to, and that the data collected will provide a complete and meaningful measure of the indicators researchers wish to measure (Grosh and Muñoz 1996; Fowler 2002).

The first step in developing our survey instrument was consultation with people who had experience working with the study population, including Natura field staff, community leaders, and other local contacts in Bolivia, particularly those with survey experience in the study area. In many situations, time can be saved by talking with people who know the study population before bringing any questions to the field to get guidance on making sure that the survey will reflect the reality of the location (Grosh and Muñoz 1996).

After consulting with local experts, we began conducting focus groups in communities similar to those in the ANMI study area. Focus groups are an important way of gathering background information in order to formulate specific questions for use in a quantitative survey instrument. Generating this information in a group setting allows participants to discuss and clarify issues relevant to the study in an open and constructive way, and new ideas often emerge in group settings as participants can build on each others' ideas and opinions (Fowler 2002; Rea and Parker 2005). Focus groups were conducted with between three and eight participants in

several communities in the municipalities of El Torno and Mairana (see Appendix I for a list of focus group dates and locations). Objectives of focus groups included the following:

- Learning local terminology. It is crucial that a survey include language that is commonly used and understood by the population to be surveyed (Grosh and Muñoz 1996; Fowler 2002). We discovered in our first focus groups that some terminology had to be adjusted for the local population. For example, different regional terms exist for communal work-sharing arrangements (*minga, faera, ayni*), so we had to learn what each term means in that region and how they differ from each other. Similarly, colloquialisms and manners of speaking vary regionally, so it was important to be able to formulate our questions in language that is consistent with how people speak in the study area.
- Understanding local land use arrangements and agricultural production. In the study area, a variety of land rental arrangements exist, as well as different methods of sharing work, as mentioned above. Focus groups allowed us to develop our understanding of how communities and households use their land in order to formulate specific questions that will capture the level of detail we want in the final survey.
- Understanding local community structures. As a major objective of the survey is to study the effects of the intervention on social norms and community institutions, it was crucial to understand how community members currently relate to each other, including existing formal organizations and informal ways that community members communicate and share information with each other.
- Identifying sensitive issues. It is not always obvious what issues are likely to be sensitive for a given population. Through focus groups we were able to ask questions in a less personal manner – i.e. “How do people in your community resolve conflicts?” instead of “How do you resolve conflicts?” – to get a sense of which questions might make people uncomfortable and how they could be re-phrased to make people more comfortable answering them.

Initial focus group discussions were broad and open. We began with general themes and questions related to the indicators identified as important but left the conversations open in order for new ideas and topics that could be relevant to the study to emerge. General themes addressed in the focus groups were environmental perceptions, land use decisions, community dynamics, community institutions and meetings, and relations with other communities. More directed focus

groups were conducted as themes and questions were developed and refined, with discussions eventually focused on specific questions that we wanted to include in the survey. Challenging themes, such as cooperation between communities and motivations behind land use decisions, were brought repeatedly to focus groups in order to discover the best way to gather the information we wanted and how to phrase certain questions so that they were understood and comfortable for respondents. Questions were also brought to focus groups in order to compile response options that should be included. See Appendix II for a list of themes and questions that were brought to focus groups.

A pretest of the complete draft questionnaire is important to make sure that the survey collects all of the information researchers are looking for, that information collected in different parts of the survey is consistent and not redundant, that the survey flows and is relatively easy to administer and understand, and to test for timing and survey format (Rea and Parker 2005). Small field tests can often identify many of the potential problems – one rule of thumb is that around half of the problems will show up in the first ten households – and can be useful for testing new or difficult sections of a survey. It is important, however, to test the survey with a large enough number of households to ensure that the survey will work for the various kinds of people who will be surveyed. Field tests need not be randomized, but it is important to ensure that the survey is tested with different kinds of households who will be included in the final survey. For example, if only a small percentage of households work with cattle, it may be necessary to over-sample those households to ensure that the cattle section of the survey is adequately tested. While pretests typically do not collect data that can be analyzed in a serious way, an analysis can be a useful way to identify potential problems with the data being collected (Grosh and Muñoz 1996).

Focus groups and survey pretests were not two distinct phases, but rather parts of an iterative process that began with very open focus group discussions and ended with a structured test run of the full survey, with revisions made to the survey in between each test trip. As questions were incorporated into a structured survey, individual interviews were conducted, and questions that proved to be problematic were brought to additional focus groups, and this process was repeated with each test of the survey.

The first tests of a draft survey were run in the communities of San Juan in the municipality of Samiapata, Pozuelos and Cerro Verde in the municipality of Mairana, and

Limoncito in the municipality of El Torno. Each survey was conducted by a Bolivian enumerator, accompanied by one of the survey designers who observed the interview for behavior and reactions of the enumerators and respondents to the survey. After each round of survey tests, the survey team discussed responses and respondents' reactions and make changes in the survey accordingly. A complete test of a draft survey was run in the communities of Quiñales and Verdecillos in the municipality of Comarapa and the community of Santa Rosa da Lima in the municipality of Los Negros, with a total of 45 households.

Responses from this test run were used to make revisions to the survey to produce the version of the survey included with this report. Because an additional round of field testing will be conducted prior to implementation, my recommendations include areas that should be focused on during this last round of field tests.

#### **4. Key Indicators for Evaluation**

This section lays out the key indicators that have been included in the survey instrument, separated into physical and environmental indicators, socioeconomic indicators, and social norms and institutional indicators. Each category includes background on why the indicators should be included in the evaluation and recommendations on how to collect the information needed in the survey instrument.

##### **4.1: Physical and environmental indicators**

The ultimate goal of Natura's work is to increase conservation and behavior that improves the quality of environmental services, so the first indicator to monitor is whether conservation and environmental quality increase as a result of the intervention. Changes in environmental quality and environmental service provision will be measured in part through hydrological and land cover monitoring that will be done in conjunction with the survey. However, survey responses will be an important component of the measurement of environmental change for a number of reasons. The hydrological effects of conservation are unpredictable and difficult to measure, and water flow can be affected by a large number of confounding factors, ranging from changes in downstream demand to climate change. These factors may make it difficult to observe water flow changes and attribute those to land use changes upstream. The survey will measure the intermediate outcome of land use change that

ideally leads to the final outcome of improved hydrological services. By measuring land use as well as water flow, it is possible to attribute land use change to the intervention, even if the link from land use to hydrological outcomes is uncertain (Asquith, Vargas et al. 2008).

#### *4.1.1: Agriculture*

*Issue:* The primary land use activity relevant to environmental outcomes is agricultural activity. In field tests, 88% of the parcels worked by respondents (including multiple parcels for households) were used for agriculture, with most of the remainder dedicated to cattle. In addition to learning how much land is dedicated to various forms of agriculture, we can estimate changes in economic returns to agricultural activities by tracking which crops households are producing and selling and how much they are earning from those crops. An analysis of agricultural returns can help us calculate opportunity cost by parcel, which allows us to determine how conservation payments compare with what they could otherwise have earned from their land. Measuring opportunity cost of land that is enrolled in a payments program provides a measure of the cost effectiveness of the payments and evidence of economic additionality, which requires that compensation be at least equal to the benefits of an alternative land use (Engel, Pagiola et al. 2008).

It is possible that conservation-related investments such as erosion control or terraces may increase with environmental awareness, or that people will be more willing to make costly investments in their land if greater land tenure security increases beliefs that the long-run benefits will pay off. Field test results show some difference in implementing conservation measures between Los Negros, where a PES program has been in place, and Comarapa, where there is no PES program. For example, in Los Negros, more households had put in wind breaks (50% compared with 22%) and erosion control (27% compared with 9%) than in Comarapa. There are many confounding factors such as different terrain that make it impossible to draw serious conclusions from these numbers, but they do point to the possibility that PES could increase the likelihood of households making investments in their land.

*Recommendations:* All households will be asked about their land uses on all the land that they own or work. It is important to include rented or leased land as it contributes to agricultural income, but it should be distinguished from owned land as it can only be enrolled in a

conservation program if the renter has a contract on the land long enough to meet the agreement of a conservation contract.

To estimate opportunity cost, the survey includes questions on all revenues from crop sales and all input costs. It is generally recommended that checks for consistency be built into the survey to ensure that the survey is gathering accurate results (Grosh and Muñoz 1996). To test for consistency in this section, we ask both how much of each crop was sold and for what price, and how much households earned in total from the sale of each crop. If these numbers are close, we should have a fairly accurate measure of earnings agricultural sales. If answers are not close, enumerators can probe further to ensure that responses are consistent. Lastly, to capture access to markets for their crops, we ask not only what price producers receive but where they sell their crops. Focus groups revealed that prices for agricultural goods vary significantly depending on where they are sold. In general, producers can receive better prices if they travel to markets in the city, but doing so requires investing the time and money to travel to sell goods.

Along with revenue from the sale of agricultural products, a measure of input costs is necessary to calculate net income from agricultural activities. In focus group discussions, respondents were unable to estimate total expenditures on agricultural activities, but were able to give fairly specific estimates of expenditures on individual components, such as fertilizer or equipment maintenance. Through field testing, we identified a list of expenditures that typical households face for agricultural production in the region, so households will be asked how much they spent on each of the identified expenditures in the past year. This is an area where enumerator coding was highly inconsistent in field tests (see section 5 for further discussion on response codes and enumerator training), so care should be given to ensure that enumerators understand this section of the survey well.

The last component of our analysis of agricultural activities is information about agricultural investments that households have made, such as terraces, irrigation systems, and erosion prevention, that people in our study area may have made in their land.

#### *4.1.2: Forests*

*Issue:* It is important to learn about all uses of forested land to understand both threats to the forest and benefits to households from standing forests. Extraction of timber, firewood, and non-timber forest products (NTFPs) can threaten forest conservation or, in the case of products

that require intact forests, can increase the economic value of forested land (Tewari 2000). Valuing NTFP extraction requires data on the quantity of each product extracted and its price. Goods consumed at home should be valued at their retail purchase price, while goods extracted for sale should be valued at their selling price. In cases where a particular good is not bought or sold in the market, the price of a close substitute can be used (Godoy, Lubowski et al. 1993).

Forest use was limited in the survey test area, with the exception of firewood extraction, and the few respondents who extracted NTFPs extracted only for their own use rather than for sale. The most challenging part of this section is quantifying forest product extraction, as none of the households in the test survey could quantify how much they extracted or used. From focus group discussions with people who extracted and sold forest products, and from the data on agricultural production, it is clear that individuals are more capable of estimating the quantities of products that they sell than of products they consume themselves. Should forest extraction become an important component household income, it is likely that households will be better able to estimate quantities of forest products that they extract and sell.

Because firewood is extracted more intensively than other forest products, it has a more significant effect on the forest and it is important to learn how much is being collected and from where, particularly if firewood is being extracted illegally. Information on who in the household is responsible for collecting firewood can tell us on whom is the burden falling most heavily, for example if the girls in the family are responsible for collecting firewood and water and thus have less time than boys to devote to education.

*Recommendations:* A list of non-timber forest products collected in this region of Bolivia has been compiled through focus groups, and respondents will be asked about their collection and use of these products. In the final field test, methods for quantifying products that households extract for their own consumption should be explored, particularly if consumption of NTFPs is high in the study area. If forest extraction is more important to households in the study area, focus group discussion can inform a revision of this section to be appropriate to the households that will be surveyed. Even if products consumed at home cannot be quantified reliably, more detailed data on NTFPs sold should be collected if this is an important component of household income. For all products sold, respondents should be asked how much income they receive from each product, and for products consumed in the household, respondents should be

asked how much that or a substitute product would have cost for their family to purchase (Godoy, Lubowski et al. 1993).

More details are included on firewood than on other forest products, including who in the household is responsible for gathering firewood and how long they spend gathering firewood. Time spent gathering can give an estimate of how much they are extracting, even if exact quantities are impossible to document, and tells us about the time cost to the family of collecting firewood. Time spent walking to where firewood is collected can also give us a measure of forest cover and access, as deforestation or degradation can increase the time necessary to reach forested land from which to gather firewood. Lastly, asking respondents where they collect firewood can tell us if they are using communal land or harvesting firewood illegally from conserved land. This is a question that needs further testing in the field site to ensure that we can ask about illegal harvesting in a way that does not make respondents uncomfortable.

#### *4.1.3: Land use decision-making*

*Issue:* To understand the mechanisms through which payments change land use, we will examine not only how people use their land, but also some of the motivations behind how they make land use decisions. By understanding what factors influence how individuals choose to use their land, Natura will be better able to design programs to increase conservation and decrease environmentally damaging activities. According to a study by Asquith et al (2008), many landowners in Natura's Los Negros project enrolled land for which payments were below their economic opportunity cost, indicating that their decision to enroll is based on more than a simple calculation of the economic return to conservation compared with alternative land uses. Opportunity cost is part of an analysis of additionality, but it does not tell the complete story. Conservation may be additional if it results from the project's institutionalization of *de facto* land tenure by reinforcing intra-village acceptance of tenure claims, making farmers feel more secure making long-term investments, or if the project removes financial, technical, or institutional barriers to land uses that provide the desired environmental services (Brown, Burnham et al. 2000). Through our survey we hope to capture some of the other factors that landowners are including in their decision to participate or not.

Households are likely to face a variety of constraints on expanding cultivation. For example, payments may allow households to overcome capital or credit constraints to invest in

more environmentally benign practices that are actually more economically beneficial for them in the long run. On the other hand, payments may give households the capital they need to clear their land, thus resulting in the perverse effect of increased clearing rather than conservation (Antle and Stoorvogel 2008). If hired labor is not readily available, time may be a constraint. In Los Negros, farmers indicated that their agricultural clearing capacity is typically constrained to 1-1.5 hectares per year. Because of this constraint, most households in the program would not have been able to clear more land than they already did, indicating that payments may have made little or no difference in these households' land use decisions (Asquith, Vargas et al. 2008).

An important factor likely to influence land use decisions is a sense of security over land tenure, which is a problem for many small-scale subsistence farmers. Without security of long-term land tenure farmers are less likely to invest in management practices with long-term payoffs. This lack of security can lead to less sustainable management and lower incomes for farmers. In some cases involvement in a PES project can assist farmers in securing legal titles to their land and local recognition of the legitimacy of their claim to the land. While uncleared forest land can be considered unproductive and therefore subject to expropriation, enrolling in a conservation program can give official recognition to forest land and increase the legitimacy of land claims (Grieg-Gran, Porras et al. 2005). In many circumstances, such as in the upstream communities in the Los Negros watershed, landowners lack government-approved titles but rely on signed purchase contracts that are locally accepted as proof of land tenure (Asquith, Vargas et al. 2008).

Land use decisions may be based on advice and information that farmers receive and exchange with each other. In order to understand the role that social norms play in land use decisions, it is important to understand who influences households' decisions and on whom they rely for information and advice (Xiaodong, Lupi et al. 2009). The extent to which people trust outside institutions for advice on agricultural practices may also be a predictor of the success of a program that aims to change land use decisions.

*Recommendations:* In initial focus groups, respondents did not understand open-ended questions such as "Why do you decide to plant the crops that you plant?" Respondents were generally unable to answer these questions, or gave responses such as "I just plant the same things as always" (Anonymous 2009). Discussions revealed that households make changes in their land use from year to year, and that they face clear constraints to expanding cultivation, but

that more specific questions were necessary. In general, focus group participants were better able to talk about changes they had made recently than to talk in general about what drives their decisions. Through focus groups we developed a straightforward list of changes that landowners make in their agricultural activities: planting something new, no longer planting something they used to plant, increasing or decreasing cultivation of a given crop, or cultivating more or less of their land. Further discussions about those decisions led to a list of reasons why people would make changes, which have been revised further following the field test to ensure that codes capture most possible responses. Primary reasons for changing land uses include receiving advice or seeds from an institution or expert, changes in physical characteristics of their land, economic factors including changes in prices and access to capital and credit, and limitations to respondents' own capacity to work the land, such as health problems or lack of time.

To understand constraints to making changes, we will ask why households do not plant more than they do. In field tests, the most commonly identified constraints were lack of money and time, but also included labor, prices of products, quality or quantity of land, and capacity of the farmer themselves, such as illness or old age. This question could also provide an indicator of environmental quality, if respondents identify water (as two did in the field test) or quality of the land as constraints on cultivation.

We found in our survey test that respondents consult different people and institutions for different kinds of decisions: most respondents consult family members more than anyone else, but they are more likely to consult neighbors or institutions about how to improve their production or what they should sell than about what to plant. Focus group and field test results helped us compile a list of the possible decisions on which households might consult others (what to plant, what and where to sell, how to improve production), and with whom they might consult (family, community members or leaders, or various outside institutions), which will be given as response options for these questions.

Lastly, to see whether land tenure security has an impact on decisions, the survey should ask whether or not respondents have legal titles to their land and how secure they feel about their land tenure security.

#### *4.1.4: Environmental awareness*

*Issue:* Interventions such as Natura's can change behavior through multiple channels, including changes in social norms and values related to conservation and land use. A main interest of this study is to understand both how existing norms may influence the effectiveness of the intervention and how norms may change over time as a result of the intervention.

Existing norms and values will influence the likelihood of participation in the program, the likelihood of compliance with the conservation contracts, and therefore the ultimate environmental impacts of the program. In Costa Rica's national PES program, landowners with higher levels of environmental consciousness were more likely to enroll in the PES program (Arriagada, Sills et al. 2009). In a study of Mexico's national PES program, Shapiro (2010) found that 94% of the funds that communities received were invested in forest management and forest protection. While the majority of landowners in this study would likely not have cleared the forest that was enrolled in the program, forests were threatened by other factors, such as fire, pests, and illegal encroachment on the land. Communities and landowners invested in protections such as fire breaks, pest management, and patrolling their forests to ensure that their forests would remain conserved. This demonstrates that an understanding of threats to standing forests can enable landowners to protect the forests that they agree to conserve.

An awareness of the connection between cloud forest conservation and water provision can also facilitate the implementation of a program because less education is necessary to explain the link between the land use change for which upstream landowners are being compensated and the service that downstream landowners are receiving (Asquith, Vargas et al. 2008). In most cases, increased forest cover tends to decrease water flow because trees consume and evaporate more water than crops. The cloud forests conserved in Natura's projects are a rare example of a forest type that actually tends to increase water flow because the forest captures cloud-born moisture (Calder 2000; Bruijnzeel 2004). Irrigators in Los Negros, who can see the clouds that form on forested hillsides, understand this link and connected the decrease in water flow with both increased water use and forest clearing in the cloud forests upstream (Robertson and Wunder 2005).

Many societies have cultural norms and taboos that guide conduct towards the environment. While these informal institutions have largely been neglected in conservation design, they can be very useful because they are decentralized and self-enforced and thus do not

rely on any external authority for promulgation or enforcement. Norms for land use behavior that originate from within a community are often more effective than externally-imposed rules, and can be very useful in situations where external authorities are absent, distrusted, or ineffective (Cardenas, Stranlund et al. 2000; Colding and Folke 2001). The mediating effect of social norms that evolve over time as a result of the intervention may be particularly important because sustaining behavioral change beyond the end of the program is crucial to the success of the program. One way in which social norms change is through education and information. If mismanagement of watershed resources is due to a lack of understanding of the effects of deforestation, education may change the way individuals value and manage resources. Environmental knowledge and attitudes and support for conservation can be key determinants for the success of conservation programs. Conservation success has been shown to be higher in situations where the local public has a more positive attitude towards wildlife and the forest (Kleiman, Reading et al. 2000).

One claim that has been made from Costa Rica's national PES program is that it creates broad public awareness that intact forests and their environmental services have economic value (Arriagada, Sills et al. 2009). In rural Bolivia, many relatively poor irrigators pay to maintain irrigation systems and ensure water supply, so the concept of paying for water is already familiar to those who would be contributing to a PES program. On the other hand, there is a widespread belief in Bolivia that market mechanisms signify privatization and will lead to the restriction of use, particularly by the poorest resource users. Many Bolivians also question the philosophy of an economic valuation of nature, which could be an obstacle to participation in a payments program (Asquith and Vargas 2007).

It is unclear how the assignment of an economic value to environmental services will change behavior. The premise of an incentive-based conservation mechanism is that price changes lead to behavior change by simply changing the economic calculation that farmers make when deciding what to do with their land. But placing a price on natural resources may also affect the way that individuals value resources. Laboratory and field evidence has shown that economic incentives for behavior change often do not have the effect that one would predict. On the one hand, exogenously imposed prices may "crowd out" existing motivation to conserve natural resources, thus creating a perverse incentive for landowners to conserve only when they are paid to do so, rather than based on an intrinsic value they place on environmental protection.

On the other hand, it is possible that attaching a price to resources that have traditionally been considered “free” may increase the value attributed to these resources and raise awareness of the need to preserve them (Frey and Oberholzer-Gee 1997; Cardenas, Stranlund et al. 2000; Benabou and Tirole 2003).

*Recommendations:* To assess environmental awareness, the survey asks respondents to identify benefits that come from the forest, threats to the forest, what actions could be taken to help protect the forest, and environmental difficulties they face in their community. One of the research questions is how being paid for environmental services changes landowners’ understanding of the environment, including their understanding of the benefits of the forest. The field test does reveal some differences between the communities with and without PES. More respondents in Los Negros listed clean air, clean water, erosion prevention, and non-timber forest products, while more respondents in Comarapa listed hunting, firewood, and timber. The most striking difference is that nearly half of respondents in Comarapa identified firewood as a primary benefit of the forest, while none in Los Negros did. While this is a small non-randomized sample, it does indicate a possible shift in perceived benefits from the forest.

Threats and difficulties were not as easily understood as benefits: two questions were intended to capture what environmental problems people face and the causes of those problems, but many respondents gave the same answer to both. Threats to the environment in general was a concept that respondents in focus group did not understand in a consistent way, eliciting responses ranging from “people” as a general threat to specific environmental problems (rather than causes of those problems) such as erosion and diseases affecting crops and animals. When asked about the causes of a specific environmental problem such as landslides or water pollution, focus group participants understood more consistently what was being asked and were able to give responses that were consistent with the question, such as that deforestation can cause landslides (Anonymous 2009).

Because respondents are able to identify causes of specific problems but not general threats to the forest, there is a trade-off between capturing all of the environmental threats and getting responses that are consistent and that can be analyzed. Because Natura’s PES program targets forest conservation and watershed services, we have decided that focusing on specific problems related to Natura’s work in more detail will give us a better indicator of environmental awareness relevant to the project. The survey will ask specifically about water problems: about

the effects, the causes, and possible solutions, including what the respondent's family could do to respond and what the community could do, and whom the respondent would trust to solve the problem. Because this section has been modified significantly since the last field test, it will require additional field testing before final implementation.

## **4.2: Socioeconomic indicators**

Natura aims not only to increase conservation but also to improve the livelihoods of the communities and families with whom it works. For this reason it is crucial to measure whether families are better off as a result of their involvement with the project. This may include increased or stabilized income as well as improvements in well-being that may be observed in areas such as improved health and education outcomes. Socioeconomic effects may spill over to nonparticipants as well as participants, for example through changes in employment opportunities.

### *4.2.1: Estimating income and wealth*

*Issue:* In addition to increasing income for households, payments can provide a stable source of income and can allow households to diversify their income sources. Agriculture tends to provide highly variable income, so even if payments do not increase average income, households may benefit from the stability that they provide. If payments do not adequately compensate for the average opportunity cost of enrolling, as is the case for many participants in Los Negros, some households may opt for stability over higher expected incomes and benefit from added stability even if average income is slightly lower (Grieg-Gran, Porrás et al. 2005).

Because most families we will be interviewing do not have formal, regular salaries or savings accounts, capturing income and wealth is not a simple matter. Consumption is often used in surveys in place of income as a measure of economic well-being for a number of reasons. Income and wealth enable households to buy goods and services that generate economic well-being, which in the end is what we hope to capture. Income measures the potential to achieve a certain level of living standards, but by looking at a household's consumption, we can assess the living standards that they actually achieve with their income. Agricultural income tends to be uneven throughout the year, so income depends on the month during which a survey is conducted. Consumption tends to be more evenly spread out. Low consumption is therefore a

better indicator of poverty than low income, which may simply be due to the survey being conducted during the off-season for agricultural production (Grosh and Muñoz 1996).

Accurate information on consumption can in many situations be easier to gather than income. Self-employment income, such as agricultural income, is often very difficult for respondents to estimate, especially if individuals are receiving income from multiple sources or from irregular employment, as was the case for the majority of our respondents. Employment in our test survey included jobs such as construction, driving, and tailoring, all of which tend to be irregular. Of those who worked non-agricultural jobs, 42% did not know how much they had earned at those jobs in the past year. Money spent on goods and services tends to be easier for respondents to remember and estimate accurately. Respondents are also generally more likely to be honest about consumption than about income, as it tends to be a less sensitive subject (Grosh and Muñoz 1996).

To use consumption as an accurate proxy for income, a survey must be comprehensive and include all goods and services that contribute to people's welfare. A sample of household goods does not give an accurate measure of welfare across households because households spend different proportions of their income on different goods. A comprehensive consumption survey typically must be conducted over several visits so that enumerators can speak with the member of the household who is responsible for each area of expenditures, and so that individuals do not have to sit for an interview for too long on a given day. Because of recall error, some surveys use diaries for respondents to record expenditures over a certain period of time, which requires at least two visits to drop off a diary and pick it up (Grosh and Muñoz 1996).

*Recommendations:* Some researchers (see, for example, Labonne and Chase 2008) have foregone a complete list of expenditures in favor of simpler proxies for well-being, such as an index of valuable assets or nonessential purchases such as parties. Because our survey has multiple objectives beyond consumption, we have decided to gather detailed information only on key expenditures and assets so that time can be devoted to other areas of the survey, particularly on information related to environmental outcomes and social norms. Focus groups were dedicated to understanding which key assets and expenditures should be included in the survey so that it would capture the expenditures that are most important to families in our study area and that are indicators of economic well-being.

We asked focus group participants about the items they spend money on and that they would like to spend money on if they could afford to, and included these items in our survey.

Assets include:

- Characteristics of the dwelling: type of roof, windows, bathrooms, etc; services such as electricity and running water.
- Animals
- Vehicles
- Household goods: kitchen appliances, electronics, etc.
- Farm equipment

While we do not plan a detailed consumption survey, we hope to estimate overall expenditures on important categories including:

- Food
- Education
- Health
- Clothing
- Festivals

This is an area that will be tested further in the last field test to ensure that we can get estimates that are accurate, if not as detailed as some household consumption surveys.

#### *4.2.2: Economic access and constraints*

*Issue:* As addressed above, payments may help farmers overcome constraints such as a lack of access to capital and credit that are common among poor rural farmers. In an economic simulation of a payment for soil carbon sequestration, Antle and Stoorvogel (2008) found that farmers would benefit economically from using fertilizer at the level required by carbon contracts, but they did not because of constrained access to credit that would allow them to make the initial investment required. In this situation, payments for carbon sequestration could finance the transition to fertilizer practices that were both more beneficial economically for farmers and provide greater carbon sequestration services. Understanding the credit constraints faced by farmers can help us understand more completely the role that payments may play in farmers' economic calculations of their land use. Payments for environmental services may induce farmers to adopt an activity that would be profitable without payments but which they would be

unable to adopt in the absence of payments due to start-up costs. Households with limited access to credit may benefit the most from a payments program that removes the start-up costs of a transition in land use practices.

In the absence of savings accounts and formal loans, many households in low-income countries have developed informal mechanisms to deal with economic hardship and variability. Households may, for example, buy or sell durable goods, borrow from friends or neighbors, or rely on reciprocal exchanges of gifts or labor. These mechanisms may be important for consumption smoothing and insuring against risk for farmers whose incomes are seasonally variable and unpredictable (Wong and Godoy 2003). While one possible benefit of conservation payments is the income stability they provide, some research suggests that external payments may simply crowd out existing consumption-smoothing and risk-sharing practices in communities (Morduch 1999). By understanding the existing ways that households deal with risk and variable income, we can see whether payments do provide stability to households or simply crowd out existing mechanisms. This can also help us understand social networks in the community, as exclusion from such forms of social insurance can be a form of sanctioning. By learning who is borrowing from and lending to whom we can understand economic interdependence among households, which can help us understand how social norms may be spread in the community.

*Recommendations:* We ask in our survey about both informal and formal loans, including the terms on the loans in order to understand not only access but the quality of loan options available to respondents. If loans are available but only at exorbitant rates or if they are very difficult to obtain, they are not a viable option for many households. Unfortunately, respondents in our test survey who had taken out loans were unable to answer detailed questions about them. All respondents knew how much they had borrowed and how much they owed, but none knew the interest rate of their loan, the date they had taken out the loan, or the date when the loan was due. Respondents may know how the amount of each payment and the number of payments remaining, from which interest rates can be calculated, but testing is required to see which details about loans respondents are most likely to know. This is a section that is going to be tested further before the final survey implementation in order to find a way to estimate interest rates.

To learn about the informal ways households save money and obtain money when needed, we also ask what they would do with any surplus income they earn and how they would

obtain money in an emergency. Responses in this section were variable in the survey test: more than half of respondents said they would use savings or take out loans in the case of emergency, while the rest would rely on family or would sell assets such as land or cattle. We can also learn from our questions on valuable assets. Because households may buy expensive items such as appliances when they have high income and sell large items when they need money, we ask about any assets that households have bought or sold in the past year. A high degree of buying and selling assets may indicate that households are using assets as a way to save money rather than bank accounts and loans.

Many households were uncomfortable being asked about assets they had sold, particularly when being asked about large and expensive items, such as tractors or generators, that very few people in the community owned. This has been resolved by removing some of the expensive items that nobody in our test survey owned, but including an option for “other” so that those items are captured for the few households that do own them. While there is a risk of excluding items by asking respondents to remember them rather than reading off a list, respondents are less likely to leave out something large and expensive like a truck than something small like a machete (Molina, Aguilera et al. 2009). Thus smaller items that did not make respondents uncomfortable will be read off to ensure that they are all included, while respondents will be likely to remember large items like tractors without prompting.

#### *4.2.3: Employment and income sources*

*Issue:* It is important to capture the different sources of income for each household, even if exact income is difficult to estimate precisely. This can help us understand whether payments are helping households diversify or stabilize their income sources and understand what motivates households to participate in the program. In a study of Costa Rica’s national PES program, Arriagada et al. (2009) found that households with a higher proportion of their income coming from non-farm sources were more likely to enroll in the program and conserve forest land. These families spent more time on their off-farm jobs and thus had less time to dedicate to agricultural activities, and received more income from off-farm jobs than they could have received from agricultural activities.

Income and employment information can also help us understand spillover effects on nonparticipants in the community. Employment opportunities in a community may increase or

decrease as a result of a PES program. Landowners who participated in Natura's project in the Los Negros watershed and received bee boxes as compensation for conservation hired landless workers for their apiculture activities. It is possible, however, that these landless workers would otherwise have been employed as laborers on land that would have otherwise been cleared for agriculture (Asquith and Vargas 2007). Whether net jobs are created or lost due to a PES project depends on the relative labor intensity and profitability of the conservation-related activities and those they replaced. To measure the economic impacts of PES on a community, employment impacts for non-landowners must be included in addition to benefits to participating landowners (Grieg-Gran, Porrás et al. 2005).

*Recommendations:* In focus groups and our test survey, we found that nearly all households rely primarily on agriculture but that in approximately half of the households surveyed at least one person had some kind of off-farm employment. Much of this employment is irregular and informal, making it difficult to measure accurately, as discussed previously. If an individual works at a variety of jobs that change seasonally, it is hard to capture the full range of employment over the course of a year. If we ask about all employment activity within the last year, respondents are unlikely to be able to respond if they are engaged in multiple activities. On the other hand, if we only ask about the last week or the last month our responses will be biased depending on when in the year the survey was conducted. One solution to this problem is to ask broadly about all jobs worked in the past year, and ask for more detail only for the jobs worked in the past week (Grosh and Muñoz 1996). This is an area that will be tested further before final survey implementation.

#### *4.2.4: Non-income measures of well-being*

*Issue:* Indicators of well-being, such as health and education, that are related to increases in wealth can contribute to a picture of the socioeconomic impacts of the intervention. Families that are better off economically are more likely to have the time and disposable income to educate their children, invest in higher-quality food, and access health care, all of which in turn can lead to economic growth. Health and education may be impacted directly if they are provided as part of an intervention, such as in another payments program in Bolivia, the Noel Kempff Mercado Climate Action Project (Asquith, Ríos et al. 2002). Health may also be affected by changes in environmental quality, particularly water-related health problems (Grieg-Gran,

Porras et al. 2005). Health and education improvements may also come simply from increases in wealth. Basic health and education indicators therefore can contribute to an evaluation of the project's overall effects on local livelihoods, while information on expenditures on health and education can help us understand how households' allocations of expenditures change over time. If the project increases wealth, families may, for example, invest their extra income in their children's education, thus increasing long-term prospects for improvements in livelihoods (Grosh and Muñoz 1996).

Infrastructure, such as roads and electricity, is important for community development, as access to markets can provide better prices for goods both bought and sold, and for access to health and education. The impacts of PES on infrastructure could be positive or negative depending on the circumstances (Grieg-Gran, Porras et al. 2005). In Bolivia's Noel Kempff Mercado project, community members had relied on roads and transportation networks that were in place for timber activities were halted as part of the program. While local people lost important transportation infrastructure, they benefited from healthcare and education infrastructure that came with the project (Asquith, Ríos et al. 2002). This example demonstrates the need to look beyond what is provided directly by the project to secondary effects, such as the transportation network that was connected to the forest-clearing activity the project intended to stop (Grieg-Gran, Porras et al. 2005).

*Recommendations:* Because health and education are not the primary focus of our survey, we plan to include only basic indicators of both. Questions on education include school attendance, years of schooling, literacy, expenditures on education-related expenses, and access to primary and secondary schools. Questions on health include common health problems, behavior questions on sanitation and waste disposal, expenditures on clinic visits and medicines, and access to health clinics and hospitals. These questions have largely been taken from other household surveys that have gone into more depth on health and education than our survey (for example Grosh and Muñoz 1996; IFPRI 2005; Uganda Bureau of Statistics 2006). The one area where we do plan to go into more detail is on water-related health problems so that we can see whether there are any direct health impacts of changes in environmental quality. We plan to ask about cases of diarrhea for children in the family, including the number and seriousness of instances, visits to health facilities, and the amount of school missed due to illness. Because

water-related health problems are caused by both contaminated water and failure to take protective measures, we also ask about measures households take to clean the water they drink.

We also plan to include community-level measures of well-being, such as proximity to health facilities and schools and infrastructure. These indicators will be uniform for all households in a community, as was observed in the field test of the draft survey. In order to save time, rather than ask all households about a question to which they will all give the same answer, we plan to conduct a community-level survey with questions on roads, public transportation, services such as water and electricity, and proximity to schools and health clinics. Questions for this survey were tested along with household-level questions. Natura has field technicians in the region who are responsible for establishing contacts in each community in order to facilitate both data collection and implementation of the project. These technicians can identify an appropriate community leader who will be able to answer the community-level survey.

#### **4.3: Social norms and institutional indicators**

In order to examine the effects of PES on social norms in the community, our survey includes a section dedicated to community institutions, trust and cooperation within and between communities, social norms and values, especially those related to environmental behaviors, and the social networks through which norms and values spread.

##### *4.3.1: Community institutions and organizations*

*Issue:* Whether communities can successfully manage common resources such as water depends on institutional arrangements for resource management (Ostrom 1990). Existing community institutions may help to make the implementation of a payments program possible. In the Los Negros watershed, downstream irrigators were already organized before Natura's involvement. In addition to constructing canals, irrigators had created rules for water use and a system for enforcing those rules. The existence of a water management system with the social organization to support it meant there was less social infrastructure that needed to be created for the program. The extent to which both upstream and downstream participants in a PES project are organized around resource use is important both as a possible predictor of how challenging implementation will be and as a possible benefit of the project (Asquith, Vargas et al. 2008).

In case studies of payment-based projects, a benefit that has been observed is the development of local institutions and improved cooperation among neighboring communities

(Grieg-Gran, Porras et al. 2005). Natura's project in Los Negros resulted in the establishment of environmental committees in the upstream communities, decreased tension between upstream and downstream communities, and an increased recognition that watershed management is a problem that affects all resource users in the watershed and must be solved cooperatively (Asquith and Vargas 2007). We hope to track institutions in the communities involved in the study to see both whether existing institutional capacity is a predictor of project success and how the project affects institutions in communities.

We also want to understand the level of involvement and trust in community organizations. A high level of participation signifies willingness to invest the time and effort necessary for the creation and maintenance of community institutions. Trust for community organizations and the decisions they make is important to their success. It is not necessary for all community members to be actively involved in creating and maintaining institutional arrangements, but if community members generally disagree with decisions that are made, they are unlikely to comply with those decisions and institutions may be less successful.

*Recommendations:* We plan to gather information on existing organizations, the conditions that may contribute to institutional capacity for sustainable resource management, and how institutions change over time with the implementation of a PES project. Through focus groups we have developed a list of organizations that exist in the types of communities we will be surveying. We plan to ask about institutions related to environment and land use, such as agrarian unions, producers' associations, and irrigation cooperatives, because those organizations are likely to influence agriculture and land use decisions. We will also include organizations not directly related to agriculture or land use, such as school boards and local development committees, in order to understand better the general level of organization and community involvement. An active school board, for example, may not influence conservation behavior, but is an indicator of cooperation and involvement in the community, which indicates capacity for the creation of institutions for conservation and sustainable resource use.

The first measure of involvement is knowledge about what organizations exist in the community and about community meetings (Labonne and Chase 2008). We ask respondents about what organizations exist and about community meetings and decisions. To further measure involvement and trust, we ask about respondents' level of involvement in and trust for the organization to make decisions that they agree with and to do work that benefits the community.

In our survey test, we discovered that people who participated actively in organizations were not necessarily the same people who tended to agree with decisions made in the community. These are both important measures. Thus we also ask how much trust individuals have in organizations and how often they agree with the decisions they make.

#### *4.3.2: Informal institutions*

*Issue:* Community institutions are not limited to formal organizations but include informal institutions such as work-sharing agreements and cooperation among community members. Participation in such work-sharing systems and in community work is an indicator of cooperativeness within the community. If farmers work their land together they are also more likely to share information related to agriculture and land use, which may lead to environmental norms spreading among farmers.

Participants in our focus groups mentioned work-sharing arrangements common in the area, including *minga*, a tradition where a farmer throws a party for people who agree to help him with his work for the day, and *ayni*, when farmers share work and keep a tally of work-days owed to one another. Most communities where we ran focus groups also have a system of community work in which all households are required to participate. For example, one participant talked about work-days for jobs such as cleaning up the school and maintaining the road. Everyone in the community is required to participate, and anyone who does not participate is assessed a fine (Anonymous 2009).

*Recommendations:* We plan to ask about the rules for community work in the community-level survey. Respondents will be asked about the number of times someone in their family has participated in both community work and work-sharing arrangements in the past year in our individual-level survey.

#### *4.3.3: Environmental rules and norms*

*Issue:* An institutional benefit that may come with increased environmental awareness is the establishment of internal rules and norms to regulate behavior related to conservation and land use. It is not clear whether external payments will complement or crowd out communities' ability and willingness to regulate natural resources internally. External financial incentives for conservation can be seen as having two effects: a price effect and a crowding effect. While the price effect changes economic calculations in favor of conservation, the crowding effect can

move in either direction. A monetary incentive may reinforce the value of conservation and increase motivation to conserve. On the other hand, it may replace intrinsic motivation by changing individuals' relationship with nature to a purely monetary one or by shifting responsibility for conservation from the community to the external organization providing incentives. Both effects have been observed in the field and in laboratory settings (Frey and Oberholzer-Gee 1997; Cardenas, Stranlund et al. 2000; Velez, Murphy et al. 2008).

Rules and norms regulating land may have little impact without effective monitoring, enforcement, and sanctioning of those who violate the rules (Ostrom 1990). It is one thing to support environmentally friendly actions, but quite another to be willing to punish your neighbors for environmentally unfriendly actions. Sanctions are an important part of norm enforcement, so a measure of people's willingness to impose rules on themselves and enforce those rules can tell us something about how effective rules regulating resource use are likely to be. Sanctions can only be effective if people are willing to enforce them, so a willingness to punish those who violate the rules increases the likelihood that community members will continue to follow resource-use rules (Fehr and Fischbacher 2004).

In focus groups, no communities identified existing rules to regulate resource use or conservation, but many respondents talked about behavior that they identified as problematic, such as contaminating the water or clearing land close to the river. Many also made comments implying that they would like to have regulation of such behavior, but that they felt unable to do so. For example, during a discussion of behaviors that lead to water contamination, a focus group participant said, "We talk about doing something, and then we never do anything. Just a few people can't do anything, we need a whole group of people" (Anonymous 2009). This points to willingness and capacity as two necessary conditions to creating environmental regulations in communities, and we hope to capture both. If the intervention increases environmental awareness and consciousness, willingness to establish environmental regulations may increase. If the intervention increases institutional capacity, as has been observed in some past PES projects, the ability to establish such rules may increase.

In the field test, respondents were asked whether they would support the idea of having community-level rules about what farmers could do with their land for the purpose of protecting the environment, and 89% of respondents said yes. Given that none of the communities actually have such rules in place, this response indicates either that people are willing to support

environmental regulations in theory more than in practice or that communities lack the capacity to institute regulations that community members support, or likely both. Respondents knew that they were speaking with an environmental NGO, so social desirability bias, the tendency of respondents to give answers that will be viewed favorably by the interviewer, is likely influencing responses here as well (Fowler 2002).

*Recommendations:* General support for environmentally friendly behavior does not tell us much, particularly when almost everyone gives the same answer, so these questions have been made more concrete and specific. The survey includes questions about the kinds of environmental rules that exist and that respondents would support. When asked what kinds of rules respondents would support for environmental protection, respondents gave not rules that could be implemented, but rather actions that individuals could take to protect the forest, such as clearing less or planting trees, or vague statements such as respecting the forest. We have therefore changed this question to ask whether respondents would support a list of specified rules in order to understand not only whether respondents support environmental regulation in general but what kinds of regulations they would be willing to accept. Because this question has been changed, we should pay attention to how it is received in the last field test.

Of respondents who supported the idea of imposing environmental regulations in their community, 80% supported punishing violators. Responses to the open-ended question of what kinds of sanctions they would support were more specific than to the question about types of regulations. 72% of respondents who supported punishing violators suggested imposing a fine, and other responses included making violators do community work or reforestation. Like the question about types of rules, we have made this question more concrete by asking respondents what specific punishments they would be likely to support. The open-ended responses in the test survey for both of these questions helped us identify specific options to include in the final survey instrument.

#### 4.3.4: *Value and attitudes*

*Issue:* Because the goal of a PES program is to internalize the externalities that one's land use imposes on others, it is important to address both individuals' understanding of those externalities, as addressed earlier, and a measure of how they feel about their neighbors that might predict their proclivity to account for their neighbors' well-being in their land use

decisions. The impacts on cooperation and trust within a community may be positive or negative. Because not all community members receive payments, particularly if there are a large number who do not own land, it is possible that the program could increase inequality in the community, leading to increased social conflict (Grieg-Gran, Porrás et al. 2005). In Natura's Los Negros program, some community members in Santa Rosa da Lima, one of the upstream communities, are resentful because of their perception that Natura has only helped the richest members of the community, because only those with land are eligible to receive payments. This has created tension between participants and nonparticipants within the community, and nonparticipants believe that the program has increased economic inequality (Molina, Aguilera et al. 2009).

Other surveys have asked questions about values and attitudes, namely the World Values Survey (2005), which has been measured social and political values in 60 countries around the world, and the Latinobarómetro Survey (2008), which is used to measure public opinions annually in 18 Latin American countries. The benefit of using these questionnaires is that they have been tested and applied extensively in the developing world and, in the case of the Latinobarómetro questionnaire, in Latin America in particular.

*Recommendations:* We selected questions from existing surveys related to trust in others, cooperation, and social values, and adapted them to be understood in our field setting. The section on attitudes and values includes goals and values that are important to the respondent and questions about cooperation with others, economic equality, and trust in other people.

Because we are working with a population with education and literacy levels, significant field testing was necessary to ensure that questions are worded in a way that is easy to understand. Many questions on values and attitudes, for example, ask respondents to rank their opinion on a numerical scale, such as ranking how strongly they agree or disagree with a particular opinion on a scale of 1 to 5. Our subjects were very often unable to answer questions numerically, and would instead simply respond "yes" or "no" on numerical ranking questions (Molina, Aguilera et al. 2009). Both the Latinobarómetro and World Values Surveys use cards for respondents to indicate their answers. Survey instruments designed by International Forestry Resources and Institutions researchers (2006) ask similar questions in two parts: first whether respondents agree or disagree, followed by how strongly they feel about their answer. We tried cards with both numbers and faces to indicate degree of agreement, but our enumerators indicated that respondents did not clearly connect either the numbers or the faces to their level of

agreement with the statement (Molina, Aguilera et al. 2009). The method that was clearest for respondents was for enumerators to read the response options in full (i.e. strongly agree, agree, neutral, disagree, or strongly disagree), and probe for a more detailed response if respondents simply answer “yes” or “no.” This was the most time-consuming option, but the only way we could get clear answers from our respondents. It also requires enumerator training to ensure that enumerators probe for the correct responses.

The survey includes questions to measure the degree of trust respondents have for people and institutions within their community as well as people from neighboring communities. Natura’s project in Los Negros lists among their successes not just improved institutions in participating communities but decreased tension between upstream and downstream communities, so we want to assess trust and cooperation not only within communities but between communities who share a water source (Robertson and Wunder 2005; Asquith, Vargas et al. 2008). Both the Latinobarómetro and World Values Surveys include a number of questions about trust, including a respondent’s general level of trust for others and more specifically about trust of different types of people and organizations (WVS 2005; Latinobarómetro 2008). These questions have been adapted to ask about the types of people and institutions that are relevant for our study and to make sure the questions are worded in a way our respondents understand.

#### *4.3.5: Trust for outsiders and support from external institutions*

*Issue:* Asquith et al. (2002) argue that for conservation and development projects to help local people, those people must have a voice in the design of the project so that they can articulate their needs and priorities and contribute local knowledge that can increase project success. Perceptions of outside institutions, including government agencies and NGOs, who are likely to be involved in a PES project are therefore important to consider. Where community members trust external institutions and feel included in the process of project development, they will likely be more interested in participating and more likely to view the project as one that will benefit them. If local people feel some ownership over project development and connect the project goals with their own needs and priorities, we may observe less of a crowding-out effect than if the project were viewed simply as externally imposed limitations on land use.

Views of outside institutions are related to institutional capacity within a community. A component of institutional capacity is a belief that community members have the ability to work

together to solve common problems. Projects tend to be successful if they are partnerships between implementing organizations and communities, rather than projects initiated and carried out by external institutions. Such a partnership is challenging if community members see themselves as recipients of aid from outsiders rather than as potential partners in the project. Focus group discussions on perceived problems and possible solutions revealed a near-consensus that the best or only way to solve problems in their communities was to ask for money and projects from the municipal or state government or from NGOs, indicating that perceptions of internal capacity to solve problems is low.

In rural Bolivia, distrust of outsiders and institutions, particularly international organizations or those from the city, is very high due to a history of failed development efforts and of outsiders exploiting natural resources and leaving little for local people. Trust is important for the success of these projects: landowners must trust downstream resource users and involved NGOs to provide the compensation they promised, and downstream resource users must trust the upstream landowners to comply with the land use restrictions for which they are being compensated. Trust is needed in part because of a lack of formal enforcement mechanisms, and is one of the reasons why Natura has focused on small-scale projects where payments stay within a given watershed (Robertson and Wunder 2005; Asquith and Vargas 2007). However, despite the small scale of its initial project in Los Negros, Natura struggled to gain the trust of communities. As a result, uptake was slow and distrust continues to exist in some participating communities. Downstream farmers lacked trust that payments would actually lead to conservation, while some upstream landowners were fearful that the program was designed to appropriate their land. Because there was no credible downstream institution to ensure that buyers would contribute equally to the fund, there was the possibility of conflict among downstream farmers related to who was and was not contributing, which could increase uncertainty among upstream landowners that they would continue to receive payments (Asquith, Vargas et al. 2008).

*Recommendations:* We aim to address, in a general sense, the trust that respondents have for outside institutions and for members of other communities, to see both whether trust is a necessary condition for project success, and to see whether the project itself increases trust for institutions and other communities. Questions similar to those asked about trust for individuals are included to measure trust for external institutions and neighboring communities.

We also want to understand the role that respondents see external institutions playing in resolving problems in their communities. Several questions address whether respondents believe their communities are capable of solving important problems internally or whether they would turn to help from external institutions. Because we found in focus groups and the field test that respondents are more capable of answering concrete and specific questions, we ask about how respondents think the community can best deal with a set of specific problems, namely those related to the environment, rather than how the community can deal with problems generally. Lastly, we ask which actions respondents would be willing to take, such as accepting limitations on their land use activities or contributing work or money, to solving community problems.

## **5. Conclusions and Recommendations**

The survey instrument included here has been designed specifically to evaluate the intervention in the ANMI Rio Grande – Valles Cruceños, but can be modified for use in future evaluations that Natura may wish to conduct of their interventions. Field tests should be conducted for any questions that are changed or added, and for the modified survey as a whole to ensure that it gathers all of the necessary information and that it is appropriate for the area where the survey will be conducted. Following are some recommendations for the field test process based on experiences from developing this survey instrument.

### **5.1: Documentation**

Detailed documentation of the evolution of the survey is useful for making any changes to the survey and for developing future surveys. Documentation should include questions that were tested, reasons for making the changes that were made, and notes from discussions with respondents. More detailed discussions with respondents can include not only their answers to questions but how they interpreted questions and went about answering them. Such information can help survey designers ensure that people are interpreting the question in a way that researchers want them to and help understand the cognitive processes behind responding to questions (Grosh and Muñoz 1996). Documenting changes to the survey can be especially useful if changes develop and questions need to be altered or added. In several cases, we deleted questions we believed to be unnecessary or because they were not well understood, and decided later, due to changes in the study design, to include them again. More detailed documentation of

why these questions were removed could have helped us reintegrate them into the survey more easily with less testing.

## **5.2: Field tests**

In order to avoid affecting the responses of people who will be included in a study, it is advisable to conduct focus groups and test drafts of a survey with people outside of the study area but who are as similar as possible to the respondents who will be interviewed (Fowler 2002). We conducted focus groups and field tests in communities close to the ANMI and deemed to be relatively similar to communities in the study area. This poses two potential problems. The first is that households may not be as similar as we had hoped, resulting in a survey that is appropriate for one region but not for the region where we hope to collect data. Because we consulted significantly with local experts who had worked in both the ANMI and in the areas where we tested our survey, we believe this will not be a serious concern in our case, but it is something that Natura should be aware of if adapting this survey for use in other areas.

The second and more serious problem is potential resistance in communities where focus groups and field tests are conducted. In several of the field work sites, local community members were distrustful of outsiders, and many complained that NGOs had come into their communities and made promises that they had not kept. Much of this may be due to miscommunication. For example, in several communities in El Torno, Natura had previously conducted a survey to assess opportunity cost of the land to determine whether the site would be appropriate for a PES project. Natura had determined from this survey that the site was not appropriate for a project (Marin 2009). Many community members believed that Natura had promised to implement a project and were therefore distrustful of NGOs and unwilling to work with our research team. Because focus groups and field tests must be conducted in an area that will not be part of the intervention to be studied, they require the cooperation of communities that will not benefit from the intervention. Careful communication is necessary to ensure that participants understand that their participation will not result in the implementation of a project in their community. In our experience, community members were less willing to participate if there was no benefit to them, so researchers must find a way to encourage participation without making false promises. In our survey test, participants were given hats as gifts as a token of our appreciation for their

participation. Gifts are recommended to thank participants, and it should be made clear that further compensation will not be provided.

### **5.3: Survey design**

Care must be taken to minimize errors in the data collected. A survey instrument should be formatted to make it as easy as possible for enumerators to conduct in the field and to enter the correct information. Enumerators need to know which questions to ask which people, which responses to read out loud and which questions to leave open-ended, which codes to enter for all possible responses, including non-response. Response codes must be clear and simple, and they must exhaust all likely answers to a question. Responses should in general be mutually exclusive, unless respondents are explicitly given the opportunity to give more than one response. If only one response is wanted, responses can be made mutually exclusive by adding a qualifier, such as primary, first, or most recent (Grosh and Muñoz 1996).

The order in which questions are asked can be unrelated to how data will be analyzed, but should reflect what will be easiest and most comfortable for respondents. For example, we are interested in data on firewood collection to understand use of forestland, but because firewood is used for cooking, it is easier for respondents to think about firewood when they are thinking about other sources of energy they use in the kitchen and household (Molina, Aguilera et al. 2009). Consistency checks should be built into the survey to make sure that accurate information is being collected. For example, a survey can include both age and date of birth, and if responses are inconsistent, enumerators can probe for the correct answer. For accuracy, respondents should also be allowed to choose units that they use and understand, to reduce error in converting to an unfamiliar unit. Conversion into standard units can be done later, but it is important to gather conversion information for any non-standard units (Grosh and Muñoz 1996)

An important decision to be made for every question is whether to give response options or to leave the question open for respondents to answer. If options are read out loud they will influence responses, while leaving a question open-ended leaves makes it difficult to ensure consistency (Fowler 2002). In focus groups we read a list of possible benefits that could come from the forest, and respondents generally gave positive responses for nearly all of the benefits. When asked the same question without being prompted, respondents gave widely varying responses. Responses that respondents come up with themselves are more informative in terms

of what benefits respondents actually associate with the forest, but open-ended questions are more challenging to code and analyze. Focus groups and field tests have helped us identify the appropriate response codes for open-ended questions, and focus groups should be conducted for any future survey to ensure that response codes are appropriate for the population in question. Field tests also revealed that enumerators frequently recorded responses inconsistently or incompletely, so care should be given to ensure that enumerators understand response codes and record responses in a consistent way.

To avoid bias, it is important that all questions are asked in a uniform way. Questions should be written out in their entirety and read verbatim. According to a study of World Bank surveys, errors were 7-20 times higher on questionnaires without exact wording than on questionnaires with exact wording (Grosh and Muñoz 1996). In early trial runs of the survey, enumerators were free to alter the wording to find ways to ask each question that were most natural and most clearly understood. This process informed the wording used in the final questionnaire. For many questions, it is necessary to probe respondents for answers, such as if they answer “I don’t know” or give an incomplete response, such as excluding the units. These questions should be anticipated, and enumerators should be trained in a uniform way to probe for answers on such questions (Grosh and Muñoz 1996).

Respondents are more likely to give accurate and honest responses if they feel comfortable. Questions should be phrased to minimize discomfort for respondents, and respondents should be assured that their responses will be kept confidential. Sensitive questions should generally be asked towards the end. This gives interviewers time to develop a rapport with respondents to increase the likelihood of a respondent answering the question. Additionally, if a respondent does react negatively to sensitive questions and terminates their participation, information from previous questions will still be usable (Grosh and Muñoz 1996; Rea and Parker 2005). We found questions related to money and questions that asked about opinions rather than facts were most difficult and uncomfortable for respondents, so these questions have been moved to the latter part of the survey (Molina, Aguilera et al. 2009).

#### 5.4: Areas in need of further testing

There are a number of questions that require further testing before final survey implementation. These include areas that were unsuccessful in the field test and therefore needed significant revision as well as questions that have been added to the survey since the field test.

1. Ethnic group: We need to learn what ethnic groups exist in our study area, and the sensitivity of asking about ethnic identity.
2. Agriculture:
  - a. Make sure we include all crops commonly grown in our study area, as this varies from region to region.
  - b. What decisions related to farming do people consult others on? Make sure our list (what to plant and sell, how to improve production) is accurate and complete.
  - c. Investments: details about irrigation systems that people may have invested in and other land investments that should be included.
3. Firewood:
  - a. Units: what units are used for firewood, whether units are consistent.
  - b. Where people collect firewood, and how to ask this, especially if it's from protected areas or collected illegally.
4. Other forest products extracted in study area, as this may differ from test site.
5. Environmental Quality:
  - a. What problems are caused by poor water quality? Low quantity? Landslides?
  - b. What are the causes of poor water quality? Of poor water quantity? Of landslides?
  - c. Why would these problems affect some people more than others?
  - d. What could you do about this problem? What could your community do?
6. Assets:
  - a. Window materials in the study area, as this has been added to the questions about dwelling characteristics. Windows are easier to upgrade than wall or materials, so they are more likely to change with increases in wealth than walls roofs.
  - b. Sources of electricity, and how people understand sources of electricity.
7. Consumption:
  - a. What are the significant expenditures that households spend money on, and how they categorize their expenses.

- b. How accurately people can estimate their overall expenses on food, clothing, etc., if we do not ask for details on individual food items, clothing items, etc.
- 8. Employment: How best to estimate employment and income from irregular and informal labor.
- 9. Loans: What is the best way to ask people about the interest rate, and what details about loans are people able to remember?
- 10. Health:
  - a. What health problems are frequently observed in the study area?
  - b. What health problems are attributed to water quality?
- 11. Institutional capacity:
  - a. What are the reasons people don't trust community organizations or outside organizations?
  - b. What could communities do to resolve problems in the community?

In addition to learning about each of the topics above, the full survey should be tested with these new questions incorporated to ensure that the survey is coherent, complete, and not redundant with the new or revised questions.

## **5.5: Conclusions**

Evaluation is crucial for understanding the impacts of Natura's projects in the communities where the organization works so that projects can be improved to meet Natura's objectives most effectively. The survey instrument included in this project will allow Natura to conduct a large-scale, rigorous evaluation of its project in the Rio Grande – Valles Cruceños management area. This will allow Natura to improve its own programs and contribute to our understanding of the ways in which PES programs change social norms and conservation behavior. By following the recommendations included in this report, Natura can modify the survey instrument to evaluate other projects in the future, choosing the sections and questions that are appropriate for the project and modifying as needed for the region and the population. With an improved understanding of the environmental, socioeconomic, and institutional impacts of PES, Natura and other organizations can design interventions that more effectively meet both social and environmental goals.

## **6. Appendix I: Focus Group and Field Test Locations and Dates**

<u>Date</u>	<u>Location</u>	<u>Description</u>
9 June 2009	Quebrada León, El Torno	Focus groups
12 June	Quebrada León, El Torno	Focus groups (2)
20 June	San Pedro, El Torno	Focus group
20 June	El Torno	Focus groups (3)
21 June	La Forestal, El Torno	Focus group
21 June	La Forestal, El Torno	Focus group with draft questions (3)
30 June	Quebrada León, El Torno	Draft survey test
16 July	Pozuelos, Mairana	Focus groups (2)
16 July	Pozuelos, Mairana	Draft survey test
17 July	Cerro Verde, Mairana	Focus groups (2)
17 July	Cerro Verde, Mairana	Draft survey test
18 July	San Juan, Samaipata	Draft survey test
27 July	Limoncito, El Torno	Draft survey test
30 July	Quiñales, Comarapa	Draft survey test
31 July	Quiñales/Verdecillos, Comarapa	Draft survey test
1 August	Quiñales/Verdecillos	Draft survey test
2 August	Santa Rosa da Lima, Los Negros	Draft survey test
3 August	Santa Rosa da Lima, Los Negros	Draft survey test

## **7. Appendix II: Focus Group Guiding Questions**

These questions were used to guide discussion during focus groups for the development of themes and questions for the survey. Focus groups were fairly unstructured and only some of these questions were covered in each group.

### **Environmental knowledge and perceptions**

#### **-Knowledge and information:**

Do you know what effects your land decisions may have on others? And vice versa?

Do you know what you could do to protect water supply?

Where do you get information about the environment?

What sources of information do you most trust? What information is most useful?

Has anyone (who?) come to teach you about the environment and conservation practices?

#### **-Importance of environment:**

What environmental resources are most important for you?

Do you think your resource use will change? Why? What threatens those resources?

What can you/others do to ensure a steady supply of those resources?

What services does the environment provide? Do these services have an economic value?

Do you leave some of your land in conservation? Why?

#### **-Changes:**

Do you feel the environment has changed recently? Why do you think this has happened?

How much are you affected by these changes personally?

Has the productivity of any of your activities (agriculture, etc) changed?

Are people in this community all equally affected?

Who do you think suffer (or benefit?) most from these changes?

#### **-Problems:**

What are the biggest environmental problems, and why are they problems?

What do you believe causes the problem?

Have those problems changed? Why do you think they have changed?

Do environmental problems come primarily from inside or outside the community?

Do you think there are threats to the environment? What are they?

#### **-Problem-solving:**

What do you believe are the solutions to environmental problems?

Do you think that you can do something about this problem?

Has anything been done to solve the problem? Was it effective?

Who would you trust most to solve this problem?

Can you give me an example of a decision that this community took to preserve the environment?

Can you give me an example of a problem with the environment that this community faced but could not solve?

#### **-Rules**

Does your community have any rules about the environment?

Do you think that your community could make rules to protect the environment?

What kinds of rules could your community have?

Who would decide about these rules?

Do you think this would be a good idea?

### **Land use decisions**

#### **-Decision-making:**

How do you make land use decisions? How do you decide what to plant each year?

Do you talk about land use decisions with your neighbours?

Can you give me an example of one such conversation?

Do you observe what use your neighbours make of their land?

How do most people in your community make decisions on how to use their land?

#### **-Understanding of effects of land use:**

Do you think that the use that other farmers do of their land affects you?

When you think about decisions regarding your own land use, are you aware of any impacts from your land use on other people?

#### **-Land tenure:**

Does security of tenure influence your land use decisions?

Do you have secure land tenure?

#### **-Outside influences:**

Have others tried to influence the way you use your land (government, NGOs etc)?

How have you reacted?

### **Community dynamics**

#### **-Cooperation:**

Do people cooperate with each other to solve problems in this community?

Can you give me examples of things people help each others with?

How do people get together to solve a problem?

Can you tell me the last time you helped others in your community? What happened?

Whom would you ask for help for a given problem?

Whom would you be most likely to help if they asked you?

If someone helps you, are you expected to return the favour?

Is someone who helps regarded better in the community?

Do you teach your kids they should help others?

Are there institutions or sanctions to foster cooperation?

#### **-Problems with cooperation:**

What do you think are the obstacles to cooperation?

What happens if someone doesn't help?

Can you tell me about the last time that there were problems with cooperation, and what was the reaction of other community members?

#### **-Community work**

Do people in your community do community work?

What happens if someone does not participate?

#### **-Conflict:**

Is there frequent conflict between community members?

What are the common causes of conflict?

How are conflicts in the community dealt with?

Can you give me an example of how a conflict developed and how it was solved?

#### **-Community problems:**

What are the main problems that people in this community face?  
How did they become a problem? What do you think are the main causes?  
How much are you affected by them?  
Is everyone in the community affected equally? If not, who is most affected?  
Do problems in your community come primarily from inside or outside the community?

-Problem-solving:

What can be done to solve community problems?  
What can you do personally to solve them?  
What institutions would you trust more to solve them?  
Can you give me an example of one problem that this community had to face, and how it solved it?  
Can you instead give me an example of a problem that this community faced, tried but did not manage to solve?  
What do you think was behind this success/failure?  
Does the community have a plan to solve the problem? If so, how was the plan developed? Did anyone assist?

-Trust, etc:

How close do you feel to other members of your community?  
Do you trust other community members?  
Do you trust members of neighbouring communities?  
How long have you been living in this community?  
Do you plan to leave this community?  
Why do people come into or leave this community? Can you give me an example?

-Decision-making

What are the important things your family or community has to make decisions about?  
What are the decisions about which you might seek advice? From whom?  
What decisions do you make for your family?  
What decisions are taken on the community level? Who makes these decisions?

## **Community institutions**

-General:

What are the institutions in the community?  
What does each institution do?  
What decisions does it take and how?  
Can you walk me through a community meeting and how decisions are taken there?

-Effectiveness and trust:

For each institution, do you trust it?  
Can you give me an example in which it has been effective in solving a problem?  
Can you give me an example in which it has not been effective?  
How do you feel about decisions taken by each institutions?  
Do you respect them? Do you agree with them?

-Interaction with institutions:

Do you approach any of these institutions? Why do you approach them?  
Can you tell me about the last time you did it?  
Whom would/did you approach about advice, etc?

## **Community meetings**

### **-Before the meeting:**

- How are community meetings decided? Are they regular or called when issues arise?
- Can you give me an example of a situation in which a meeting is called for and describe the process that leads to the meeting?
- Do people turn up when they are called to a meeting?
- How much in advance has a meeting to be organised for people to turn up?

### **-During the meeting.**

- What happens during a community meeting?
- Who leads the discussion?
- Can you describe the last meeting you had?
- What issues are usually discussed?
- How are decisions taken?

### **-Records.**

- What records are kept from each meeting?
- Can I see the minutes from the last meeting?
- Would it be possible to transcribe these minutes as they may give us useful information on how decisions are taken in the community and what issues are discussed?

## **Relations with other communities**

### **-Cooperation:**

- Do people cooperate with others in different communities?
- Can you describe to me when it happened last?
- How did cooperation start, who initiated, who participated?
- What things do you cooperate on with other communities?
- What do you think about it?
- Can you give me an example of when cooperation was tried but failed?
- What do you think are the obstacles to cooperation?
- What are the issues that you think require cooperation across villages to be dealt with?
- What institutions would you trust more to foster collaboration across communities?
- Do you trust outsiders?

### **-Conflict:**

- Is there frequent conflict between communities? What are the causes of conflict?
- How are conflicts with other communities dealt with?
- Can you give me an example of how a conflict developed and how it was solved?

### **-Access:**

- How far is the nearest market?
- How often do you go to the market?
- Do you meet people from other communities at the market?
- Where else do you meet people from other communities?
- Do you talk to them?
- Can you give me an example of a conversation with someone from another village?
- What are the topics that you mostly discuss?

## 8. Appendix III: Survey Instrument

Survey Number		Name OTB/Code OTB							
Enumerator Name		Municipality							
Survey code (initials+date+time: SC01031855)		Date of visit (dd/mm/yy)							

**Section I: Members of the household**

I'd like to ask you some questions about the people who live in your household. Members of the household are those who share the same pot.

N°	Question	Format	Response									
1	How many people live in your house? (Total members including the respondent)	#										

Now I'd like to ask some questions about each member of your household. Let's start with the names of each and then we'll go to the questions.

Fill the table for each member of the household, filling each column before continuing with the next family member.

		Member 1 (Respondent)	Member 2	Member 3	Member 4	Member 5	Member 6	Member 7	Member 8
2	Name	Name							
3	What is the relation with the head of household?	0. Head of household 1. Spouse 2. Partner 3. Son/Daughter 4. Stepson/stepdaughter 5. Son/Daughter-in-Law 6. Grandchild 7. Great-grandchild 8. Second cousin 9. Stepson/daughter's son/daughter 10. Parent 11. Step-parent 12. Parent-in-Law 13. Brother/Sister 14. Aunt/Uncle 15. Cousin 16. Other (specify)							
4	Gender	0. Masc. 1. Fem.							
5	Age	#							

Starting with question 8, only ask those older than four years old.

6	Marital status	1. Single 2. Married 3. Partnered 4. Separated 5. Divorced 6. Widowed 7. Other (specify)							
7	Does ___ know how to read?	0. No 1. A little 2. Yes							
8	Does ___ know how to write?	0. No 1. A little 2. Yes							
9	Up to what grade did ___ study? (Indicate the last level completed)	0. None 1. 1st Elementary 2. 2d Elementary 3. 3d Elementary 4. 4th Elementary 5. 5th Elementary 6. 1st Middle School 7. 2d Middle School 8. 3d Middle School 9. 1st High School 10. 2d High School 11. 3d High School 12. 4 <sup>th</sup> High School 13. College							
10	Is ___ currently studying?	0. No 1. yes							
11	How many hours did ___ work with the land last week?	Hours							
12	How many hours did ___ work with activities not related to the land in the last week?	Hours							
13	In the last year, how many months did ___ live away from home?	[0-12]							

Now I'd like to ask you questions about your household			
14	For how many generations has your family lived in this community?	# More than 0 => Go to 17	
15	For how many years has your family lived in this community?	#	
16	Where did you come from?	1. This municipality 2. This province 3. This department 4. Another department (specify) 5. Another country	

#### Health

N°	Question	Format	Response							
Now I have some questions about health in your household										
17	How many children of less than 16 years in your household had diarrhea in the last year?	# 0 => Go to next section								
Fill the table for each child, filling each column before continuing to the next				<i>Child 1</i>	<i>Child 2</i>	<i>Child 3</i>	<i>Child 4</i>	<i>Child 5</i>	<i>Child 6</i>	
18	How old was each child who had diarrhea in the last year?	age								
19	How many days did this child have diarrhea?	#								
20	How many instances of diarrhea did this child have?	#								
21	How many days of school did this child miss in the last year because of diarrhea?	#								
22	How many times did this child go to the hospital or sanitary post because of diarrhea?	#								

### Section II: The household

How I'd like to understand better how your household functions and how you organize your household.

#### Assets

N°	Question	Format	Response
<b>House</b>			
1	Is the house where you live owned or rented?	1. Owned => Go to 3 2. Rented 3. Anticrético 4. Cuida 5. Other (specify)	
2	How much do you pay per month?	Bolivianos per month	
3	Does anyone in your household own another house?	0. No => Go to 6 1. Yes	
4	How many?	#	
5	Where? (Indicate all that apply)	1. This community 2. In the municipality 4. In Santa Cruz 5. Another community 6. Other (specify)	

Type of construction		
6	What are the walls of your house made of? (Select the primary material)	1. Brick 2. Adobe 3. Stone 4. Clay 5. Wood 6. Logs/palm/cane 7. <i>Tabique</i> 8. Other (specify)
7	What is the roof of your house made of? (Select the primary material)	1. Clay/mud 2. Metal calamina 3. <i>Caña hueca</i> 4. Cement fiber ( <i>Duralit</i> ) 5. Palm tree leaves 6. Slate 7. China 8. Concrete 9. Other (specify)
8	What are the windows of your house made of? (Select the primary material)	0. No windows 1. Uncovered 2. Cloth 3. Panels 4. Shutters 5. Glass 6. Wood 7. Other (specify)
9	How many rooms are in your house?	#
10	How many bathrooms are in your house?	#
11	Where are the bathrooms located?	0. Outside of the house 1. Inside of the house
12	What kind of bathroom do you have?	1. Connected to a public sewer system 2. Septic tank 3. Latrine 4. Other (specify)

Animals			
N°	Question	Format	Response
I'd like to know what animals you have and how many of each you have. If you don't have any, say "zero."			
13	How many horses?	#	
14	How many donkeys or mules?	#	
15	How many hens?	#	
16	How many ducks?	#	
17	How many pigs?	#	
18	How many dogs?	#	
19	How many cows?	#	
20	Do you have any other animals?	0. No => Go to 23 1. Yes	
21	Which?		
22	How many?	#	
23	Did you buy or acquire any of these animals in the last year? (Indicate all that apply)	1. Horses 2. Donkeys or mules 3. Hens 4. Ducks	
24	Did you sell any of these animals in the last year? (Indicate all that apply)	5. Pigs 6. Dogs 7. Cows 8. Other (specify)	

Vehicles			
N°	Question	Format	Response
I'd like to know what vehicles you have and how many of each you have. If you don't have any, say "zero."			
25	How many cars or trucks?	#	
26	How many motorcycles?	#	
27	How many bicycles?	#	
28	Do you have any other vehicles?	0.No => Go to 30 1. Yes	
29	What kind?		
30	Did you buy any of these vehicles in the last year?	1. Car 2. Motorcycle 3. Bicycle 4. Other (specify)	
31	Did you sell any of these vehicles in the last year? (Indicate all that apply)		
Household goods			
N°	Question	Format	Response
I'd like to know what household goods you have and how many of each you have. If you don't have any, say "zero."			
32	How many refrigerators?	#	
33	How many radios?	#	
34	How many televisions?	#	
35	How many cell phones?	#	
36	How many gas ovens?	#	
37	How many generators?	#	
38	How many DVD players?	#	
Tools			
39	How many hand spikes?	#	
40	How many shovels?	#	
41	How many axes?	#	
42	How many ropes?	#	
43	How many plows?	#	
44	How many fumigating backpacks?	#	
45	How many machetes?	#	
46	How many wheelbarrows?	#	
47	How many seeding machines?	#	
48	How many silos?	#	
49	Any other tools?	0.No => Go to 52 1. Yes	
50	Which?		
51	How many?	#	
Expenses			
N°	Question	Format	Response
Energy consumption			
52	Do you have electricity in the house?	0.No => Go to 54 1. Yes	
53	Where does the electricity come from? (Read options aloud)	1. Public grid 2. Solar panel 3. Generator 4. Other (specify)	
54	Do you use gas in your house?	0.No 1. Yes	
55	Do you use firewood in your house?	0.No => Go to 65 1. Yes	
56	Who in your house collects firewood?	Use the codes from page 1	
57	How many times in the last month did someone in your house go to collect firewood?	#	

58	¿Where do you collect firewood? (Indicate all that apply)	1. Your own 2. A friend's land 3. Rented land 4. Communal land 5. Buy firewood 6. Other (specify)	
59	What kind of firewood do you collect? (Read options aloud)	1. Green firewood 2. Dry firewood 3. Both	
60	How many minutes walking does it take to get to where you collect firewood?	Minutes	
61	What kind of transport do you usually use?	1. Walking 2. Driving 3. Transport 4. Other (specify)	
62	Last time you collected firewood, how long did it take to collect firewood?	Minutes (not including travel time)	
63	How much did you collect?	Number	
64		Unit	
65	Do you use kerosene?	0. No 1. Yes	
66	Do you use another source of energy?	0. No 1. Yes (indicate which)	
<b>Water consumption</b>			
67	Do you have running water in your house?	0. No => Go to 70 1. Yes	
68	Where does the water come from?	1. Public system 2. Your own connection 3. Well 4. Rain 5. Community tank 6. Stream 7. Other (specify)	
69	How much did you pay last month?	Bolivianos per month	
70	Where do you get the water you use in your house?	1. River 2. Stream 3. Dam 4. Lagoon 5. Rain 6. Hole 7. Other (specify)	
71	How long does it take to walk to the water source you use most frequently?	Minutes walking	
72	Is there another source that's closer?	0. No 1. Yes	
73	Is the water you consume in your house good?	0. No 1. Yes	
74	Before consuming water, do you do any of the following? (Read options aloud)	0. Nothing 1. Boil 2. Chlorine 3. Filter 4. Save it on the roof 5. Settling of sediments 6. Other (specify)	

### Section III: Land Use

Now I'd like to know about the economic use of your land

N°	Question	Format	Response
1	How many hectares do you have in total, including fields, forests, crops, etc?	#	
2	How many hectares of forest do you have that you don't use?	# 0 => <b>Go to 6</b>	
3	Is this forest...?  (Read options aloud)	1. Owned 2. Rented => <b>Go to 5</b> 3. <i>Diezmo</i> or <i>al partido</i> => <b>Go to 5</b> 4. Borrowed 5. <i>Indiviso</i> 6. Other (specify)	
4	Do you have a title or deed?	1. Title 2. Deed 3. Nothing	
5	How long does it take to walk to the forest?	Minutes walking	
6	How many hectares of pasture do you have?	# 0 => <b>Go to 9</b>	
7	Is this pasture...?  (Read options aloud)	1. Owned 2. Rented => <b>Go to 9</b> 3. <i>Diezmo</i> or <i>al partido</i> => <b>Go to 9</b> 4. Borrowed 5. <i>Indiviso</i> 6. Other (specify)	
8	Do you have a title or deed?	1. Title 2. Deed 3. Nothing	
9	How many hectares of land do you work? I want to know about land that you own, rent, or otherwise work.	#	
10	How long does it take to walk to your pasture?	Minutes walking	
11	Is this land...?  (Read options aloud)	1. Owned 2. Rented => <b>Go to 13</b> 3. <i>Diezmo</i> or <i>al partido</i> => <b>Go to 13</b> 4. Borrowed 5. <i>Indiviso</i> 6. Other (specify)	
12	Do you have a title or deed?	1. Title 2. Deed 3. Nothing	
13	How long does it take to walk to your cropland?	Minutes walking	

If they work with agriculture, fill in the following. If not, go to the next section

**Agriculture**

Now I'd like to know about the crops that you cultivated in the last year.

**Crops**

N°	Question	Format	Crop 1	Crop 2	Crop 3	Crop 4	Crop 5
14	What are the five most important crops?	1. Peas 2. Rice 3. Coffee 4. Sweet potato 5. Sugar cane 6. Cherry 7. Citrus 8. Peach 9. Garbanzo 10. Corn 11. Peanut 12. Potato 13. <i>Papalisa</i> 14. Beans 15. Watermelon 16. Wheat 17. Yucca 18. <i>Bracearia</i> 19. Catgrass 20. Tanzania Grass 21. Oats 22. Barley 23. Other (specify)					
15	How many hectares did you plant?	#					
16	How much did you harvest?	#					
17		unit					
18		kilos per (unit)					
19	How much did you sell?	#					
20		0 => Go to 27 unit					
21		kilos per (unit)					
22	What was the highest price you received in the last year?	Bolivianos unit					
23							
24	What was the lowest price you received in the last year?	Bolivianos unit					
25							
26	Where did you sell this crop in the last year? <i>(Indicate all that apply)</i>	1. Local market (community) 2. Non-local market (municipality) 3. Non-local market (capital) 4. Intermediary 5. Company 6. Neighbors 7. Other (specify)					

**Agriculture decisions**

N°	Question	Format	Response
27	What is missing for you to plant more? <i>(Indicate all that apply)</i>	1. Ability (age, sickness, etc.) 2. Water 3. Help 4. Credit 5. Money 6. Labor 7. Equipment or tools 8. Prices 9. Land (quality or quantity) 10. Time 11. Other inputs 12. Nothing (don't want more) 13. Other (specify)	
28	From whom do you receive information that you most trust about your land use activities? <i>(Indicate all that apply)</i>	1. Family 2. Neighbors 3. Community leaders 4. Institutions or professionals 5. Municipal government 6. Self 7. Nobody 8. Other (specify)	

Cattle		
<b>Fam information</b>		
29	Do you have cattle?	0.No => Go to next section 1.Yes
30	How long have you been working with cattle?	Years
31	How many hectares do your cattle use for grazing?	Hectares
32	How many hectares of grass do you have?	Hectares
33	How many hectares of <i>ramoneo</i> do you have?	Hectares
34	Is it fenced?	0.No 1.Barbed wire 2.Electric fence 3.Live fence 4.Other (specify)
<b>Cattle Data</b>		
35	Do you have a register of your cattle herd?	0.No 1.Yes
36	How many cattle do you have?	#
37	How many did you buy in the last year?	#
38	What was the price per head?	Bolivianos
39	How many did you sell in the last year?	#
40	What was the price per head?	Bolivianos
41	For how many months each year are your cattle in the forest?	Months
42	For how many months each year are your cattle in the pasture?	Months
43	How many times per month do you check on your cattle in the forest?	#
44	From where do you cattle take water?	1.River 2.Stream 3.Connection 4.Well 5.Other (specify)
45	Do you do something to protect the streams your cattle use?	0.No => Go to 47 1.Yes
46	What do you do?	
<b>Infra structure</b>		
47	How many paddocks do you have?	#
48	How many corrals do you have?	#
49	How many stables do you have?	#
<b>Expenses</b>		
<b>Format</b>		
<b>Response</b>		
Now I'd like to talk more about the expenses of your work with cattle or crops. I have a list of expenses, and I'd like to know how much you have spent in the last year. If you don't spend anything, say "zero."		
50	How much do you spend on labor?	Bolivianos
51	Seeds?	Bolivianos
52	Fertilizer?	Bolivianos
53	Pesticides?	Bolivianos
54	Technical assistance?	Bolivianos

<b>Investments in land</b>		
Have you done any of the following with your land?		
55	Windbreak?	0. No 1. Yes
56	Terraces?	0. No 1. Yes
57	Irrigation?	0. No => Go to 59 1. Yes
58	What type of irrigation system?	1. Drip 2. Spray 3. Flood 4. Tubes 5. Other (specify)
59	Fence?	0. No 1. Yes
60	Some type of erosion control?	0. No => Go to 62 1. Yes
61	Which?	
<b>Forest</b>		
If they do not have any forest, go to the next section.		
Now I'd like to know more about your forest.		
62	Why did you decide to leave some of your land forested? (Indicate all that apply)	1. Conservation 2. Estancia 3. Extraction of wood or other products 4. Lack of money to invest 5. Lack of access to the site 6. Lack of time to cultivate 7. Land not apt for cultivation 8. It's a source of water 9. Other (specify)
63	Do you extract wood?	0. No => Ir a 68 1. Yes
64	What species do you extract? (Indicate all that apply)	1. Cedar 2. Eucalyptus 3. Mara 4. Walnut 5. Pine 6. Tajibo 7. Cebo 8. Other (specify)
65	How much did you extract in the last year?	Square meters
66	Is it for your own consumption or for sale?	1. Consumption => 91 2. Sale
67	How much did you earn from wood sales in the last year?	Bolivianos
68	Has anyone taken wood from your land without your permission?	0. No 1. Yes
69	Have you planted any trees in your forest?	0. No => Go to 70 1. Yes
70	How many have you planted?	#

Non-Timber Forest Products			
71	Did you extract any of the following in the past year? (Read options allowed and indicate all that apply)	1. Bark 2. Fruit 3. Straw 4. Seeds 5. Resins 6. Leaves 7. Roots 8. Flowers 9. Game 10. Medicinal plants 11. Fertilizer 12. Other (specify) 13. None => Go to Other Revenues	
72	Is it for your own consumption or for sale?	1. Consumption 2. Sale 3. Both	
Section IV: Other Income and Expenses			
Other economic activities			
N°	Question	Format	Response
1	In which economic activities did you participate in the last year? (Indicate all that apply)	1. Construction 2. Carpentry 3. Driving 4. Commercial/Sales 5. Sewing 6. Employed 7. Daycare 8. Mechanics 9. Clothing design 10. Teaching 11. Veterinarian 12. Artisan crafts 13. Other (specify) 14. None	
Pensions, Benefits, and Transfers			
2	Do you or anyone in your family receive a pension, retirement, or grant from the government?	0. No => Go to 4 1. Yes	
3	What is the monthly value of all of these benefits?	Bolivianos	
4	Does your family receive remittances?	0. No => Go to 5 1. Yes	
5	How much did you receive in the last year?	Bolivianos	
Credit and Money			
Liquidity			
5	Does anyone in your family have a bank account?	0. No 1. Yes	
6	How do you invest your money other than your expenses for agricultural production and household expenses? (Indicate all that apply)	1. Savings 2. Buying durable goods 3. Education 4. Children (toys, etc.) 5. Invest in agricultural production 6. Home improvements 7. Pay off debts 8. Other (specify)	

7	If your family needed money suddenly (for example, if you had an illness in the family), where would you get money? <i>(Read options aloud and indicate all that apply)</i>	1. Ahorros 2. Consequir préstamo 3. Familiares 4. Amigos 5. Vende ganado 6. Vende terreno 7. Otro (especificar)	
<b>Loans</b>			
8	Did anyone in your household receive loans (from an institution, a friend, or family) in the last year?	0. No => <b>Go to 18</b> 1. Yes	
9	How many loans?	#	
10	What is the value of all of the loans you have taken out?	Bolivianos	
11	What is the value of the biggest loan you have taken out in the past year?	Bolivianos	
12	What is the interest rate?	%	
		frequency	
13	What is the term of the loan?	Months	
14	How frequently do you have to make payments?	1. Weekly 2. Bi-monthly 3. Monthly 4. Trimester 5. Semester 6. Other (specify)	
15	How much was the last payment?	Bolivianos	
16	From which sources have you taken out loans? <i>(Read options aloud and indicate all that apply)</i>	1. Bank 2. Credit union 3. Government fund 4. NGO 5. Friend 6. Family 7. Credit cooperative 8. Other (specify)	
17	Why have you taken out loans? Can you give me all of the reasons you have taken out loans?	1. Land 2. Equipment or tools for work 3. Capital for work 4. Goods for the house 5. Sickness in the family 6. Education 7. Patron saint festival 8. Other (specify)	
18	In the last year have you loaned money to anyone?	0. No => <b>Go to next section</b> 1. Yes	
19	What is the value of the loan?	Bolivianos	
20	To whom have you loaned money?	1. Friend 2. Family 3. Other (specify)	

## Section V: Organizations and Institutions

N°	Question	Format	Response
<b>Organizations</b>			
Now I would like to talk about your family's participation in community organizations. Of the following, can you say if nobody in your family participates, or if someone in your family participates, is an authority in the organization, or used to be an authority in the organization?			
<i>For each institution, read the options aloud.</i>			
1	OTB	0. Nobody participates	
2	Representative of the law	1. Participates	
3	Political organization or union	2. Is an authority	
4	Producers' organization	3. Was an authority	
5	Dairy or meat producers' organization	4. Doesn't exist in the community	
6	Water cooperative		
7	Irrigation cooperative		
8	School board		
9	Mothers' club		
10	Other (specify)		
11	How many meetings did the OTB have in the past month?	#	
12	In how many OTB meetings did you or someone in your household participate?	#	
13	Do you agree with the decisions your community makes all the time, sometimes, or never?	1. Always 2. Sometimes 3. Never	
14	Do you or someone in your household participate in community work?	0. No => Go to 16 1. Yes	
15	Can you remember how many times in the past year?	#	
16	Do you participate in <i>minga/faena</i> or <i>ayni</i> ?	0. No => Go to 21 1. Yes	
17	How many times in the past twelve months did people work your land with <i>minga/faena</i> ?	#	
18	With <i>ayni</i> ?	#	
19	How many times in the past twelve months did someone in your family participate in <i>minga/faena</i> ?	#	
20	In <i>ayni</i> ?	#	
21	How much did your family spend in the last patron saint festival or party?	Bolivianos	
Now I'd like to talk about the trust that you have for some organizations. For each, I'd like to know if you trust this type of organization always, sometimes, or never.			
<i>For each type, read the options aloud</i>			
22	Municipal government	1. Always	
23	State government	2. Sometimes	
24	National government	3. Never	
25	Institutions or NGOs		

26	What type of support would you like to receive from institutions that come to your community?	<ol style="list-style-type: none"> <li>1. Agriculture</li> <li>2. Potable water</li> <li>3. Training</li> <li>4. Education</li> <li>5. Financial</li> <li>6. Cattle</li> <li>7. Electricity</li> <li>8. Environment</li> <li>9. Marketing</li> <li>10. Health</li> <li>11. Tourism</li> <li>12. Housing</li> <li>13. Roads</li> <li>14. Latrines</li> <li>15. Other type of infrastructure</li> <li>16. Other (specify)</li> </ol>	
27	What are the three most serious difficulties that affect your community?	<ol style="list-style-type: none"> <li>1. Water</li> <li>2. Community problems</li> <li>3. Landslides or erosion</li> <li>4. Destruction of the environment</li> <li>5. Education/school</li> <li>6. Illness of animals or crops</li> <li>7. Infrastructure</li> <li>8. Immigration</li> <li>9. Poverty</li> <li>10. Health</li> <li>11. Land titles</li> <li>12. Access to markets</li> <li>13. Other (specify)</li> </ol>	
28	Do you think that people outside of your community always, sometimes, or never want the best for your community?	<ol style="list-style-type: none"> <li>1. Always</li> <li>2. Sometimes</li> <li>3. Never</li> </ol>	
<b>Institutions</b>			
<b>N°</b>	<b>Question</b>	<b>Format</b>	<b>Response</b>
29	Has your household received support from any institutions that have come to offer support to your community?	<ol style="list-style-type: none"> <li>0.No=&gt; next section</li> <li>1.Yes</li> </ol>	
30	Which institutions?	List institutions	
31	What type of support did they offer? <i>(Indicate all that apply)</i>	<ol style="list-style-type: none"> <li>1. Agriculture</li> <li>2. Potable water</li> <li>3. Training</li> <li>4. Education</li> <li>5. Financial</li> <li>6. Cattle</li> <li>7. Electricity</li> <li>8. Environment</li> <li>9. Marketing</li> <li>10. Health</li> <li>11. Tourism</li> <li>12. Housing</li> <li>13. Roads</li> <li>14. Latrines</li> <li>15. Other type of infrastructure</li> <li>16. Other (specify)</li> </ol>	
32	Have you always, sometimes, or never been pleased with the work they have done in your community?	<ol style="list-style-type: none"> <li>1. Always =&gt; VALORES MORALES</li> <li>2. Sometimes</li> <li>3. Never</li> </ol>	
33	Why have you not been pleased? <i>(Indicate all that apply)</i>	<ol style="list-style-type: none"> <li>1. Don't follow through on promises</li> <li>2. They help some more than others</li> <li>3. Don't consult with community about what we want</li> <li>4. Bad use of money</li> <li>5. Waste of time</li> <li>6. Other (specify)</li> </ol>	

## Section VI: Values and Environment

Now let's talk about values and priorities that are important for you

N°	Question	Format	Response
1	I am going to present you with some values that can be taught to children at home. Of these, can you choose the ones that you think are most important?	1. Independence 2. Creativity 3. Taking care of the environment 4. Honesty 5. Obedience 6. Respect for other people 7. To be a good student 8. To be successful	
2	<i>(Read options aloud twice)</i>		

Now I am going to read some statements and I would like to know if you agree with each of them. There is no correct response, I only want to know your opinion about each of the statements.

3	In general, the people in my community cooperate to resolve common problems.	1. Completely disagree 2. Somewhat disagree 3. Don't have an opinion 4. Somewhat agree 5. Completely agree	
4	Most people in my community help me if I need it.		
	It is the responsibility of the government to reduce inequality between people with a lot of money and people with little money.		
5	If someone works more than others, it is fair that they earn more money.		
	If someone earns more money than other people, that person should share with others.		

### Environment

Now I would like to talk about the forests and resources that are important for you and for your family.

6	I am going to read a list of difficulties that affect some communities. Can you choose the three of these that most affect your community? <i>(Read options aloud twice)</i>	1. Trash 2. Water contamination 3. Landslides 4. Poor soil quality 5. Erosion 6. Scarcity of water 7. Loss of plants and animals 8. Drought	
7	Would you say that quality or quantity of water is a problem in your community?		
8	What are the effects of the problem? <i>(Indicate all that apply)</i>	1. Loss of income 2. Health problems 3. Loss of nature 4. Other (specify)	
9	Is it worse, better, or more or less the same as it was five years ago?		
10	What do you think could be the cause of the problem? <i>(Indicate all that apply)</i>	1. Crop planting 2. Clearing land 3. Pesticides 4. Cattle 5. Landslides 6. Climate 7. Other (specify)	
	Do all community members contribute equally to the problem?		
11	Do all community members suffer equally from the problem?	0.No 1.Yes	

Now I am going to read some statements and I would like to know if you agree with each of them. There is no correct response, I only want to know your opinion about each of the statements.		
12	To improve quality of life, it is necessary to hurt the environment.	1. Completely disagree
13	We can have better economic returns if we protect the environment	2. Somewhat disagree
14	It should be the responsibility of the government to impose laws that say what people can do with their land so that they do less damage to the environment.	3. Don't have an opinion
15	If your neighbors do nothing for the environment, you don't do anything either.	4. Somewhat agree
16	What can your community do to protect the environment? Can you give me three ideas?	5. Completely agree
17	Do you think it would be a good idea for your community to impose rules or norms to protect the forest?	1. Change our system of production
18	What are the benefits you receive from the forest? Can you give me three things?	2. Leave the forest, don't clear forest
19	Do you think the forest is in better, equal, or worse condition compared with five years ago?	3. Education, consciousness-raising
20	Do you think the community is taking care of the forest better, the same, or worse than five years ago?	4. Don't throw trash
21	Do you think your children will take better, equal, or worse care of the environment compared with the current generation?	5. Norms, rules, laws
		6. Pressure the government
		7. Plant trees, reforestation
		8. Use fewer pesticides or organic pesticides
		9. Nothing
		10. Other (specify)
		0. No
		1. Yes
		1. Clean air
		2. Clean water
		3. Animals/hunting
		4. Climate stabilization
		5. Prevents landslides
		6. Prevents erosion
		7. Water (quantity/source)
		8. Firewood
		9. Rain
		10. Wood, construction materials
		11. Other forest products (fertilizer, honey, etc.)
		12. Beauty, view
		13. Other (specify)
		1. Better
		2. Equal
		3. Worse
		1. Better
		2. Equal
		3. Worse
		1. Better
		2. Equal
		3. Worse

Finish time: _____	
<b>For the enumerator:</b>	
<i>Please answer the following questions after completing the survey.</i>	
<i>Indiate your response with the appropriate section number and question number.</i>	
<i>If the survey is not complete, please describe why.</i>	
<i>Which questions were difficult for the respondent to answer?</i>	
<i>Which questions were uncomfortable for the respondent to answer?</i>	
<i>Which questions were uncomfortable for the enumerator to ask?</i>	
<b>For tabulator</b>	
Date of entry	
Entry number	

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