

WATER RIGHTS IN PERU: EVALUATING THE IMPACTS OF THE FORMALIZATION OF WATER RIGHT FOR AGRICULTURE USE

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1. INTRODUCTION

Management of water resources is a recognized priority for development, poverty reduction and prevention of conflicts. According to the United Nations, 2.7 billion people will face severe water shortages by 2025. When a commodity is scarce, disputes over its use often arise. This is especially true of commodities that are essential for human survival, such as water. In this context, coordination of water use becomes complex as well as crucial for the mitigation of conflicts. Furthermore, the recent episodes of the rise in food prices reinforces the need to promote and assure an efficient allocation of water resources that are able to enhance agriculture productivity and prevent sub nutrition in developing countries.

In line with these events, the proposed study develops a rigorous evaluation of the impact of the program of formalization of water rights for irrigation use in Peru. The PROFODUA (*Programa de Formalización de Derechos de Uso de Agua*) includes an innovative approach for water rights formalization in the Peruvian Andean (*Sierras*) region. In four years of implementation PROFODUA issued 200,000 water licenses¹ and it is likely to continue expanding inside and outside Peru. However, so far the impacts of the program have not been formally assessed.

Water plays an essential role in sustaining life, socio-economic development and the environment. Water also has unique features, which distinguish it from other natural resources (mobility, uncertainty in supply, bulkiness, indivisibility, social and environmental uses, sequential and multiple use, interdependency among uses, etc.). These characteristics of water give rise to multiple market failures (vulnerability to monopolization and natural monopolies, externalities, public goods, and asymmetric information, among others) that must be addressed by institutions in order to ensure efficient resource allocation. The implementation of water rights reforms is a frequent approach to promote secure and sustainable access to water.

Theoretical aspects of water rights implementations and their outcomes have been vastly studied². Nevertheless, to date there are few or no rigorous scientific impact evaluations showing the effectiveness of water rights reform in delivering the desired outcomes. Most authors agree that by reducing conflicts and uncertainties about water supply, water rights for irrigation are expected to promote investments in new and more efficient production technologies as well as shifting the pattern of production to higher value crops. As a consequence, well-implemented water rights are expected to improve income generation and living conditions of agricultural producers in developing countries. To our knowledge, these results have not been empirically tested.

Therefore, the purpose of developing a formal impact evaluation of PROFODUA is three-fold: i) measuring and documenting the impacts of the program; ii) helping to improve the design and

¹ Forty times more than the number of licenses issued in the previous 35 years.

² A brief literature review is presented in Annex A.

efficiency of the program in future implementations; and iii) adding to the scarce empirical literature on evaluation of Water Rights Reforms.

The study also intends to contribute to the capacity development of the PROFODUA team by strengthening their capacity to conduct and use impact evaluation for results based management, and promoting country ownership of the information generated through this process.

2. BACKGROUND

The Peruvian Highlands (the *Sierras*) represent 30 percent of the country's surface and about 35 percent of Peruvian population. Currently more than 10 million people live in the *Sierras*. The region is characterized by high poverty rates³. While the rural *Sierra* has less than 25 percent of Peru's population, it accounts for 54 percent of the extreme poor. Chronic malnutrition is also a serious problem in the region and it reaches more than 30 percent of the children up to two years old. Malnutrition affects health condition, learning ability, and productivity and creates a vicious poverty cycle.

In recent years, the *Sierra* region has witnessed a growing number of water related conflicts and disputes. The region experienced rapid growth in demand for water due to population growth, urbanization, and the development of industrial and in particular, mining activities in past decades. Meanwhile, climate change has begun to affect the supply of glacial water. Combined, these changes reduced the availability and increased the cost of water used for irrigation. Agriculture is the main economic activity in the *Sierras*; it accounts for one-quarter of the local GDP and it is the main source of income of 70 percent of the households in the area. For this reason, scarcity and inefficient allocation of water resources have huge impacts on the already poor living conditions of the *Sierra* inhabitants.

In order to address the critical issues in water management and increase agriculture production in the *Sierras*, the Government of Peru, in partnership with the World Bank, is currently implementing the Peru Irrigation Sub-sector in the *Sierra* and Water Resources Management Modernization Project (US\$ 49 million)⁴. The project has the objective of strengthening the technical, financial, and management capacity of farmers and water users' organizations in targeted irrigated areas of the *Sierra*.

The component **Formalization of Water Rights and Extension to the National Water Registry (PROFODUA)** counts on US\$ 7 million and it is aimed to scaling up and adaptation of the experience of water rights distribution in the Coastal Region. The main goal of the proposed impact evaluation is to properly measure the causality of this intervention on a set of outcomes. PROFODUA will operate in 21 valleys and finance the formalization of about 200 thousand Agricultural Water Rights (*Licencias con Fines Agrarios*) and their integration in the existing National Water Rights Registry.

³ According to the national institute of statistics (INEI), in 2002, 80 percent of the population is poor and almost 60 percent leaves below the extreme poverty line, 20 percent more than the national average.

⁴ US\$ 20 million financed by the World Bank.

3. THE INTERVENTION

PROFODUA is Peru's national program of formalization of water rights for irrigation. The program was requested by the national board of water users as a way to implement the General Water Law (enacted in 1969) and give legal security to individual and communal water users. PROFODUA allocates water rights⁵ in function of the available water resources, fostering efficient, equitable, and sustainable water use.

Water rights are assigned within defined irrigation blocks (*bloques de riego*). Such blocks usually correspond to separate units that are more or less autonomous from a water management point of view. In general this is a block of more or less contiguous plots supplied by one and the same small canal, and often coincides with existing *Comites de regantes*⁶. An irrigation block has an average of 400 water users, but this number varies from one block to another. It is expected that an estimated 500 irrigation blocks will be formed during the project and be assigned a specific water volume.

To be granted an individual water right (*licencia de agua*), producers must comply with pre-conditions such as possessing a land title, having cultivated the land at minimum over the last five years, having paid the irrigation water tariff or signed a promise of payment, and possessing a national identification document. It is estimated that, with some assistance of the program, approximately 90 percent of the producers will be able to comply with these eligibility criteria⁷.

The process of formalization is composed by five main steps (or activities):

- **Preliminary actions** - A member of PROFODUA's team arranges a meeting with the local irrigation committee for the preliminary identification of the irrigation network, current allocation and standards of water use. PROFODUA's team also organizes an informative meeting to clarify the objectives of the program and prepare the members of the community for the next stages.
- **Field Work** – During the field visits, PROFODUA's team collects information about plot sizes, ownership and production characteristics. Producers must present their national ID, and land title to PROFODUA's representative in order to be included in the program.
- **Office Work** – The information collected during fieldwork is verified and compiled and integrated to PROFODUA's information system. Combining satellite information of the area to the field data, the technician validates the dimensions and characteristics of the irrigation block and plans the allocation of the water resources across land plots.
- **Proposition of water allocation and Public consultation** - The compiled information and proposed allocation is made publicly available. The information is exposed for 15 days in strategic places previously defined by the irrigation committee. During this period individuals can context the information and propose modifications.
- **Issuing and distribution of the water rights** – Once the period of public consultation is concluded and the pertinent modification is completed, the individual and communal

⁵ These are no transferable, indefinite duration water rights, linked to the use of an specific land plot.

⁶ Each valley has a federation of water users or *Junta de usuarios* which is composed by several smaller water users organizations or *Comisiones de regantes*, themselves sub-divided into smaller *Comites de regantes*.

⁷ In this context almost all resident owns the land: Land's rents isn't a common procedure.

water rights are distributed in a public act. The irrigation committee also receives a document compiling the information of all users in the block.

The PROFODUA water rights formalization approach implemented in Peru is innovative in comparison to other countries of Latin America, where this process is mainly declarative⁸ and without a precise and well-thought allocation plan. The process in Peru is free of cost to the water user and includes in-field verifications. The innovative character also lies in the following aspects: i) extensive use of the prior land titling actions available; ii) an analysis of water availability to ensure that issued water rights do not exceed supply; and iii) in-field verification of the land and water use (using modern technology such as digital aerial photography, high resolution satellite images, geographical information systems, satellite positioning systems, among others). Nothing comparable has been undertaken so far in the highlands of Peru, Colombia, Ecuador, or Bolivia, and it is expected that PROFODUA's intervention in the Peruvian *Sierra* may have a high potential for replication in these areas.

Another innovative feature is the intensive participation of local communities. Community participation is ensured through information and awareness raising campaigns, discussion platforms, and technical assistance. Along the field process, the individual members of the communities fill the required documents for individual use of irrigation water and their local leaders (e.g. mayors in *municipios*, local leaders, or *presidentes de comunidades* in local communities) accompany the process and promote wide spread participation. Previous experiences implementing PROFODUA in the *Costa* region have proven that such participation is essential for the success of the project.

PROFODUA's main objective is to improve the livelihood of poor farmers by promoting equitability and reducing uncertainty about water supply for irrigation. When fully implemented, the project will deliver two direct outputs: i) formal right and issue water licenses or so-called *licencias de agua* (i.e. permanent water use rights); and ii) an information system of all users of water for irrigation as well as the mapping of all water and land resources in the *Sierra* region.

4. RESEARCH QUESTIONS

The first step in the impact evaluation of a defined intervention is mapping the direct outputs and consecutive impacts generated by the program. Table 1 presents the expected outputs and subsequent outcomes from the implementation of PROFODUA. The table helps to illustrate our main research questions. (For example: Does the intervention promote the adoption of new techniques? Does it increase production of food products?) Our study seeks to understand if the implementation of PROFODUA (i.e. distribution of water licenses and creation of an information system) actually led to the outputs and outcomes presented, and to measure the size of the effects.

⁸ For example when concessions are granted for the volumes that users state they are using, without determining their actual water use.

Table 1: Potential impacts of PROFODUA

Intervention => Outputs	=> Immediate Impacts	=> Impacts in the short-term	=> Impacts in the medium-term
<ul style="list-style-type: none"> • Water Licenses • Information system of water users 	<p><u>Individual Impacts:</u></p> <ul style="list-style-type: none"> • Increase legal security • Increase user's satisfaction about quality and frequency of irrigation • Reduce uncertainties • Improve access to credit • Increase in investments • Adoption of new technologies • Increase diversity of crops <p><u>Collective Impacts:</u></p> <ul style="list-style-type: none"> • Improve internal organization of the committee • Increase information about the users • Promote formation of associations (cooperatives, exporting association, credit association, etc.) • Reduce the number of conflicts • Promote equitable access to the water • Promote collection and administration of water tariffs 	<p><u>Individual Impacts:</u></p> <ul style="list-style-type: none"> • Increase production • Increase productivity • Improve access to exporters • Intensify investment planning (future contracts) • Increase property values • Increase income • Increase consumption <p><u>Collective Impacts:</u></p> <ul style="list-style-type: none"> • Increase in the irrigated are (new properties) • Improve quality and management of the irrigation infrastructure 	<p><u>General Impacts:</u></p> <ul style="list-style-type: none"> • Improve nutrition • Reduce emigration • Improve education for the kids • Improve health conditions

As illustrated in Table 1 the analysis goes beyond the agriculture production outcomes. It is expected that the formalization of water rights will have impacts on human development outcomes, including health and nutrition. Water security provided by formalized water rights is likely to yield efficiency benefits, as it protects water users from uncompensated takings by others, reduces uncertainty for production planning, and facilitates optimum allocation of water to crops. Equity benefits are also expected as small downstream producers benefit specifically from the distributional impact of equal access to water by block. These benefits are likely to encourage producers to invest more in their farming system, for example, through improved on-farm irrigation technologies and changes in crop mix. As such, the pathways linking the formalization of water rights to food consumption and nutrition along the food supply chain are mainly related to (i) an increase in the direct consumption from increased food production; and (ii) an increase in income from the sale of agricultural commodities.

The formalization of water rights is also expected to impact the accountability and transparency of the water users' organizations, their organizational roles and responsibilities regarding system maintenance, and the services they provide to the producers. Indeed, a water right is also a social relationship and an expression of power. The formalization of water rights may result in greater equity in its distribution and strengthen the position of less powerful stakeholders. These hypotheses on the inclusiveness and equity of the program, however, will also need to be tested by the evaluation study.

Annex B presents a draft for the questionnaire to be implemented.

5. EVALUATION DESIGN

The main purpose of an impact evaluation is to correctly identify and measure the causal effects of an intervention and its outcomes. In order to isolate and assess these effects, it is necessary to determine what would have happened in the absence of the program, i.e. the counterfactual to the program.

As the true counterfactual is naturally unobservable, a common procedure is to construct a proxy for it by dividing the sample in two comparable groups:

- **Treatment Group** – a representative sub-sample of the target population that will receive the intervention.
- **Control Group** – a representative sub-sample of the population that will not be intervened (at least initially).

Ideally, groups should be identical (*ex-ante*). They should be equally affected by observable and, especially, unobservable factors, such that on average, the single difference between the two groups is the result of the implementation of the program.

The random assignment of individuals into treatment and control is a good mechanism for constructing comparable groups.⁹ We propose a robust identification strategy by randomizing at the block level. Instead of intentionally preventing farmers from accessing the program, our

⁹ Technically, randomly assigned treatment and control groups are only going to be identical with infinite sample sizes (which are unaffordable and unnecessary). The study seeks to minimize that the means of treatment and control groups differ significantly.

identification strategy works within the natural timing and logistic limitations of the project implementation to construct a counterfactual. A group of three representative valleys will be selected for the evaluation. We focus on valleys with a critical mass of blocks and that have not received PROFODUA yet. Assuming that there are 80 blocks¹⁰ in a given valley, physical and human capacity constraints limit the implementation of the program to at most 20 blocks per year. Inevitably, it will take four years to serve all the properties in the valley. The identification strategy consists of using a public lottery¹¹ to randomly distribute the blocks into four different groups. Each group will receive the intervention in a different year where the individuals intervened in the fourth year will serve as a control group for those reached in the first year.

The randomization over a critical number of blocks assures that on average individuals in the treatment and control groups are similar with respect to observable and unobservable characteristics that could influence the results of the program. Choosing from the pool of pre-selected producers helps the internal validity of the evaluation. These producers are likely to have similar levels of organization, motivation, income, and geographic conditions. Finally, randomization across blocks has the advantage of being a fair and transparent method for determining the order in which the benefit will be received and it is likely to be accepted for all involved parts.

6. SAMPLE DESIGN AND POWER CALCULATIONS

Consider the simple following framework:

$$Y_{ij} = \alpha + \beta T_i + v_j + w_{ij}$$

where Y_{ij} is the outcome for household i in group j , T_i the treatment for household i , β is the treatment effect, and the error term is decomposed into a common group element, v_j with variance τ^2 , and a household specific component, w_{ij} with variance σ^2 . Under group randomization the OLS estimator for β is consistent but inefficient. The standard error must account for intra-group correlation since the randomization is across groups. Once we correct for that, we can easily test one and two-sided hypothesis about β and by inverting these test to obtain an explicit formula to do the power calculations.

The formula underlying the power calculations will be the minimum detectable effect (MDE) under grouped randomization, as given by Bloom (2005):

$$MDE_T = \frac{(t_{\alpha/2} + t_{1-\kappa})}{\sqrt{P(1-P)J}} \sqrt{\rho + \frac{(1-\rho)}{n}} \sigma$$

where n is the number of households per group or cluster, J denotes the number of groups in the sample, P is the proportion of the sample treated, α is the desired significance level, κ is the power of the proposed test, and $\rho^2 = \tau^2 / (\tau^2 + \sigma^2)$ is the intra-cluster or intra-group correlation. Solving for n gives us the sample size for each cluster

¹⁰ This is a realistic assumption for a big valley in the Sierra region.

¹¹ with representatives of all the selected blocks.

$$n = (1 - \rho) \left(\frac{MDE^2 P(1 - P) J}{\sigma^2 (t_\alpha + t_{1-\kappa})^2} - \rho \right)^{-1}$$

Note that this formula makes the researcher set the power and significance level, decide the MDE, and make assumptions about the intra-cluster correlation and the standard deviation. The power and significance level are commonly set at 85 and 5 percent respectively. However, deciding the MDE is a little more troublesome. As pointed out by Duflo et al. (2007), when the mean and standard deviation of the outcome are not available, one can express the MDE in multiples of standard deviation of the outcome. Indeed, Cohen (1988) proposes that an effect of 0.2 standard deviations is “small”, 0.5 is “medium” and 0.8 is “large.” Regardless, knowing the standard deviation is desirable for interpretation purposes.

In order to compute the sample size, once the significance and power level are fixed, we need to determine the minimum detectable effect (MDE). The easiest way is to get pretreatment information about the distribution of the outcome variable. In particular, knowing the mean and the variance will be enough.

Given the characteristics of the intervention, we present power calculations assuming that the outcome of interest is the proportion of cultivated area adopting technical irrigation. To our knowledge there are no statistics associated with this outcome in the area where the intervention will be implemented. Therefore, we express the MDE as a percentage of the standard deviation.

Below we present power calculations assuming three different values of the MDE: 10, 20, and 30 percent of standard deviations. The following table presents our results for the different configurations of MDE assuming a minimum power guarantee of 85 percent and a maximum significance of 5 percent. The MDE ranges from 10 to 30 percent of the standard deviation. While, the number of blocks is 80, the treatment group will include only 20 blocks in each round. The internal design implies a public lottery to randomly distribute the 80 blocks into four groups; hence each group will be intervened in subsequent years. Given the staggered implementation of interventions, the identification strategy will be a difference-in-difference approach that will compare the 20 blocks treated in the first year with the 20 blocks treated the fourth year. The intra-cluster correlation is assumed to be 0.01 as the information provided in the proposal suggests.

Table 2: Sample sizes for cluster and groups during first year of intervention

Assumptions	Case 1	Case 2	Case 3
MDE (as % of SD)	10%	20%	30%
Number of Households within Community	255	22	9
Total Sample Size	10200	880	360

As it can be observed in Table 2, the number of observations increases as the MDE decreases. A reduction of 10 percent of the standard deviation for this type of intervention can be considered modest (at least according to the proposal), hence we recommend a sampling of at least 880 households (440 in each group). If a 15 percent of attrition is considered, this number can increase to 1,036 households. The team will refine these estimates as the first stage of the implementation of this evaluation.

7. METHODOLOGY OF ANALYSIS

In addition to the identification of the research questions, the sample structure, treatment and control groups, a systematic impact evaluation requires the definition of a framework of analysis. The study will implement a Difference-in-difference (DiD) approach.

A DiD methodology consists of measuring the average changes in a given indicator between the periods before and after the intervention for both treatment and control groups, and then comparing the changes for the two groups. The differences between two groups reflect the isolated effect of the program.

This approach requires the existence of base-line¹² and post-intervention information for both groups. For this reason, this project will start with the implementation of a base-line survey collecting information about individual, household, and community characteristics of the beneficiaries.¹³ The survey will be re-applied to the same sample just before the beginning of the last round of the program.

A difference-in-difference econometric analysis will allow verification of the effectiveness of the randomization strategy creating comparable groups and to correct some potential “contamination” of the data. The before- and after-difference for each group corrects for any remaining fixed difference between treatment and control, while the between groups deals with external factors that affect the target population during the interval of analysis. Assuming that those factors reach treatment and control equally, the second difference successfully isolates the true causal effect of the intervention.

8. IMPLEMENTATION TEAM

In order to assure that the team will successfully complete the evaluation with the proposed design, the team member composition will include: Word Bank teams, Academics, local partners and capacity, local supervision, and consultants if necessary.

- *World Bank Team:* The IE team will be led by Luis Andres with the full collaboration of the task team leaders of the project Marie-Laure Lajaunie and Erwin De Nys.
- *Field Data Collection:* The design and supervision of the base-line data collection will be coordinated by Luis Andres and Erwin De Nys with the support of a research assistant (to be determined). The team has already identified strategic local partners in Peru. The INEI (*Instituto Nacional de Estadística e Informática*) and the private consultant firms GRADE and Quanto have local capacity for designing and implementing surveys as well as strong analytical skills. They will contribute on the different stages of the base-line data collection.

¹² Information for the period before the intervention.

¹³ Annex B presents a first draft of the questionnaire.

- *Supervision:* Supervision will be jointly preformed by a consultant (to be defined), the World Bank team, and the technicians from PROFODUAL. The consultant will be responsible for the field supervision and quality control of the data collection.
- *Researchers:* The evaluation team will count on the assistance of local and international researchers with experience in irrigation related issues and impact evaluation methodologies. The team of researchers includes: Máximo Torero and Eduardo Maruyama from IFPRI (International Food Policy Research Institute), Ruth Meinzen-Dick and Claudia Ringler from CGIAR (Consultative Group on International Agriculture Research) [TBC]. The team also count on the technical support of Sergio Urzua (Assistant Professor, Northwestern University)

9. TIMELINE (TO BE CONFIRMED)

- Oct 2008 to Apr 2010: Definition of evaluation design, institutional arrangements, identification of the technical and implementation teams, supervision and pertinent contracts;
- Apr to Sep 2010: Formalization of the evaluation design, questionnaire, simple design and implementation of the pilot for the data collection;
- October 2010: Preparing field activities and training of interviewers;
- November 2010: Field work: base-line data collection;
- December 2010: Office work and quality control of the information collected;
- November 2012: Field work for the follow-up survey (TBC)
- Dec 2012 to Mar 2013: Development of the evaluation analysis and dissemination of these results.
- November 2014: Field work for the follow-up survey
- Dec 2014 to Mar 2015: Development of the evaluation analysis and dissemination of the results.

10. BUDGET DESCRIPTION

The main source of these funds will be the SIEF (Spanish Impact Evaluation Trust Fund) that allocated \$195,000 for this evaluation and World Bank project will commit budget to cost sharing this evaluation as well as the funding for the follow up surveys and activities.

ANNEX 1: LITERATURE REVIEW AND OVERVIEW OF THEORETICAL CONCEPTS ON WATER RIGHTS

In water management, there is competition between multiple and single users who treat a water basin as a “natural” management unit and the treatment of water as an economic good (Boelens and Zwarteveen, 2002). But there are different approaches and visions to analyze and evaluate water rights and their embedded mechanisms that are useful to achieve efficiency, equity, and sustainability. One approach treats water rights as essential to contribute to local development. But given the complex institutional setting of water exploitation, the multiple types of property rights systems involved, and the multiple actors concurrently exercising rights in any given setting, these approaches rely heavily on local governance as a critical task to exert water rights optimally (IFPRI, 2005). During the past 15 years, considerable attention has been devoted to community or local-level governance of common-pool resources such as water, forests, fisheries, and rangelands. Considerable attention is being devoted to the study and promotion of community-based governance, in part because of the perceived failure and recognized limitations of state-centered and market-based approaches. This is due to the ability of local users, in designing rules of access and of use, to draw on this information as well as their understanding of the social setting to better match rules to circumstances.

Beyond the community institutional governance approach, market-based approaches have been also implemented in many countries. Most of the body of literature on this topic focuses on mechanisms for estimating the value of water. Unfortunately, there is no well-defined market for water. Additionally, water rights are fuzzy, and as a result, the reallocation of these rights is difficult due to technical, legal, and political constraints. However, a body of literature recognizes that the market-based analysis of water rights has been limited because of the overly narrow view of water rights, recognizing only formalized, statutory rights (Benda-Beckmann and Spiertz, 1996; Meinzen-Dick and Bruns, 2000). The main advantage of market-based frameworks is that they quantitatively analyze incentives, pricing, welfare effects, and other economic mechanisms that enhance the value of water (Gleick, 1999). Yet, this body of literature has been only effectively applied on agricultural diversification and irrigation (Rosegrant, Schleyer, and Yadav, 1995; Easter and Liu, 2005).

Market-based approaches have failed to provide sustainability in access of water for household consumption. The literature that considers a fundamental focus on the legal framework and state regulations to achieve long-term sustainability stresses the limitations of market-based frameworks (Hodgson, 2006). It highlights the problems that emerge on the sale and leasing of water rights, when no regulation is present. These mechanisms tend to undervalue water and the natural resource, which leads to environmental degradation. Instead, rights to exploit and access water for multiple purposes require regulations that adapt to the legal system of each context (Tisdale, 2004). But many novel studies defend the argument that standard economic theory predicts that if there is a competitive market for water rights, separate from the associated land market, the allocation of water will be optimal and the market will be efficient (Golden et al., 2006).

Specific mechanisms have been developed to prove this last point. For instance, tradable water rights allow the price of water to reflect the value of its alternative uses, which creates incentives to put it to more productive uses. If farmers were able to sell their water rights at freely negotiated prices, some might sell surplus water to a neighboring farm where it has a higher value. Often, farmers can generate a surplus by using more efficient irrigation techniques or by switching to

less water-intensive crops (Meinzen-Dick, 2000; Moges, 2008; Libecap, 2005). In addition, buyers of water rights are likely to conserve water more efficiently. Tradable water rights can often shift water to higher value uses more cheaply and equitably than alternatives such as building hydraulic infrastructure, confiscating water from farmers, or raising water charges sufficiently to force farmers to conserve water (Armitage, Nieuwoudt, and Backeher, 1999). The same principle applies to pricing mechanisms where a body of literature supports market-based approaches rather than a government-led price setting. This is because pricing set by governments enables public authorities to set user fees for water at levels that reflect the opportunity cost of provision, thereby reducing water conservation and making more water available to lower value uses. In practice, no central government has set water prices in this way and pricing is primarily used to recover costs of water delivery (Morris, 2002).

Government-led pricing is useful to attain equity in the access and distribution of water, with mixed effects on quality (Meinzen-Dick and Nkonya, 2005). Public water rights are rights held by the state, and in which the government allocates rights to users. The government can assert its rights over water by controlling the water allocation directly through government agencies, or by acting as a licensing or leasing agent for granting water rights (Paul, 2003). People cannot have private ownership of water sources but can obtain rights to use water by acquiring a water license (Vaz and Pereira, 2000). Common water rights refer to communal water rights where water can be used by people in ways that are specified by some community. For true common property, some form of community or user group should have rights to allocate water at some level, e.g. in specifying who may or may not use the water, in what ways (WFP, 2001). The institutional setting is very important to implement public or common water rights in order to avoid conflicts (Abernethy, 2005; Palerm-Viqueira, 2005). The tradeoffs between new and traditional institutions are manifested in problems of equity. Moreover, new institutions that focus on improving the issues of equity in water distribution and rights allocations have been difficult to implement and face an even more so when multiple uses are considered. In irrigation water, for example, allowing the same time for water delivery to each irrigated hectare, or the same amount of water to each household, or something of this sort achieves equity but with a range of limited or overlapping rights definition (Abernethy, 2005).

In many countries there have been different water rights schemes that have performed successfully. In developing countries water rights are generally based on one of three systems: first-come, first-served allocation (also known as prior appropriation rights), allocation based on proximity to flows (or riparian rights) and public allocation (Sampath, 1992; Holden and Thobani, 1996; Haddad, 2000). Most developing countries follow variants of the last approach where essentially the rights are allocated free – though there may be a charge for water use (typically based on the amount of irrigated area), the water rights themselves are obtained without charge. In Chile, for instance, water rights are completely separate from land ownership and can be freely bought, sold, mortgaged, and transferred like any other piece of real estate. The National Water Directorate (*Dirección General de Agua* or DGA) is the state water rights agency. It grants requests for new rights free of charge whenever the water is physically or legally available. If the water is not enough to free for all applicants, the DGA is required to hold a public auction and sell the new rights to the highest bidder.

Just as in Chile, Brazil has adaptive water rights but with slightly different mechanisms. Prior to 1990 a centralized, top-down, conflict-ridden approach to water management existed. By in the early 1990s several states enacted specific legislation to avoid this issue. In 1997 the Federal Government followed, and enacted a law creating the National Policy of Water Resources and the National System for the Management of Water Resources. This new system included organization of management at the basin level, decentralization of decision making and resources,

a new system to allocate water rights, creation of instances for public participation (river basin, State, and National water councils), implementation of water user's permit and charging system at the basin level. To date, more than 100 river basin councils exist. They generally have a tri-party composition: i) state agencies (incl. sanitation and water utilities); ii) municipal (and state and federal) governments; and iii) civil society: federation of industries, NGOs, universities, etc. Council attributions include: establishing a water charging system, allocation of revenues, designing and approving water resource management plans, negotiation of conflicts, promotion of water/related activities such as education, training. Through these institutions the managerial aspects of water rights allocation are efficient and equitable given the transparency and participatory approaches embedded in them (León, Lemos, and Nelson, 2008).

There have been also specific mechanisms of water rights in Mexico and the Andean region in LAC. In the case of Mexico, Boelens (2006) documented a specific case of water rights and its consequences in production and water use the Lerma-Chapala basin, one of the largest bodies of water in the central region of Mexico. His analysis coincides with a World Bank (2007) study that identifies "the main potential mechanisms toward rectifying the inter-sectoral imbalances are in the transfer of water rights in water scarce areas." To cope with this issue, a registry of water rights in Mexico (REPDA) has been set up and covers 95 per cent of all water users, which is an impressive accomplishment. In addition, the National Water Law no longer allows transfer water rights, subject to certain conditions, which aims to protect the water rights of third parties and the environment. Boelens and Bustamante (2005) analyze water rights under indigenous territories with traditional institutions. They found that "vertical state law and intervention practices, as well as new privatization policies, tend to intensify the problem and generally ignore, discriminate or undermine local normative frameworks." Recognition of and security for the diverse and dynamic local rights and management frameworks is crucial not just for improving rural livelihoods but also for national food security in the Andean countries. Water rights under these complexities need to be complemented by a set of policies in order for them to be effective. Water management development is a socio-political process in which different interest groups meet, face off and negotiate, to include their ideas and interests in organizational, technical and normative designs. These interests are about increasing control over water resources themselves, over decision-making power in system management, over the redistribution of productive resources and/or over the behavior of the users' group in general.

ANNEX B: QUESTIONNAIRE (DRAFT)

ENCUESTA LONGITUDINAL DE USO DE AGUA Y SERVICIOS SANITARIOS: CUESTIONARIO

Proyecto Financiado por el Banco Mundial

Dirección de la Vivienda:
Región:
Provincia:
Comuna:

MODULO RESIDENTES: COMPOSICION DEL HOGAR

A Todas Las Personas							
Incluye a todos los miembros del hogar	1. Parentesco con el Jefe o Jefa del Hogar	2. Sexo	3. Edad	4. Núcleo Familiar	5. ¿Cuál es su relación de parentesco con el jefe(a) del núcleo	6. Estado Civil	7. ¿Pertenece a alguna etnia?
<p>Escriba el nombre de</p> <p>Lista de todos los integrantes del hogar e</p> <p>Indique quien esta presente en la entrevista</p> <p>1. Contesta</p> <p>2. Presente pero no contesta</p> <p>3. No esta presente</p>	<p>01. Jefe(a)</p> <p>02. Conyuge</p> <p>03. Hijo(a)-Hijastro(a)</p> <p>04. Padre o madre</p> <p>05. Suegro(a)</p> <p>06. Yerno o nuera</p> <p>07. Nieto(a)</p> <p>08. Hermano(a)</p> <p>09. Cuñado(a)</p> <p>10. Otro Familiar</p> <p>11. No Familiar</p>	<p>1. Hombre</p> <p>2. Mujer</p>	<p>(años cumplidos)</p>	<p>01. Principal</p> <p>02. Segundo</p> <p>03. Tercero</p> <p>...</p> <p>n. Enésimo</p>	<p>01. Jefe(a)</p> <p>02. Conyuge</p> <p>03. Hijo(a)</p> <p>10. Otro Familiar</p> <p>11. No familiar</p>	<p>01. Casado</p> <p>02. Conviviente</p> <p>03. Separado</p> <p>04. Viudo</p> <p>05. Soltero</p>	
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<p>1. ¿Bajo que situación ocupa el sitio?</p> <p>1. Propio Pagado</p> <p>2. Propio Pagandose</p> <p>3. Propiedad compartida (pagada) con otras viviendas del sitio</p> <p>4. Propiedad compartida (pagándose) con otras viviendas del sitio</p> <p>5. Arrendado con contrato</p> <p>6. Arrendado sin contrato</p> <p>7. Cedido por servicios</p> <p>8. Cedido por familiar u otro</p> <p>9. Ocupación irregular</p> <p>10. Otro. Especifique.</p>	<p>3. ¿Cuántas Piezas de Cada tipo posee la vivienda que ocupa?</p> <table border="1"> <tr> <td>a. Dormitorio</td> <td></td> </tr> <tr> <td>b. Estar-Comedor (uso exclusivo)</td> <td></td> </tr> <tr> <td>c. Estar-comedor y dormitorio (uso múltiple)</td> <td></td> </tr> <tr> <td>d. Estar-comedor y cocina (uso múltiple)</td> <td></td> </tr> <tr> <td>e. Cocina (uso exclusivo)</td> <td></td> </tr> <tr> <td>f. Baño</td> <td></td> </tr> <tr> <td>g. Otras piezas</td> <td></td> </tr> </table>	a. Dormitorio		b. Estar-Comedor (uso exclusivo)		c. Estar-comedor y dormitorio (uso múltiple)		d. Estar-comedor y cocina (uso múltiple)		e. Cocina (uso exclusivo)		f. Baño		g. Otras piezas		<p>5. Su vivienda tiene agua caliente por medio de:</p> <p>1. Calefón o gas</p> <p>2. Termo eléctrico</p> <p>3. Otro sistema. Especifique</p> <p>4. No tiene</p>	<p>6. La vivienda donde Ud. Vive, ¿dispone de energía eléctrica?</p> <p>1. Sí, de la red pública con medidor propio</p> <p>2. Sí, de la red pública con medidor compartido</p> <p>3. Sí, de la red pública sin medidor</p> <p>4. Sí, de un generador propio o comunitario</p> <p>5. Sí, de otra fuente. Explique.</p> <p>6. No dispone de energía eléctrica</p>
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	<p>4. ¿De donde proviene el agua de su vivienda?</p> <p>1. Red pública con medidor propio</p> <p>2. Red pública con medidor compartido</p> <p>3. Red pública sin medidor</p> <p>4. Pozo o noria</p> <p>5. Río, vertiente o estero</p> <p>6. Otra fuente. Especifique.</p>																
<p>2a. ¿Cuántas viviendas hay en el sitio?</p> <p>(Anoté 0 en el caso de departamento, condominio o propiedad compartida)</p>																	
<p>2b. Su vivienda, ¿es la principal del sitio?</p> <p>1. Si</p> <p>2. No</p>																	

<p>7.a Material predominante en muros exteriores de la vivienda</p> <p>1. Ladrillo o concreto (hormigón) o bloque (de hormigón armado)</p> <p>2. Albañilería de piedra</p> <p>3. Tabique forrado por ambas caras (madera u otro)</p> <p>4. Adobe</p> <p>5. Barro, quinchá o pirca</p> <p>6. Tabique sin forro interior (madera u otro)</p> <p>7. Desecho (cartón, lata, sacos, etc)</p> <p>8. Otro. Especifique</p>	<p>7.b Estado de conservación de los muros</p> <p>1. Bueno</p> <p>2. Aceptable</p> <p>3. Malo</p>	<p>9.a Material predominante en el techo de la vivienda</p> <p>1. Teja, tejuela, losa de hormigón con cielo interior</p> <p>2. Zinc o pizarreño con cielo interior</p> <p>3. Zinc, pizarreño, teja, tejuela o madera sin cielo interior</p> <p>4. Fonolita</p> <p>5. Paja, coirón, totora o cana</p> <p>6. Desecho (plásticos, latas, etc)</p>	<p>9.b Estado de conservación del techo</p> <p>1. Bueno</p> <p>2. Aceptable</p> <p>3. Malo</p>	<p>11. ¿Bajo qué situación ocupa la vivienda?</p> <p>1. Propia pagada</p> <p>2. Propia pagándose</p> <p>3. Propiedad compartida (pagada) con otros hogares de la vivienda</p> <p>4. Propiedad compartida (pagándose) con otros hogares de la vivienda</p> <p>5. Arrendada con contrato</p> <p>6. Arrendada sin contrato</p> <p>7. Cédida por servicios</p> <p>8. Cédida por un familiar u otro</p> <p>9. Usufructo</p> <p>10. Ocupación irregular (de hecho)</p>
<p>8.a Material predominante en el piso de la vivienda</p> <p>1. Radier revestido (parquet, cerámica, tabla, linóleo, flexit, baldosa, alfombra, etc)</p> <p>2. Radier no revestido</p> <p>3. Tabla o parquet sobre soleras o vigas</p> <p>4. Madera, plástico o pastelerías directamente sobre tierra</p> <p>5. Piso de tierra</p>	<p>8.b Estado de conservación del piso</p> <p>1. bueno</p> <p>2. aceptable</p> <p>3. Malo</p>	<p>10. Tipo de vivienda</p> <p>1. Casa o Casa en cite</p> <p>2. Casa en condominio</p> <p>3. Departamento en edificio</p> <p>4. Pieza en casa o departamento</p> <p>5. Pieza en casa antigua o conventillo</p> <p>6. Mediagua o mejora</p> <p>7. Rancho, ruca o choza</p> <p>8. Otro tipo (móvil, carpa, etc)</p> <p>Especifique</p>		<p>12. ¿Cuánto paga de arriendo?, o si Ud. tuviera que pagar arriendo por esta vivienda, cuánto le costaría el arriendo mensual? _____</p> <p>13. ¿Cuántos hogares hay en la vivienda? _____</p> <p>Si existe un solo hogar en la vivienda pasar a la pregunta 17</p>
<p>14. Su hogar, ¿es el principal en la vivienda?</p> <p>1. Si</p> <p>2. No</p>	<p>16. ¿Algún miembro de este hogar es propietario de esta vivienda?</p> <p>1. Jefe de hogar</p> <p>2. Conyuge</p> <p>3. Hijo(a)</p> <p>4. Otro pariente</p> <p>5. Otro no pariente</p> <p>6. Jefe y Conyuge</p> <p>7. Jefe y otro pariente</p> <p>8. No es propietario (pasar a módulo de uso de aguas)</p>			
<p>15. ¿Cuántas piezas de cada tipo ocupa su hogar?</p> <p>a. Dormitorios (uso exclusivo para dormir)</p> <p>b. Estar-Comer (uso exclusivo)</p> <p>c. Estar-comer y dormir (uso múltiple)</p> <p>d. Estar-comer y cocinar (uso múltiple)</p> <p>e. Cocina (uso exclusivo)</p> <p>f. Baño</p> <p>g. Otras piezas no habitables</p>	<p>17. ¿Algún miembro de este hogar es propietario de otra vivienda?</p> <p>1. Si, jefe de hogar</p> <p>2. Si, conyuge</p> <p>3. Si, hijo(a)</p> <p>4. Si, otro pariente</p> <p>5. Si, otro no pariente</p> <p>6. Jefe y conyuge</p> <p>7. Jefe y otro pariente</p> <p>8. No es propietario</p>			

MODULO: USO DE AGUAS

<p>1. ¿Puede indicar cuál de las siguientes fuentes de agua están disponibles para hogares en este vecindario?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Conexión domiciliaria privada</td><td></td></tr> <tr><td>2. Pozo privado en casa</td><td></td></tr> <tr><td>5. Agua de lluvia acumulada en su vivienda</td><td></td></tr> <tr><td>6. Agua de lluvia acumulada dentro del vecindario.</td><td></td></tr> <tr><td>7. Fuente pública</td><td></td></tr> <tr><td>8. Pozo público</td><td></td></tr> <tr><td>9. Pozo privado en el vecindario</td><td></td></tr> <tr><td>10. Río</td><td></td></tr> <tr><td>11. Otro. Especifique</td><td></td></tr> </table>	1. Conexión domiciliaria privada		2. Pozo privado en casa		5. Agua de lluvia acumulada en su vivienda		6. Agua de lluvia acumulada dentro del vecindario.		7. Fuente pública		8. Pozo público		9. Pozo privado en el vecindario		10. Río		11. Otro. Especifique		<p>3. ¿En que año la vivienda obtuvo la conexión privada?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td></td><td></td></tr> </table> <p>4. ¿Cuánto tuvo que pagar por la conexión? (Induya todos los costos de conexión)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td></td><td></td></tr> </table> <p>5. El pago se realizó</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. De una vez</td><td></td></tr> <tr><td>2. Durante varios meses</td><td></td></tr> <tr><td>Indique el número de meses</td><td></td></tr> </table> <p>6. ¿Recibió algún tipo de subsidio para obtener la conexión?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Si (PASE A P7)</td><td></td></tr> <tr><td>2. No (PASE A P8)</td><td></td></tr> </table> <p>7. ¿Por qué recibió un subsidio? (PASE A P9)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Postulé a un subsidio entregado por una institución del gobierno</td><td></td></tr> <tr><td>2. Un empleado público vino a nuestro hogar para ofrecernos el subsidio</td><td></td></tr> <tr><td>3. Miembro del hogar tenía contactos</td><td></td></tr> <tr><td>8. ¿Postuló a subsidios para obtener la conexión? (PASE A P11)</td><td></td></tr> <tr><td>1. Sí, pero no se me otorgó</td><td></td></tr> <tr><td>2. No</td><td></td></tr> </table>					1. De una vez		2. Durante varios meses		Indique el número de meses		1. Si (PASE A P7)		2. No (PASE A P8)		1. Postulé a un subsidio entregado por una institución del gobierno		2. Un empleado público vino a nuestro hogar para ofrecernos el subsidio		3. Miembro del hogar tenía contactos		8. ¿Postuló a subsidios para obtener la conexión? (PASE A P11)		1. Sí, pero no se me otorgó		2. No		<p>9. ¿Quién entregó el subsidio? (En caso de múltiples organizaciones, reporte la entidad que proveyó el mayor monto de subsidio)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Gobierno vecinal</td><td></td></tr> <tr><td>2. Gobierno comunal</td><td></td></tr> <tr><td>3. Gobierno provincial</td><td></td></tr> <tr><td>4. Gobierno nacional</td><td></td></tr> <tr><td>5. Empresa de agua</td><td></td></tr> <tr><td>6. Institución de caridad</td><td></td></tr> <tr><td>7. Comité de agua</td><td></td></tr> <tr><td>8. Otro. Especifique.</td><td></td></tr> </table> <p>10. ¿Cuánto fue el monto del subsidio?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td></td><td></td></tr> </table> <p>11. ¿Quién provee el agua?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Municipalidad</td><td></td></tr> <tr><td>2. Entidad privada</td><td></td></tr> <tr><td>3. Otro. Especifique.</td><td></td></tr> <tr><td>4. No sabe</td><td></td></tr> </table> <p>12. En el pasado año, ¿cuántos problemas mecánicos/técnicos ha tenido su conexión?</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td></td><td></td></tr> </table> <p>13. ¿Está satisfecho con su conexión? (PASE A P18)</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr><td>1. Si</td><td></td></tr> <tr><td>2. No</td><td></td></tr> </table>	1. Gobierno vecinal		2. Gobierno comunal		3. Gobierno provincial		4. Gobierno nacional		5. Empresa de agua		6. Institución de caridad		7. Comité de agua		8. Otro. Especifique.				1. Municipalidad		2. Entidad privada		3. Otro. Especifique.		4. No sabe				1. Si		2. No																																																																																																																					
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19. ¿Algún miembro del hogar vende agua a sus vecinos?	
1. SI (PASE A P20)	
2. NO (PASE A P21)	

20. Para cada una de las fuentes de aguas que su hogar utiliza, y respecto a la venta de agua, indique:				
	F1	F2	F3	F4
a. El cargo se realiza por				
i. Diariamente				
ii. Semanalmente				
iii. Mensualmente				
iv. Anualmente				
vi. Por metro cuadrado				
vii. Por envase de 20 litros				
viii. Por envase de 200 litros				
ix. Otro. Especifique.				
b. ¿Cuánto es el monto que cobra?				

21. Para cada una de las fuentes de agua que su hogar utiliza, indique:				
	F1	F2	F3	F4
a. ¿Trata el agua antes de ser utilizada? i. NO				
ii. Si, con fluor				
iii. Si, con cloro				
iv. Si, con filtro				
v. Si, otro. Especifique.				
b. ¿Utiliza el agua para algún uso productivo?				
1. No [PASE A P21]				
2. Si				
Negocio o Almacén				
Riego de productos agrícolas				
Servicios (lavado de ropa)				
Otro. Especifique.				

MODULO: Sistemas de Eliminación de Excretas

1. La vivienda donde Ud. Vive, dispone de sistema de eliminación de excretas?	
1. Si, con WC conectado a alcantarillado [PASE A P5]	
2. Si, con WC conectado a fosa septica	
3. Si, con letrina sanitaria conectada a pozo negro	
4. Si, con cajón sobre pozo negro	
5. Si, con cajón sobre acequia o canal	
6. Si, con cajón conectado a otro sistema	
7. No dispone de sistema	

2. ¿Ha algún miembro de su hogar intentado contactar a la entidad a cargo del sistema de alcantarillado para conseguir acceso?	
1. Si	
2. No [PASE A P4]	

3. Cuando se llevó a cabo el contacto, ¿experimentó su familia alguno de los siguientes problemas? (PASE A P5)	
1. Mi vecindario no posee servicios de agua privado	
2. Los gastos de conexión eran muy altos	
3. Era necesario pagar un soborno, y no estuvimos dispuesto a hacerlos	
4. Era necesario presentar un título de propiedad de la vivienda y no lo tenemos	
5. No pudimos conseguir permiso del dueño de la vivienda	

4. ¿Por qué ningún miembro de su hogar nunca ha contactado la entidad a cargo del sistema de alcantarillado?	
1. Mi vecindario no posee servicios de agua privado	
2. Los gastos de conexión eran muy altos	
3. Los gastos de mensuales eran muy altos y no podemos cancelarlos	
4. Era necesario pagar un soborno, y no estuvimos dispuesto a hacerlo	
5. Era necesario presentar un título de propiedad de la vivienda y no lo tenemos	
6. No pudimos conseguir permiso del dueño de la vivienda	

5. ¿El sistema de eliminación de excretas está dentro de su vivienda?	
1. Si	
2. No	

6. ¿Qué distancia recorre para llegar? (Reporte metros)	

7. Aparte de los miembros de su hogar, ¿cuántas personas utilizan el sistema?	

8. ¿Debe esperar regularmente para utilizar el sistema?	
1. No	
2. Si	
Cuántos Minutos?	

9. ¿Debe pagar por el uso del sistema?	
1. No	
2. Si	
¿Cuánto paga mensualmente?	

10. ¿Cuánto paga anualmente por el mantenimiento del sistema de excretas en su hogar?	

11. ¿Tiene inconvenientes con su sistema de excretas durante períodos de lluvias e inundaciones?	
1. Si	
2. No	

[illegible]19

MODULO OTROS INGRESOS

A TODAS las personas		
1. El mes pasado ¿recibió ingresos por...?	2. En los últimos 12 meses, ¿recibió ingresos por...?	3. El mes pasado, ¿recibió ingresos por...?
Registre como máximo dos tipos de ingresos		Tipo
1. Arriendo de propiedades urbanas	1. Intereses por depósitos	1. Jubilación
2. Pensión de alimentos	2. Dividendo por acciones	2. Pensión de Invalidez
3. Dinero aportado por familiares ajenos al hogar	3. Donaciones de instituciones o personas ajenas al hogar	3. Pensión de Viudez
4. Remuneración por trabajos ocasionales (no ocupados)	4. Valor del consumo de productos agrícolas producidos o recolectados por el hogar (huertos, gallineros, productos del mar, etc) Especifique	4. Pensión de Orfandad
5. Arriendo de maquinarias, animales o implementos	5. Retiro de Utilidades	5. Otro. Especifique
6. Trabajos realizados antes del mes anterior correspondientes a sueldos, finiquitos, indemnizaciones de trabajadores	6. Arriendo de propiedades agrícolas (tierras e instalaciones)	6. No recibió este tipo de ingresos
7. No recibió estos tipos de ingresos	7. Arriendo de propiedades por temporadas	
	8. Otros ingresos. Especifique	
	9. No recibió este tipo de ingresos	
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MODULO SALUD

Todas Las Personas										
1. ¿Qué miembro de su hogar se sintió enfermo el mes pasado?	2. Sexo	3. ¿Esto fue provocado por diarrea, colera, gusanos o alguna otra enfermedad?	4. ¿Cuáles fueron sus síntomas (marque todas las que apliquen)						5. ¿Qué cree usted causó la enfermedad?	6. ¿Qué edad tiene esta persona?
	1. Hombre 2. Mujer		4.a Dolores estomacales/ abdominales	4.b Defecación frecuente (más de 3 veces al día)	4.c Excremento aguoso	4.d Excremento con sangre	4.e Vómito	4.f Fiebre		
01. Jefe(a)		01. Diarrea							01. Agua no segura	
02. Conyuge		02. Cólera							02. Comida contaminada	
03. Hijo(a)-Hijastro(a)		03. Gusanos	01. Si	01. Si	01. Si	01. Si	01. Si	01. Si	03. Malos hábitos de higiene	
04. Padre o madre		04. Malaria	02. No	02. No	02. No	02. No	02. No	02. No	04. Saneamiento inadecuado	
05. Suegro(a)		05. Dengue							05. Otro	
06. Yerno o nuera		06. Otro								
07. Nieto(a)		99. No sabe								
08. Hermano(a)										
09. Cuñado(a)										
10. Otro Familiar										
11. No Familiar										
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MODULO: Venta y Producción Agrícola

1. ¿Podría decir que su hogar vende su oferta agrícola en? ¿Con qué frecuencia?		2. ¿Podría decir que su hogar vende su oferta agrícola a? Con qué frecuencia?		3. ¿Podría decir que su hogar compra productos alimenticios necesarios a? Con qué frecuencia?		4. ¿Podría decir que su hogar compra productos necesarios durables (ropa, zapatos, electrodomésticos, etc) de? Con qué frecuencia?	
1. En la puerta de su granja	1. Todo el tiempo	1. No Aplica en esta pregunta	1. Todo el tiempo	1. No Aplica en esta pregunta	1. Todo el tiempo	1. No Aplica en esta pregunta	1. Todo el tiempo
2. Tiendas locales	2. Frecuentemente	2. Tiendas locales	2. Frecuentemente	2. Tiendas locales	2. Frecuentemente	2. Tiendas locales	2. Frecuentemente
3. El mercado del pueblo	3. A veces	3. El mercado del pueblo	3. A veces	3. El mercado del pueblo	3. A veces	3. El mercado del pueblo	3. A veces
4. El mercado del pueblo cercano	4. Rara vez	4. El mercado del pueblo cercano	4. Rara vez	4. El mercado del pueblo cercano	4. Rara vez	4. El mercado del pueblo cercano	4. Rara vez
5. El mercado del distrito central	5. Nunca	5. El mercado del distrito central	5. Nunca	5. El mercado del distrito central	5. Nunca	5. El mercado del distrito central	5. Nunca
6. El mercado de la ciudad grande más cercana		6. El mercado de la ciudad grande más cercana		6. El mercado de la ciudad grande más cercana		6. El mercado de la ciudad grande más cercana	

MODULO: USO DE TIERRA (SOLO JEFE DEL HOGAR)

1. ¿Por favor dígame respecto de cada terreno que le pertenece a su vivienda. Por favor indique el nombre o característica del terreno.	2. Es este terreno utilizado en:	3. ¿Cuál es el área del terreno?	4. ¿Tiene propiedad sobre el terreno?	5. ¿Cómo su hogar obtuvo la propiedad del terreno?	6. ¿En qué año obtuvo la propiedad?	7. ¿Cuál es el documento de propiedad que posee?	8. ¿El documento esta a nombre de?
	1. Labores agrícolas 2. Residencia urbana 3. Uso comercial 4. El terreno es de la comunidad 5. Oficina 6. Cantera/Mina	1. En metros cuadrados 2. Hectáreas 3. Acres 4. No sabe	1. Si [PASE 5] 2. No, arriendo [PASE 10] 3. No, ocupamos el terreno legalmente [PASE 13] 4. No, ocupamos el terreno ilegalmente [PASE 13]	1. Heredado 2. Comprado 3. Entregado por las autoridades locales 4. Fue recibido a cambio de otro terreno 5. Entregado por las autoridades nacionales		1. Ninguno 2. Título de Propiedad 3. Título comunitario 4. Otro. Especifique.	1. Jefe de hogar 2. Esposa 3. Otro miembro de hogar 4. Padres del jefe de hogar 5. Padres de esposa 6. Otro pariente 7. El vendedor 8. Otro. Especifique.
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9. ¿En que año recibió el título de propiedad? [PASE A 13]	10. ¿Cuál ha sido la duración del contrato de arriendo?	11. ¿A quién le arrienda el terreno? 1. Pariente 2. Amigo 3. Otro hogar en el vecindario 4. Autoridad local 5. Organización privada 6. Otro. Especifique.	12. ¿Cuál es el arreglo de arriendo que tiene con el dueño del terreno? 1. Pago en especies 2. Pago con producción del predio 2. Pago en dinero [EN CADA CASO INDIQUE MONTO]	13. ¿Tiene algún documento informal que certifique algún tipo de derecho sobre el terreno? 1. Carta del dueño 2. Boleas de pago 3. Otro. Especifique	14. ¿Espera conseguir un documento legal de título? 1. Si 2. No	15. ¿Le gustaría tener un título legal de propiedad? 1. Si [PASE 17] 2. No [PASE 16]	16. ¿Por qué no quiere tener un título de propiedad? 1. El terreno no requiere título para ser utilizado 2. No necesito el título en estos momentos 3. No sabe como conseguir el título 4. Es muy caro 5. Toma mucho tiempo 6. Otro. Especifique
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17. ¿Está dispuesto a pagar por él? 1. Si [PASE 18] 2. No [PASE 19]	18. ¿Cuánto esta dispuesto a pagar por el título?	19. Si el dueño del terreno tuviese que venderlo (con toda su inversión) ¿cuánto cobraría?	20. ¿Ha transferido derechos de propiedad del terreno en los últimos 5 años? 1. Si 2. No	21. ¿Ha arrendado el terreno en los últimos 5 años? 1. Si 2. No	22. ¿Cuánto dinero puede conseguir en un préstamo utilizando el terreno como prenda/colateral?	23. ¿Arrienda Ud. el terreno a alguien? 1. Si [PASE A 24] 2. No [PASE A 27]	24. ¿Cuál ha sido la duración del contrato de arriendo?
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	25. ¿A quién le arrienda el terreno?	26. ¿Cuál es el arreglo de arriendo que tiene con el arrendatario?	27. ¿Está preocupado por una posible disputa de los títulos de propiedad con otra persona?	28. ¿Con quién?	29. ¿Cuál es la razón de su preocupación?	30. ¿Ha tenido disputas/conflictos en el pasado?	31. ¿Con quién?	32. ¿Cuál fue la razón del conflicto/disputa?
	1. Pariente 2. Amigo 3. Otro hogar en el vecindario 4. Autoridad local 5. Organización privada 6. Otro. Especifique.	1. Pago en especies 2. Pago con producción del predio 2. Pago en dinero [REPORTE EL MONTO EN CADA CASO]	1. Si 2. No [PASE A 30]	1. Esposa 2. Niños 3. Otros parientes 4. Arrendatario 5. Dueño del predio 6. Gobierno 7. Vecino 8. Otro. Especifique.	1. Herencia 2. Uso de derechos 3. Compensaciones 4. Desalojo 5. Reubicación 6. Gobierno expropié 7. Problemas con los límites del terreno 8. Problemas con riego 9. Otro. Especifique.	1. Si 2. No [PASE A 41]	1. Esposa 2. Niños 3. Otros parientes 4. Arrendatario 5. Dueño del predio 6. Gobierno 7. Vecino 8. Otro. Especifique.	1. Herencia 2. Uso de derechos 3. Compensaciones 4. Desalojo 5. Reubicación 6. Gobierno expropié 7. Problemas con los límites del terreno 8. Problemas con riego 9. Otro. Especifique.
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	33. ¿Cuándo comenzó el conflicto?	34. ¿Cuándo terminó el conflicto?	35. ¿Dónde acudió inicialmente para un arbitraje?	36. ¿Cuánto dinero gastó durante el arbitraje?	37. ¿Quién resolvió el conflicto?	38. ¿Está satisfecho con la resolución del conflicto?	39. ¿Le gustaría utilizar productivamente mas tierra de la que hoy día posee?	40. ¿Cuál es la razón más importante de porque no lo hace?
	[ESPECIFIQUE AÑO]	[ESPECIFIQUE AÑO]	1. A ninguna parte 2. Vecino 3. Corte local 4. Otro. Especifique.		1.El conflicto aun continua 2. Vecino 3. Corte local 4. Otro. Especifique.	1. Si 2. No	1. Si 2. No [TERMINE]	1. No tengo suficiente mano de obra 2. No tengo capital de trabajo 3. No tengo suficiente capital físico 4. No se me permite 5. No es rentable
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BIBLIOGRAPHY:

- Abernethy, C. L. (2005). *Constructing New Institutions for Sharing Water*. IFPRI, Washington D.C.
- Anderson, T. L. and P. Snyder (1997) *Water Markets* Washington DC, Cato Institute, USA
- Armitage, R.M., W. L. Nieuwoudt, and G.R. Backeberg (1999). Establishing tradable water rights: Case studies of two irrigation districts in South Africa. *Water SA* 25, 301-310.
- Bate, R. (2002). Water – Can Property Rights and Markets replace Conflict? In: *Sustainable Development: Promoting Progress or Perpetuating Poverty?* Profile Books, London U.K.
- Rutgerd Boelens & Paul Hoogendam (eds), 2002. *Water Rights and Empowerment*. Van Gorcum Pubs. Netherlands.
- Benda-Beckmann, F., K. von, and H.L.J. Spiertz (1996). Local law and customary practices in the study of water rights. *Water Rights Workshop*. Kathmandu.
- Bloom, H. S. (2005). Randomizing groups to evaluate place-based programs NY: Russell Sage Foundation, chap. Learning more from social experiments, pp. 115–172.
- Boelens R. (2006). Water use and production in the Central Highlands, Aguascalientes and the Lerma-Chapala watershed. Bank Netherlands Water Partnership Program (BNWPP) and Water Watch. Washington D.C.
- Boelens, R. and R. Bustamante (2005). Formal law and local water control in the Andean region: a field of fierce contestation. International workshop on ‘African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa’, Johannesburg, South Africa.
- Boelens R. and M. Zwarteveen (2002). Gender Dimensions in Water Control in Andean Irrigation. In: “Water Rights and Empowerment” R Boelens and P. Hoogendam. (Eds.) Van Gorcum. Assen.
- Bruns B.R., C. Ringler, and R. Meinzen-Dick (2005). *Water Rights Reform: Lessons for Institutional Design*. IFPRI. Washington D.C.
- Cohen, J. (1988): *Statistical Power Analysis for the Behavioral Science*. Hillsdale, NJ: Lawrence Erlbaum, 2nd edition edn.
- Duflo E., Glennester R. and Kremer M. (2007). *Using Randomization in Development Economics Research: A Toolkit*.
- Easter, K. W., and Y. Liu (2005). Cost Recovery and Water Pricing for Irrigation and Drainage Projects. *Agriculture and Rural Development Discussion Paper 26*. World Bank.
- Galiani, S., P. Gertler and E. Schargrotsky (2005). Water for Life: The Impact of the Privatization of Water Services on Child Mortality. *Journal of Political Economy*, Vol. 113, pp. 83-120, February 2005
- Gleick, P.H. (1999). The Human Right to Water. *Water Policy* (1), 487-503.
- Golden, B., T. Kastens, K. Dhuyvetter, and J. Peterson (2006). “Developing an Economic Tool to Predict the Value of Water Rights.” Research report posted to www.agmanager.info. May, 2006
- Haddad, B. M. (2000). *Rivers of Gold: Designing Markets to Allocate Water in California*, Island Press, Washington, DC.

- Hodgson, S. (2006). Modern water rights: theory and practice. FAO legislative study, 92. Rome: Food and Agriculture Organization of the United Nations
- Holden, P. and M. Thobani (1996). "Tradable Water Rights: A Property Rights Approach to Resolving Water Shortages and Promoting Investment", Policy Research Working Paper No. 1627, World Bank, Washington, DC.
- León, A., M.C. Lemos, and D. Nelson (2008). Water Rights in Brazil and Chile. WP2201. UC Berkeley, USA.
- Meinzen-Dick, R. and L. Nkonya (2005). International workshop on 'African Water Laws: Plural Legislative Frameworks for Rural Water Management in Africa', Johannesburg, South Africa Understanding legal pluralism in water rights: lessons from Africa and Asia.
- Moges, S. (2008). The Economics of Shared Irrigation Water Rights: An Alternative Analytical Framework. Water Resources Engineering Management at UDSM-Dissertation Thesis.
- Moraes, L, J. Cancio, S. Cairncross, and S. Huttly (2003) Impact of Drainage and Sewerage on Diarrhoea in Poor Urban Areas in Salvador, Brazil. Transitions of the Royal Society of Tropical Medicine and Hygiene, v. 97, 153-158.
- Mohanty, N. and S. Gupta (2002). Breaking the Gridlock in Water Reforms through Water Markets: International Experience and Implementation Issues for India. Working Paper Series Julian L. Simon Centre for Policy Research.
- Palem-Vaqueira (2005). Derechos de Agua. Coordinación del No. del Boletín Archivo Histórico del Agua, nueva época, año 10, núm. 29 enero-abril,
- Paul, M. O. (2003). Defining property rights for water marketing. Paper presented at the World Water Congress, International Water Resources Association, Madrid.
- Rosegrant M.W., R.G. Schleyer, and S.N. Yadav (1995). Water policy for efficient agricultural diversification: market-based approaches. Food Policy, Volume 20, Number 3, pp. 203-223(21)
- Sampath, R.K. (1992). "Issues in Irrigation Pricing in Developing Countries", World Development, 20(7): 967-977.
- Tisdale, M.S. (2004). The Price of Thirst: The Trend Towards the Privatization of Water and its Effect on Private Water Rights, 28 Suffolk University Law Review 535.
- Tushar, S. (2006). Agricultural and Rural Development Notes. Issue 6. February, World Bank
- Vaz, Á. C. and A.L. Pereira (2000). The Incomati and Limpopo international river basins: A view from downstream. Water Policy, 2 (1-2), 99-112.
- World Bank (2007). MEXICO Water Public Expenditure Review. Report No. 36942-MX, Washington D.C.
- World Food Programme (2001). Water Tenure, Natural Resource Management and Sustainable Livelihood. Natural Resource Management No. 5. International Land Coalition Resource Centre, Rome, Italy.