

## **Linking Forest Conservation and Water Management in San Juan Olindepeque, Guatemala**

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## **1. Description of Problem**

The municipality of San Juan Olindepeque is located in the Department of Quetzaltenango, in the Western Highlands of Guatemala. 44% of its territory is covered by an oak-pine forest (136.15 km<sup>2</sup>) (INAB, 2015a), which is managed by the municipality's Forest Office. Currently, 1.11 km<sup>2</sup> are under forest incentives granted by the National Institute of Forestry (INAB) through the Forestry Incentives Program (PINFOR), of which 1.0 km<sup>2</sup> is under protection and management mode, and 0.1 Km<sup>2</sup> is under natural regeneration (INAB, 2012c). However, despite efforts made, the municipality has an annual forest net loss of 0.052 km<sup>2</sup>; representing an annual loss of 0.81% (INAB, 2011). The forests in this municipality are at risk for a variety of reasons, being the main one that 57% of the municipalities' citizens, especially those in rural areas, depend on wood as an energy source for cooking and warming their homes. Wood harvesting from natural forests in the area exceeds its production capacity by 10.02 million of m<sup>3</sup> (INAB, 2015b).

Deforestation has impacts not only on energy availability but on water availability and the hydrological cycle. In San Juan Olindepeque, the water supply for human consumption comes mainly from groundwater. There are 25 mechanical wells with coverage of 96% of the population (Municipality of San Juan Olindepeque, 2013). In 2007, an assessment of the water situation in the municipality was conducted which established that the availability of groundwater has decreased significantly from 100 feet in the 70's, to 700 feet in 2004 (SER, 2007).

In rural parts of San Juan Olindepeque, as the population is dispersed, water distribution and collection of money<sup>1</sup> for provision services presents a challenge. Those homes with access to water distribution are connected via conduction tube lines, though many lack water meters. The service is provided only from 05:30 to 16:00, except in places where there are water meters, in which water is available at all times (Letona, 2014).

Historically, most of the population within rural areas can take up to 4 months to pay water bills. This was reflected in the Municipal Financial Diagnostic (Letona, 2014) which found that in 2012, the percentage of income coming from water services across the municipality decreased by 17%. Letona (2014) also describes that the money collected is only invested on operating expenses, distribution, and maintenance of infrastructure; no money is allocated for water services such as sanitation or conservation of the water supply. In addition, the costs of water service provisions are 33% higher than the average income within the municipality, requiring the municipality to subsidize its services (Letona, 2014). In order to improve conditions of the water service, many actions must be taken. However, one of the most important steps is to guarantee water provision and availability from the source. This can be approached by investing in forest conservation and recovery.

## **2. Decisions and Actions Taken**

### **2.1 Developing the San Juan Olindepeque Hydrological CES Mechanism**

Establishing a Compensation, or Payment, for Environmental Services (CES) mechanism has been used as a strategic alternative that allow local people, stakeholders, and government to engage and establish social agreements for the conservation of natural resources (Rosa et al., 2004) In Guatemala, such mechanisms have historically concentrated in forest management

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1 Since citizens must address to the municipality building to pay their water bill

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and conservation since 1997 (known as the Forest Incentive Programs or PINFOR). This case study examines a recent effort to create a CES combining forest management with watershed management for improved hydrological services.

In Guatemala, CES has been well-established as a strategy for conservation of forest ecological services, since it is part of a national Forest Policy supported by economic resources. In 2015, a National Law was published for extending the PINFOR incentives (Decreto 2-2015 “Ley de Fomento al Establecimiento, Recuperación, Restauración, Producción y Protección de Bosques en Guatemala, -Probosques-“) in which Article 19 specifically requires that the National Forest Institute, in collaboration with beneficiaries and other stakeholders, must promote the development and operation of compensation mechanisms aimed for holders of forest projects that generate ecosystem services. Meanwhile, hydrological CES’s in Guatemala are newer and have been based on local agreements, sometimes not including financial returns for the people involved, and are adapted for the local people’s needs and capacities in each particular case.

The development of a hydrological CES in the Guatemalan municipality of San Juan Olinstepeque started in 2012, by an initiative from the National Forest Institute and HELVETAS Swiss Cooperation, working with the support of several institutions such as Kim Tzu Pop, the Municipality of San Juan Olinstepeque, The Nature Conservancy, and REDD/CCAD-Giz Program. Local communities were also involved and funding was from the Climate Nature and Communities consortium and the Fund for Tropical Forests. The activities were conducted under the Probosques program from the HELVETAS Swiss Cooperation, and though the Probosques program has ended, the CES mechanism is intended to be permanent (HELVETAS, 2015).

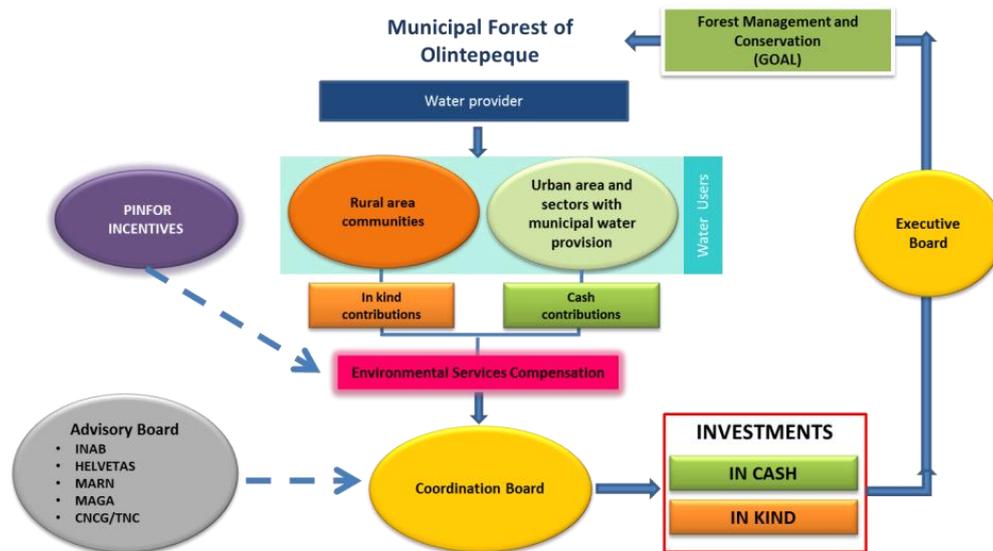
The main goals of the San Juan Olinstepeque hydrological CES were (GIZ, 2014):

- Contribute to the management and conservation of the municipal forest.
- Promote public involvement in the forest management and conservation and the environmental services provided.
- Ensure the permanence and availability of water for the population of the municipality.

The first steps taken were to conduct biological and hydrological surveys to analyze the benefits and services provided by the forest and their impact on the municipality. This information together with the Forest Management Plans (made as part of the PINFOR program) provided strong arguments to convince local communities and the municipalities about the importance of taking action to conserve, manage, and recover the municipal forest (HELVETAS, 2015) . Secondly, the CES mechanism was designed by INAB together with the institutions mentioned previously (Figure 1). It identified the water provider (municipal forest), water users, contributions to be made by the users according to their economical capacity, adding other funding coming from PINFOR incentives, and the organizational structure inside the mechanism.

Once the mechanism was designed, meetings with the Municipality Council were held, in order to present the initiative for their approval. As a result, a Municipal agreement was created to back up the implementation of the hydrological CES; it stated that the Municipal Environment Commission would be in charge of the negotiation process with the local committees and other beneficiaries. With the support and approval from the municipality, meetings with the members of the Communities Water Committees and other beneficiaries were organized to inform people about the CES mechanism.

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**Figure 1** Compensation for Hydrological Environmental Services Mechanism for the Municipality of San Juan Olintepeque  
Source: INAB, 2012b

### 2.2 Raising Local Awareness and Establishing Appropriate Water Users' Contributions

In parallel to the creation of the hydrological CES mechanism, a communication plan was designed in order to sensitize and inform the communities about water, forest conservation and management, and environmental services provided by forests. During these development stages of the hydrological CES, it was difficult to establish local involvement due to lack of perceived credibility of the municipal authorities. In addition, local people held the belief that the money collected for the CES could be embezzled. This problem was overcome by creating a specific category for the fund administration in the municipality treasury and also by involving the Coordination Board which included representatives from the different communities' Water Committees selected by the local people. Water users eventually conceded and made a commitment to contribute to the CES.

Several meetings were held with water users to analyze their contribution possibilities according to their incomes. As a result, two different kind of contributions were identified as appropriate: in-kind contributions (working one day per year in forest conservation activities) for people with less income, and cash contributions for people with more economical availability (generally from the urban area). For the latter category, this would mean an increase of Q. 8.33 (approx. US \$1.09) in a monthly water bill.

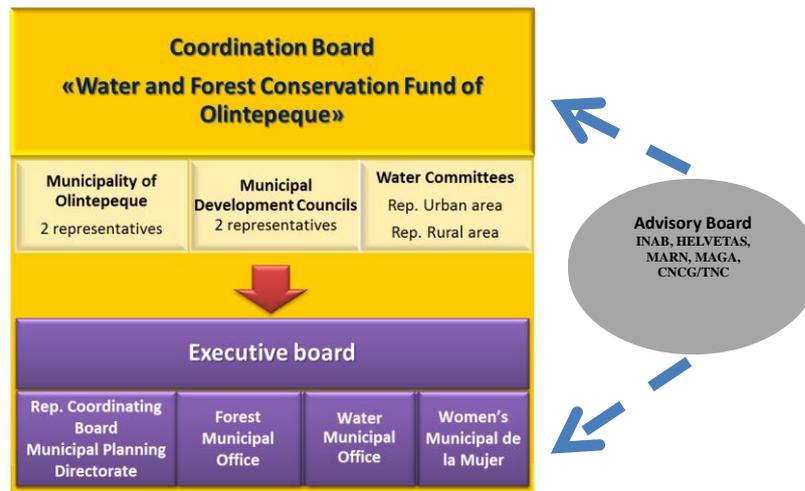
An annual action plan was created to establish monthly activities to be held by beneficiaries giving in-kind contributions. It included conservation and management actions in the forest (such as building and maintaining fire prevention structures, infiltration trenches, and vegetative barriers, and reforestation).

### 2.3 Development of Organizational Structure of the CES

Once the CES mechanism was in place and local people were sensitized to the importance of their involvement, the organizational structure of the CES was developed (Figure 2). It included a Coordination Board, in charge of prioritizing actions needed; the Executive Board, in charge of the implementation of the actions proposed by the Coordination Board; and the Advisory Board, in charge of providing technical advice and support to the implementation process. During this time, regulations for the operation of the CES were also established. A specific category for the fund administration was created in the municipality treasury, to

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ensure that incomes from the CES were consistently directed to conservation of the municipal forests.



**Figure 2** Organizational Structure of the Hydrological CES of San Juan Olintepeque. *Source: INAB, 2012b*

### 2.4 Generation of a Municipal Certification over the Municipal Agreement

In order to ensure that the CES will be implemented in spite of turnover in municipal authorities, a Municipal Agreement was signed by the Mayor of San Juan Olintepeque, his Council, and the local people involved with the implementation of the CES. Also, certificates were extended to local people in order to encourage them to continue contributing with the conservation of the municipal forest.

### 2.5 Launching of the CES

A public event was held in May, 2013, with the presence of all the supporting institutions (HELVETAS, TNC, CNCG), governmental authorities (from the National Forest Institute, National Council of Protected Areas, Ministry of Agriculture, Ministry of Environment and Natural Resources, Water Committees) and local people, to present the initiative, the Municipal Agreement, and to start with the implementation of the CES.

## 3. Outcomes

Though the establishment of the hydrological CES framework took approximately one year (2012-2013), it took 2 more years for implementation and first actions to be taken. In 2015, the first year of implementation, 20,000 tree seedlings were donated by GIZ, to establish 8 hectares of an energetic forest. 1,900 in-kind contributions in reforestation activities and 550 in-kind contributions in nursery activities were made. The municipality also started charging the fee to those citizens falling in the “in-cash” category; by the end of the year, 28% of the people had paid (HELVETAS, 2015).

Other achievements that accompanied the first year of implementation were:

- Construction of 6 rainwater collectors for mini irrigation systems in order to raise the production of potatoes up to one additional harvest per year.
- Boundary delimitation and labeling of 7 municipal forests
- Maintenance of 12 water sources
- 23.39 hectares of municipal forest reforested
- 1 tree nursery modernized with a total production of 30, 200 plants
- 16 workshops to train people from the communities on implementing activities for

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climate change adaptation

- Donations from REDD CCAD-GIZ: support equipment for the Forest Municipal Office and equipment for the people that will be giving in-kind contributions (hoes, pickaxes, machetes, and shovels) (HELVETAS, 2015).

An outcome of the development of the CES was the establishment of baseline data on the hydrological services provided by the municipal forests within San Juan Olintepeque. The initial studies conducted provided scientific evidence supporting the conservation and protection of forests in the municipality; this evidence is integral for validating the CES, proving its worth, ensuring implementation success in the future. It is hoped that as the CES implementation progresses, forest conditions will improve and this will contribute to improved biodiversity and ecosystem service provision.

San Juan Olintepeque Social impacts started with transferring the information generated in initial assessments to local people and authorities; they now have greater awareness of the importance of getting involved in actions that help to conserve the municipal forest. Increased public participation in conservation actions has already been witnessed, such as: construction of soil protection structures in cultivation areas in order to reduce erosion and improve water infiltration; reforestation activities; forest patrolling; fire prevention; etc. An important step was to enable space for the Community Development Councils (COCODE's) participation within the CES mechanism, as this helped communities gain trust in the project. As a result of involving COCODE, local communities now have greater impact on decision-making in regards to municipal forest management.

Also, after signing the CES agreement, the Municipality Department of Protected Areas and Environment (DAPMA) started developing conservation, management, and recovery actions with a forest based approach to improve water recharge in strategic areas. This is just one example of strengthened inter-institutional coordination, which has allowed greater effectiveness in achieving common goals that are promoting the conservation of the forest (HELVETAS, 2015).

### 4. Lessons Learned

- Political will from the municipal authorities is fundamental for the CES to be considered and developed.
- Ensuring community representation within the CES mechanism (such as through the COCODE's, Water Committees, or from other kinds of existing community organization) is important to facilitate inclusive communication with local people and improve the CES outcomes.
- Establishing a political frame such as a Municipal Agreement is a key factor for assuring the continuity and sustainability of the CES.
- Initial baseline studies and research to generate information about the state of the municipal forest and the water availability in the area allows for evidence-based decision making. The results will likely help to convince the authorities and local people of the urgency to take action.
- A CES mechanism is a strategy that allows building links among the people from the community as well as between the community and the authorities; this strengthens collaborative actions and generates participative spaces. It also reinforces a sense of ownership for natural resources and the benefits of taking better care of them.
- Generating a strong negotiation strategy is basic to achieve agreements within the communities, to get them involved, and to be able to establish contributions for the CES.

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- Having a continuous program of communication with environmental facts and success stories, even after the implementation of the CES, is important to achieve local people's permanence inside the CES and help raise awareness.
- Capacity building at all levels is necessary so the Coordination Board can generate support and advocacy from authorities, water beneficiaries, and the local people.
- It may be necessary to strengthen the main actors of the CES mechanism (such as in this case, the Municipal Forest Offices or the Municipal Department of Environment and Protected Areas), as they give technical advice and orient the actions that the participants must carry out in the area.

### 5. Conclusion

This case study has described some features of a successful CES which aims to restore hydrological services through forest management. The municipality of San Juan Olinstepeque was faced with high deforestation rates, a water provision system with poor financial return, and depletion of groundwater - the primary source of freshwater for the population. It was determined that implementing a CES mechanism would be appropriate to improve both forest and water conservation, due to the capacity for provisions from the municipal forests within San Juan Olinstepeque. The mechanism was developed with the involvement of local stakeholders and the government, though both required sensitization of the issues faced and the value of ecosystem services. The CES provides two alternatives for different economic groups in the population to contribute, ensuring to include all members of society. Since the development of the CES mechanism in 2013, there have been several outcomes. The municipality has witnessed greater public participation in forest, soil, and water conservation activities and local involvement in decision-making through COCODE. There has been increased inter-institutional and bilateral cooperation within the municipality to coordinate forest and water management initiatives. The municipality is also now collecting both types of contributions through the mechanism. Further monitoring and evaluation of the CES will likely reveal improvements required to improve groundwater storage and overall forest and water conservation.

Lastly, much of the development of the CES took place with minimal previous experience and, as a consequence, some gaps were left during the planning phase of the CES. For example, an assessment of potential risks in the project implementation was not completed, nor was a contingency plan. Additionally, a monitoring and evaluation plan for the CES mechanism and implementation was not established. Finally, though stakeholders and public-private partnerships were eventually included in CES development, it was not from the beginning of the process; this may impact advanced stages of the CES implementation.

As it is only the second year of implementation since actions started, monitoring and evaluation of the CES mechanism will likely reveal further lessons learned, challenges, and improvements. The National Forest Institute is sharing this experience at a national level to encourage other municipalities to consider implementing their own CES. At the time of writing, there are another 4 CES mechanisms being developed in different parts of Guatemala (F. Visoni, pers. com. September, 2016). This demonstrates that San Juan Olinstepeque's hydrological CES was considered a national success. Importantly, these mechanisms have been adapted to the particular environmental and social conditions of the sites. For example, in some, the municipalities are not involved and rather there are only agreements between forest keepers and water users (F. Visoni, pers. com. September, 2016).

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