

## Bolivia- Tarija

### *Watershed conservation in Sama Biological Reserve-Tarija (PROMETA)*

#### SUMMARY

NGO-led initiative to increase funding for the management of the Sama Biological Reserve, containing the two watersheds that supply water to the city of Tarija. No payments are being made by water users but in 2004 watershed conservation group PROAGUA was established as a discussion forum with representation from private and public users and providers. Several preparatory studies have been conducted which show that there is a connection between land use and water availability and avoided costs and that there is willingness to pay (WTP) downstream; however no scheme of payments has been applied yet due to "the negative political environment for creating a 'new tax' and, on the provider side, unclear property rights would make payments to providers a difficult and contentious process" Robertson and Wunder (2005)

#### MATURITY OF THE INITIATIVE

**No payments are being made by water users**, but there are plans to introduce them. WTP exists but there is no political will to implement. More 'preparing the ground' work has been conducted than in most other ongoing PES schemes. A watershed conservation fund established in 2002, and in 2004 a new private institution, PROAGUA, was set up to protect the water resources that serve the city and surrounding villages.

#### DRIVER

The NGO PROMETA has been promoting this initiative from the start. Funds were established to finance the protection of Sama Biological Reserve and its watersheds: Victoria and Tolomosa. Tarija, a city of 140,000 inhabitants, does not have continuous water supplies, in large part due to irregular water management (<http://ww.ipsnews.org/interna.asp?idnews=26772>)

#### STAKEHOLDERS

##### Supply

Landowners within the Sama Reserve (farmers and ranchers): The reserve status permits human habitation and exploitation of natural resources for subsistence use within the protected area. About 25 communities live inside the reserve, with a total population of 4000 inhabitants.

##### Demand

*Current demand:* international donor, TNC. *Future demand* the city of Tarija: 145,000 domestic water users. 75% of Tarija's drinking water comes from the Victoria River via a cement-covered canal. The Tolomosa River, to the west, provides at least 30% of the irrigation water to farmers in the Central Valley. The San Jacinto Dam on the Tolomosa receives 80% of its water from the Sama Reserve.

##### Intermediary

PROMETA (Foundation for Protection of the Environment of Tarija)

##### Facilitator

*TNC; members of PROAGUA: public institutions:* Council of the Department of Tarija, local government of Tarija and San Lorenzo, National Service of Protected Areas; *private institutions:* Rural Labour Federation of Tarija, Public Services Cooperative of Tarija, Civic Committee of Tarija and PROMETA;

#### MARKET DESIGN

##### Service

*Increased water quantity* (for domestic and irrigation users) and *sedimentation reduction* (at the dam) from avoided forest fires.



## Commodity

Unclear at this stage. Although some of the projects sponsored include reforestation and some best-management practices through fire control.

### Payment mechanism

At the moment the scheme is donor-funded, but PROAGUA has been established and is expected to pool contributions from some of its members in the near future. PROMETA conducts watershed protection activities upstream, in a project-based manner.

### Terms of payment

In-kind. Upstream landowners participate in PROMETA's conservation projects.

### Funds involved

*At present:* watershed conservation fund, financed entirely by external donors; in the future, they expect to set up a trust fund (working only with the interest generated) that will be financed by tax on urban water consumption and external donors. Domestic charges are US\$2.6 per month. Demand for irrigation is high and increasing; Hydroelectric San Jacinto provides 25% of Tarija's electricity supply.

## ANALYSIS OF COSTS AND BENEFITS

### Economic

*Baseline studies.* PROMETA conducted studies quantifying both water-consumers' willingness to pay for watershed protection and the economic losses that would be incurred without protection.

i) a contingent valuation measuring water consumers' willingness to pay (WTP) for watershed protection either in cash (annual average of US\$15 per urban household) or labour (24 work-days, equivalent to US\$75.6 per rural household which is much greater than the urban contribution on a per-capita basis)—rural users currently do not pay for water. Based on this valuation, "the total calculated value of the environmental service provided by Sama to the urban and peri-urban rural consumers is US\$484,134 per year." Robertson and Wunder (2005)

ii) an *avoided cost method analysis* for the Tolomosa dam looks at the costs if the dam reservoir dipped below its functioning capacity due to decreased dry-season flow. Sediment accumulation has not been quantified. A "without" project scenario indicates that water flows will drop 28% in the dry season, resulting in a loss of approximately US\$236,832 in revenue during the dry months. In 2002, the critical water level was not reached and the dam did in fact incur major revenue losses. (Brezo and Crespo, cited in Robertson and Wunder, 2005). Also, the study looked at the effect of reduced dry season water flow on the water cooperative's revenue : "with a 15% decrease in water level in the Victoria watershed, the water cooperative would lose US\$22,283 in annual revenues." (Brezo and Crespo, cited in Robertson and Wunder, 2005)

Based on this valuation the **value of the environmental service** to be protected by the watershed protection fund is **US\$743,249 per annum**. (WTP from urban and peri-urban rural consumers - US\$484,134 per year - and estimated avoided costs from the water cooperative and San Jacinto Hydroelectric - US\$259,115 per year. (Brezo and Crespo, cited in Robertson and Wunder, 2005)

### Environmental

*Current situation.* Annual rainfall of 600mm; activities being sponsored by the fund: fire control, reforestation (a 2-year native species reforestation project in the headwaters of the Victoria river), control of soil erosion and improved agriculture; enclosure and patrolling of protected areas.

To provide a basis for the establishment of the PES system, PROMETA began an environmental education campaign, a reforestation project, and a fire control project. It also conducted a hydrological study (based on existing data entered into predictive hydrological models), which concluded that: "further deforestation (mostly through uncontrolled burning) and land-use degradation of natural grassland and shrublands (from expanding agriculture, ranching and population growth) would have substantially adverse effects on dry-season flow." Robertson and Wunder, 2005 p.54

### Social

Institutional strengthening of Tarija's water cooperative through creation of a water management association - the Association for the Protection of Water Sources of the City of Tarija and Surrounding Communities (PRO-AGUA, in its Spanish acronym) in 2004. This association builds on the existing



water cooperative (responsible for water collection, treatment and distribution), and includes 7 other private and public bodies (PROMETA, regional and municipal authorities of Tarija, the National Protected Areas System and the agriculture labourers union).

### LEGISLATION ISSUES

Land use restrictions within the Reserve are unclear.

### MONITORING

No information available.

### MAIN CONSTRAINTS

Despite the encouraging results of both the hydrological predictions (showing a connection between land use and water availability) and valuation studies (showing WTP and highlighting avoided costs), PROMETA has not yet implemented a scheme of payments to protect the watershed. According to Robertson and Wunder (2005) the reason for this might be the negative political environment for creating a 'new tax' and, on the provider side, unclear property rights would make payments to providers a difficult and contentious process. Instead, PROMETA has been working on a more strategic level by creating PROAGUA, the watershed conservation association.

### MAIN POLICY LESSONS

This project provides important lessons regarding public perceptions and institutional credibility (Robertson and Wunder, 2005). In this case, no political support exists despite detailed background studies showing a connection between changes in land use and their effect on the environmental services and willingness to pay from users. The creation of a discussion forum (PROAGUA) is expected to provide the platform for engaging, and become the driving force towards watershed protection. Its success will depend, ultimately, on its institutional capacity, credibility and strategy.

### OTHER INFORMATION

#### CONTACT

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#### REFERENCES

Robertson, N. and Wunder S. 2005. Fresh Tracks in the Forest Assessing Incipient Payments for Environmental Services Initiatives in Bolivia. Bogor, Indonesia, CIFOR

López, A.B. and Guerrero, R.A. (2004) *La Asociación para la Protección de las Fuentes de Agua de la Ciudad de Tarija y las Comunidades de Aledaños- PRO-AGUA. Protección del Medio Ambiente Tarija-* PROMETA, Tarija, Bolivia.

#### LINKS

Website NGO PROMETA: <http://www.prometa.org/prometa%20spanish/prometa%20spanish.htm>

Website PROAGUA: <http://www.proagua.org/index.php>