



Integrated Water Resources Management (IWRM) successful experiences, San Jeronimo Basin, Baja Verapaz, Guatemala.

Summary

The overexploitation of water tables and the pollution of water resources bordering the San Jeronimo River, together with the advance of the agricultural border and the resulting indiscriminate deforestation, have generated conflicts between bordering communities. These conflicts originated with the deterioration in the quality and amount of water resources. The creation of the San Jeronimo Basin Committee is aimed at contributing to this problem's solution. This Committee is enabling both the recovery of this river basin and the creation of alternative sources of income for its inhabitants through more efficient use of the resource.

The San Jeronimo Basin Committee acts as a negotiating body between all the basin's users. Therefore, this Committee is composed by representatives of its main users representing various functions, including agricultural irrigation, aquaculture, hydroelectric use, human consumption and tourism. Its mission is to achieve integrated management of the sub-basin, as well as to preserve biodiversity to ensure the socioeconomic well-being of the population and of water consumers. The creation of the Committee has allowed for strengthened coordination between all the different key players involved, and the development of joint activities aimed at preserving the river basin and promoting sustainable water use.

Through the incorporation of institutions, users, and river basin protectors in integral water resource management, socioeconomic benefits increase for the local population. The social responsibility of organizations located in a specific area is a key factor in obtaining positive results in water conservation. The negotiating role assumed by the Committee has helped establish coordinating mechanisms between different water resource users, and among its Board of Directors and coordination commissions through the development of joint operations.

Importance of this case for the Integrated Water Resources Management

This case shows that through coordinated efforts between local key players from a communitarian base, an appropriate atmosphere can be created to develop actions framed in an IWRM focus with the support of public and private parties. At the same time, this process also guarantees benefits for all the participants in efforts to protect and preserve a river basin.

Tools used

B1.4 River basin organizations, B1.8 Role of the private sector, B1.9 Civil society institutions and community based organizations, C2.2 River basin plans.

Keywords

Integrated Water Resource Management (IWRM), local coordination, basin organization.

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Problematic

“A paradise to save”¹

Sierra de las Minas is one of the most spectacular mountain ranges of Central America, extending approximately 130 kilometers in length and about 30 kilometers wide.

The region represents an important fresh water source since there are more than 60 rivers that flow down the Sierra feeding the Motagua and Polochic Rivers. With its 242,642 hectares (2,426 km²), the reserve is recognized by the United Nations' Man and Biosphere (MAB) Program, and has been managed by Defensores de la Naturaleza since 1990.

Sierra de las Minas' resources also have great intrinsic value as part of the natural patrimony, but they are also very valuable from a socioeconomic point of view. There are 63 permanent rivers born in the Mountain range, and they play a key economic role, since they supply water for domestic, agro-industrial and hydroelectric use. These rivers are grouped in 52 sub-basins.

In the forests of the Sierra there are more than 100,000 hectares (1,000 km²) of land destined to agro-forestry production and management, which means an enormous economic potential for the region and the country. The reserve lands also produce a great amount and variety of foods and medicinal plants. The landscapes and particular species of the Sierra also offer a great potential for ecotourism-related activities. Finally, the Reserve plays a fundamental role in the prevention of natural disasters and the protection of infrastructure projects such as roads, bridges, irrigating and water supply systems.

One of the most outstanding characteristics of the Biosphere Reserve Sierra de las Minas is its large size. Its extensive territory covers 5 departments and 14 municipalities. This makes inter-institutional coordination one of the basic tasks in Reserve management. Within the Reserve there are 180,000 people living in over 200 communities. Most of the communities belong to the Q'eqchi' ethnic group, although there are also groups of ladinos and Poq'omchi' is.

Generally speaking, the inhabitants of the Sierra depend on agriculture (coffee, cardamom, staple grains and fruit), and some practice agro-forestry and forest management. For those living in and around the Sierra, **water is a critical resource**, which stresses the need to preserve the forests to ensure the availability of water resources. Although the resource is abundant, the risks of contamination due to pesticides, residual waters (mostly domestic), indiscriminate deforestation, and excessive pasturing and forest fires make water conservation initiatives critical. These include efforts in protection, education, reforestation, inter-institutional coordination and others.

The San Jerónimo river basin is a microbasin belonging to the Salamá sub-basin, which belongs to the Salinas basin. The Salinas river forms the Usumacinta river and flows down to the Gulf of Mexico. It is the only river of Biosphere Reserve Sierra de las Minas that belongs to this slope. Although the San Jerónimo basin is located in two municipalities, Salamá and San Jerónimo, this document will only refer to the latter since it is here that the greater extension of the basin is found.

Description of the Municipality and its problems:

The Municipality of San Jerónimo belongs to the Baja Verapaz department. Its extension, as per the Geographic Dictionary of Guatemala is 464 km². It is located 152 km from the Capital city of Guatemala and 10 km from the Department capital, Salamá. It borders to the north and west with

¹ www.defensores.org.gt



Salamá, to the east with the municipality of San Agustín Acasaguastlán and Morazán (“El Progreso” Department) and to the South with Morazán and Salamá. The last census (year 2002) reported a population of 17,469 inhabitants and 4,351 dwellings.

The municipality’s problems are related to the lack of proper waste water and solid waste treatment, which results in the polluting of underground and surface water sources. This pollution is transferred to the neighboring communities and even to the municipality’s population, which suffers due to the increase of gastrointestinal and related diseases mainly afflicting children under five years old.

The pollution, as well as the protection of the river basin relies upon the inhabitants of the municipality, since their actions exacerbate water pollution problems. Nevertheless, through the establishment of the River Basin Committee, there has been an improvement in the processes related to the protection and use of water resources. This Committee actively involves the local government, the Association of Users of Irrigation of San Jerónimo (AURSA) and Defensores de la Naturaleza, the NGO in charge of managing Sierra de las Minas.

Defensores de la Naturaleza, AURSA and the municipality of San Jerónimo all face common problems, which have forced them to coordinate through the Basin Committee, in order to develop joint efforts aimed at the sustainable management of the river basin and especially of Sierra de las Minas.

The Solution: Decisions and actions taken

The need for protecting water resources, identified by the key players in the San Jerónimo basin, allowed for the establishment of the Basin Committee as a coordinating and negotiating agent. This Committee aims to implement joint operations towards the sustainable use of the basin’s water resources. The Committee includes representatives of all main users and their functions, including irrigation, pisciculture, hydroelectricity, tourism, domestic uses and others.

The Committee’s main objectives are: to preserve and to properly use the San Jeronimo basin’s natural resources, to fortify the abilities of its members in the integrated management of the natural resources and to motivate the key players of the river basin to preserve and adequately use its natural resources.

The Basin Committee has been an integrating organization for the diverse sectors and users of San Jeronimo basin. This committee promotes attitudinal changes about water management through the preservation of water sources and ecosystems in the river basin in order to guarantee maintenance and even improvement of water quality and quantity levels.

The preservation actions implemented in the area have been primarily led by three institutions:

Defensores de la Naturaleza: An environmental NGO, whose objective is the assurance of long-term biodiversity, as well as of the goods and services that Sierra de las Minas offers to the inhabitants of the area. This is accomplished through the management of the “Water Fund”, which pursues preservation of a steady water supply by means of the conservation and sustainable management of its river basins. This Fund is sustained by an innovative system of payment for environmental services aimed to protect the hydrographic river basins in the Motagua-Polochic System. Its contribution to resource preservation in the river basin is very valuable, since it promotes consensual and coordinated interventions for the region’s development, such as reforestation and environmental education at Sierra de las Minas. Actions carried on by Defensores include: forest fire control, management of the reserve’s biological monitoring Plan, design and implementation of the Water Fund, and the implementation of monitoring systems on biological



aspects, water resources and forest coverage. These include eco-tourism projects, projects of alternative production (such as organic coffee, cardamom and crafts) and reforestations and conservation through the Program of Forestation Incentives (PINFOR).

Local Government: The government has defined a Water Regulation within local policy, which makes it a pioneer in the local regulation of water resources. This bylaw is called: "Municipal Regulation for Sustainable Water Management of San Jerónimo, Baja Verapaz". It is the result of many years of effort by neighbors and their municipality, combined with the efforts made by the Basin Committee. The following is a description of the main articles of the regulation, as per their importance: Article 1. Objective: To assure the availability of the water resource, in enough amount and quality as to satisfy the needs and achieve rational use by the population of San Jerónimo, taking into account the protection and preservation of the river basin and its recharge area. Article 2. Territorial scope: This regulation is applicable within the entire municipality of San Jerónimo, Baja Verapaz territory. Article 3. Uses of the water hereby regulated: The instrument regulates the following uses of water resource: Urban and rural drinking water, irrigation, industrial and commercial use.

The Association of Users of Irrigation of San Jerónimo (AURSA): It groups 800 users of one of the country's older irrigation systems. These 800 families faced the issues of inadequate water management, pollution, heavy investment for water transportation, need for more efficient irrigation and treatment of their waste waters. This situation motivated those families to organize themselves, to improve processes, to fortify their joint operations and to contribute financially to build infrastructure, and to ease self-management processes, environmental education and process systematization. This work has brought development to their families, their municipality and their river basin. AURSA members contribute annually with \$3,00 for each irrigated "manzana" (around 7,000 square meters), destined to the reforestation of Sierra de las Minas. An example of this mechanism is the current project taking place in coordination with Defensores de la Naturaleza for the reforestation of 30 hectares in the nucleus area of Sierra de las Minas, designated as Biosphere Reserve. AURSA is in charge of looking after the proper management of water resources coming from "Las Astras" dam in the municipality of San Jerónimo, which largely includes the valley of San Jerónimo and Salamá. Water coming from this dam is collected by a branching over the river, which is located about 10 km after the purging point of the hydroelectric plant. After this, water is gravity-driven down to the network of canals that flows for approximately 12 kilometers between the villages of Los Jocotes, El Cacao, Los Limones and big farms within the region. AURSA is in charge of distributing water to each one of those three sectors, so they must have due controls in place in order to assure that users make an efficient use of the resource.

4. Results Analysis

The San Jeronimo Basin Committee, which brings together different water users, developed a joint plan, which generated the following actions and guidelines: a) main diagnosis of the issues and needs of the sub-basin, as a starting point; b) strengthening of the committees capacities; c) preservation and management of water resources; c) preservation and management of forest resources and d) agricultural practices. The important benefits obtained are:

1. Improved coordination, in order to protect and preserve the San Jerónimo basin, as well as similar basins.
2. Participation in training, experiences and exchange events with GWP Guatemala as a platform.
3. Joint awareness campaigns, information and environmental education aimed at reducing pollution of underground and surface waters due to waste waters and solid waste.
4. Contribution from members of the Basin Committee such as AURSA. Through the member's contribution to the Water Fund (managed by Defensores de la Naturaleza) reforestation of the high part of Sierra de las Minas is deemed possible.



5. Production and sale of 2,400 quintals of tilapia each year.
6. Generation of more than 100 jobs, annually.
7. Generation of yearly average revenue of four hundred and sixty-eight thousand dollars (\$468,000.00).

Some institutions that are either members of, or related to the Basin Committee, have strengthened their actions and received additional results, such as:

4.1 AURSA results:

1. Diversification of water resource uses as an alternative for improving the population's quality of life through fish farming. This has resulted in additional income for its members.
2. Adding a tax to the annual fee paid by members for irrigation services. These funds go towards the conservation of the recharge area of the San Jerónimo river basin (Sierra de las Minas).
3. Incorporation to the Union of fishermen and pisciculturists of Guatemala (GREPISGUA).
4. Incorporation as members of the Unions Association of Rural Entrepreneurs (AGER).

4.2 Defensores de la Naturaleza results:

1. Implementation of a communal drip irrigation system, with a coverage of 10 hectares, that will benefit a total of 20 families whose members have volunteered in control and prevention activities, as well as education and awareness programs on proper water use and valuation.
2. Work with the Program for Forest Incentives (PINFOR) in order to protect the nucleus area. This work benefited over 5 communities, as well as private owners, within both the nucleus area and the sustainable use area of Sierra de las Minas.
3. Work with PINFOR in the reforestation and regeneration of damaged private forests.
4. Prevention and control of forest fires: 800 km of blacklines were set up as means for forest fire prevention, as well as 200 ha of controlled clearing and 750 ha of prescribed burning. In addition, three voluntary community brigades were equipped with the objective of handling preventive measures.
5. The timely alert system was fortified by providing maintenance to weather stations. A communication radio system was also implemented for taking care of emergencies.
6. 28 Q'eqchí and Poqomchí communities have developed both their Plan and the indigenous ground rules for river basin management. With the support of the Royal Embassy of the Netherlands, plans and activities were designed with the support of the municipalities and through a system of community development councils.
7. Activities for improving the communities' income are continuously in place, such as the building of four greenhouse irrigation systems, as well as the planting of 12ha of coffee and fruit trees.
8. 5 land administration studies were made, aimed at disaster prevention.
9. Construction of four community drinking water systems was carried out, so that families have fresh and safe water.
10. The Program of Environmental Management continued in place. This program carries out 5 production projects at the Northern part of the Reserve.

4.3 The Water Fund and Defensores de la Naturaleza experience.

The Water Fund (WF) is an innovative financial mechanism that aims to preserve the permanent fresh water supply for the users of the complex Motagua-Polochic by means of conservation and sustainable handling of its river basins. Although the project has grown like a system of payment for environmental services (PES), it comprises different financial services that look to provide sustainability to the operation as well as benefits in the short, medium and long term.



The project's main strategy is to create a new technical and financial initiative for medium and long term water management. By achieving private investment for proper water management in the river basin's highlands, it is possible to preserve the forest, its flora and fauna, to maintain ecological processes and systems and, ultimately, conserve biodiversity. This is especially effective for the nucleus area of Biosphere Reserve Sierra de las Minas, which is under the management of Defensores de la Naturaleza Foundation.

The Water Fund is an independent and financially sustainable mechanism that looks to guarantee flexible and effective ways for sustainable use of water resources. It also intends to aid with the conservation and threat-minimization of biodiversity in the Motagua-Polochic System. Income from the Water Fund will be used to promote the effective management of protected areas, to develop integrated river basin management and to assure better productive practices amongst local users. In addition, it will be used to create an environmental conscience in local groups, to carry on scientific conservation studies and to design and implement local and regional water policies. The final goal of these actions is to contribute with the preservation of the forest, fresh water and coastal resources and ecosystems at the Guatemalan Caribbean drainages, while promoting the socio-economic well-being of local populations.

5. Lessons Learned

By involving institutions, users and river basin protectors in the integral management of water resources, socioeconomic benefits increase for the local population. .

Local organizations improve their image and receive recognition from other institutions by demonstrating proper handling of water resources. AURSA has obtained grants from institutions such as AGER and AGEXPRONT, among others.

Social responsibility by local organizations is a key factor in obtaining positive results in water resource conservation efforts.

The negotiating role assumed by the San Jeronimo Basin Committee has resulted in the establishment of coordinating mechanisms between various water resource users, and within its Board of Directors and coordinating commissions, which has allowed for the development of joint actions.

The implementation of financial and other compensation mechanisms like the payments for environmental services (PSE), results in a higher level of voluntary collaboration from the varied sectors of water users since they obtain direct benefits from the implemented projects to assure the amount and quality of water they need.

6. Limiting factors:

- a. Initial reluctance to pay by those using irrigation.
- b. Limited financial resources, compared with what is needed to conduct reforestation activities.
- c. Authorized and non-authorized tree-felling in the river basin.
- d. Steady advance of the agricultural border.

7. Challenge



Promoting the involvement of other irrigation units (as per AURSA example) within the Federation of Irrigation Units of Guatemala (FENURGUA) in taking care of their own water-supplying river basins.

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